



MINISTERUL CERCETĂRII,  
INOVĂRII ȘI DIGITALIZĂRII

Proceedings of  
The 15<sup>th</sup> Edition of

# **E U R O I N V E N T**

## **EUROPEAN EXHIBITION OF CREATIVITY AND INNOVATION**



Editor: Andrei Victor SANDU

ISSN Print: 2601-4564

Online: 2601-4572

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Romanian Inventors Forum / Forumul Inventatorilor Romani

All the patents and research information are provided  
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Date: 17.April.2023

Ref. No.: 2023-111

Subject: EUROINVENT 2023 - Message

**Dear Inventors and Innovators**

Inventions and Innovations is a critical driver of success in today's rapidly changing world. The inventors and researchers that are able to innovate and adapt to new challenges and opportunities are well positioned to thrive in the global marketplace. Inventions are a vital force in today's ever-changing world, driving progress, growth, and economic development.

On behalf of the International Federation of Inventors Association (IFIA), I would like to take this opportunity and extend our congratulation to the organization committee of the European Exhibition of Creativity and Innovation "EUROINVENT" for successfully organizing this great event over the last 14 years.

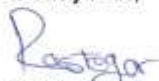
IFIA invites all members, inventors, innovators, and researchers to participate to the **15<sup>th</sup> International Invention and Innovation Show "EUROINVENT 2023"**, which will be held in **May 11<sup>th</sup> to 13<sup>th</sup> at the Palace of Culture, Iasi, Romania**.

On the eve of the 55<sup>th</sup> anniversary of the IFIA, the International Federation of Inventors' Associations whose aim has been to promote the culture of invention and innovation for more than half-century highly supports the creation of an international platform where the world inventors get together, exchange innovative knowledge, and display the fruits of their mind.

**EUROINVENT 2023** offers interested parties a convenient way to find new innovative ideas and products and promotes creativity and innovation in the international context.

I hope all participants will enjoy this great event.

Sincerely Yours,



**Alireza Rastegar**  
IFIA President



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## Letter of Recommendation

2023/4/17

On behalf of World Invention Intellectual Property Associations (WIIPA), I would like to advance my appreciation to Romanian Inventors Forum for the great deal of effort they have devoted to organizing a big event such as the 2023 European Exhibition of Creativity and Innovation in Romania which continue to thrive in the culture of innovation for eighth consecutive years.

Romanian Inventors Forum is truly one of the biggest to be held in Romania. Their dedication to bring inventors and entrepreneurs together while facilitating innovation in marketing, licensing and manufacturing of products is truly remarkable. WIIPA supports this event as well as WIIPA's honorable member Romanian Inventors Forum, and urges all of the inventors as well as invention association, entrepreneurs, industry representative and manufactures to take the best advantage of this milestone in the trade show and play a significant role in the success that such event will bring about.

Sincerely Yours,

**Manli Hsieh**

*President*

World Invention Intellectual Property Associations (WIIPA)



World Invention Intellectual Property Associations

[www.wiipa.org.tw](http://www.wiipa.org.tw)



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The Green Environment Award	Pro Scientia et Innovatio
The Medicine Award	Special Prizes
Advances in Biology Award	Gold Medal
The International Delegation Award	Silver Medal
The Best Design Award	Bronze Meda
The Exquisite Award	Excellence in Innovation

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<b>1</b>	<b>Environment - Pollution Control</b>
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<b>3</b>	<b>Agriculture and Food Industry</b>
<b>4</b>	<b>Medicine – Health Care – Cosmetics</b>
<b>5</b>	<b>Industrial and laboratory equipments</b>
<b>6</b>	<b>Mechanical Engineering – Metallurgy</b>
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<b>10</b>	<b>Information Technology and Communication</b>
<b>11</b>	<b>Printing and advertising</b>
<b>12</b>	<b>Safety, protection and rescue of people</b>
<b>13</b>	<b>Sports, Games and Leisure</b>
<b>14</b>	<b>Other</b>
<b>X</b>	<b>Innovative Research</b>

## **P R E A M B L E**

The Inventions' exhibitions and shows, national or international ones, represent one of the exogenous determining factors, with multiple effects on the creative process. The system is one of the most encouraging, an interactive manner to disseminate inventions, a competitive background generating innovative ideas, while as an evaluative scientometric system, allow attracting the potential applicants or inventions' owners. It is the best medium for negotiating, conveying or transferring inventions, the place where the complete new results are exhibited.

The past 30 years experience, a time in which many Romanian inventors took their new releases in international exhibitions and were rewarded with numerous medals, orders, distinctions and diplomas, situated each time Romania, in unofficial statistics, on the first places. The honours list of the Romanian inventions create a paradoxal result of the two very close fields, the technological or applied research and on the other hand the fundamental or scientifically research. If the scientific output, represented by papers published in ISI Thomson acknowledged journals, situate Romania dragging behind the second league, in compensation, the patented awarded inventions turn it in one of first countries. So much more we should focus especially on the organizing of this kind of shows which offer real opportunities to many inventors to see their dreams come true by putting their results into a competitive-interactive system of evaluation.

Interdisciplinarity of inventics as a science is approached today in a connected, integrated way (education-research-production), with both educative and research functions, carrying great attractivity for the young generation and increasing standards both for inventors and for their products. In this respect, it is necessary to pay a special attention to the inventics schools, as they have, beside the role to form characters, professions, as well as vocations and talents, the mission to stimulate the technical creativity. We should underline the fact that after 1990 we noticed a slight lowering of the Iași inventics school contribution in its aim to form young inventors. Meetings and workshops in the inventions exhibitions should put light on and find

solutions to turn the inventics schools in institutions and to improving and harmonizing the laws regarding the intellectual propriety and the industrial one.

Another serious, upsetting and alarming aspect which I want to put light on is the fact that about 60 to 70% of the Romanian specialists with international output accepted to work abroad, where they are appreciated and stimulated according to their value. We should as well attract them and offer the opportunity to reevaluate them selves at home and participate to such representative competitions.

A peculiar notice is the fact that many Romanian inventors of success, internationally acknowledged, are invited in organizing committees, in international juries and are active members or founders of associations or professional clubs. The Romanian delegations created a tradition in the international exhibitions, to organize a Romanian event, the so-called “The Romanian Inventors Day”, where they present in a festive atmosphere their inventions, their contributions and offer diplomas and small gifts to the hosts and the other participants.

This edition of EUROINVENT sent invitations to inventors associations from many countries. A big number of institutions and individual inventors are participating from Romania, a remarkable fact being to have here many young inventors (from schools or universities) as well as older inventors. Considering the pandemic time and the geopolitical situation, this show is exhibiting more than 700 inventions and research projects from over 30 countries.

With pleasure and gratitude, acknowledgements to all the persons, institutions and organizations who participate to EUROINVENT, to the partners, Romanian Inventors Forum, EUROPE-DIRECT Iasi, “Gheorghe Asachi” Technical University of Iași and “Alexandru Ioan Cuza” University of Iasi and all the partners for all their support and efforts to organize the events.

Prof. Ion SANDU – Honorary President of Romanian Inventors Forum

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Romanian Inventors Forum



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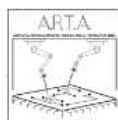
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## INTERNATIONAL PARTNERS



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## WIIPA Family

### World Invention Intellectual Property Associations

#### Introduction

In 2010, it was founded by Mr. Hsieh Hsin-Ming. At the moment, 50 member countries and partners have joined the "WIIPA Family" with the goal of promoting invention, innovation and intellectual property rights around the globe.

#### Founder

Since 1993, Mr. Hsieh Hsin-Ming has formed "TIIPA" Successfully, opened up a way for Taiwan's products to be in line with international standards and also laid the foundation for the establishment of WIIPA.

#### History

In 2000, Mr. Hsieh Hsin-Ming felt that the main axis of TIIPA is limited to Taiwan. With a vision to gain access in the international stage, he dedicated his time and effort to gather transnational forces to put his vision at work.

Fueled with a vibrant ideology, he continued to open doors of opportunities for young and talented inventors to a global level and thrived on gaining international attention for the establishment of WIIPA as a multinational organization.

#### Our Goal

WIIPA upholds the spirit of globalization and extends its vision across the globe. With technology, using network interface allows a fluid communication pattern for a more innovative exchange of ideas and information among stakeholders.

#### Members

WIIPA member states span across continents. The member countries in the "WIIPA Family" currently has 50 member states and partners.

WIIPA put great emphasis on "common concept" and "substantial participation". WIIPA members have certain privileges other associations aspire for. One of them is taking part in WIIPA meetings, conferences as well as exchange activities from time to time to have a full understanding and mastery of the development and complexity of international inventions.





World Invention Intellectual Property Associations

# WIIPA Family Create Your Minds Explore Your Life



[www.wiipa.org.tw](http://www.wiipa.org.tw)



## Oficiul de Stat pentru Invenții și Mărci

Str. Ion Ghica Nr.5 Sector 3, București

office@osim.ro; www.osim.ro

Telefon centrală – 021.306.08.00 / Relații cu publicul – 037.282.59.85

Oficiul de Stat pentru Invenții și Mărci (OSIM), autoritate unică pe teritoriul României în acordarea protecției proprietății industriale, are ca principală misiune susținerea inovării, competitivității și profitabilității ca factori de creștere economică.

OSIM furnizează servicii de specialitate de calitate prin acordarea drepturilor de proprietate industrială, promovează proprietatea industrială prin toate mijloacele și asigură cooperarea României în relațiile internaționale, în conformitate cu tratatele, convențiile și acordurile în domeniu, la care țara noastră este parte.

### Atribuțiile OSIM :

- înregistrează și examinează cererile din domeniul proprietății industriale, eliberând titluri de protecție care conferă titularilor drepturi exclusive pe teritoriul României;
- este depozitarul registrelor naționale ale cererilor depuse și ale registrelor naționale ale titlurilor de protecție acordate pentru invenții, mărci, indicații geografice, desene și modele, topografii de produse semiconductoare, modele de utilitate și certificate suplimentare de protecție;
- editează și publică Buletinul Oficial al Proprietății Industriale al României;
- editează și publică fasciculele brevetelor de invenție;

- administrează și conservă Colecția națională de proprietate industrială, întreține și dezvoltă baza de date informatizată în domeniul său de activitate, inclusiv prin schimburi internaționale;
- efectuează, la cerere, servicii de specialitate în domeniul proprietății industriale;
- publică on-line, pe site-ul oficial al instituției, la cerere, în mod gratuit și fără acordarea de drepturi de autor, articole destinate promovării domeniului proprietății industriale;
- atestă consilierii în domeniul proprietății industriale și ține evidența acestora în registrul național al cărui depozitar este;
- acordă, la cerere, consultanță de specialitate în domeniul proprietății industriale și organizează cursuri de instruire, seminarii și simpozioane în domeniu;
- asigură armonizarea cadrului legislativ național cu reglementările internaționale și europene în domeniul protecției proprietății industriale;
- inițiază, negociază și participă, în condițiile legii, la încheierea de convenții, acorduri, protocoale și alte înțelegeri interne și internaționale în domeniul protecției proprietății industriale;
- participă și implementează prin specialiștii Oficiului de Stat pentru Invenții și Mărci proiecte europene și regionale în domeniul proprietății industriale, finanțate parțial sau integral de către organisme cu care oficiul dezvoltă relații de cooperare;
- îndeplinește orice alte atribuții în domeniul proprietății industriale, care decurg din dispozițiile legale în vigoare și din acordurile internaționale la care România este parte.



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**The State Agency on Intellectual Property of the Republic of Moldova** (AGEPI) is an administrative central authority subordinated to the Government, responsible for promoting and implementing activities in the field of legal protection of intellectual property.

Through AGEPI you can effectively protect your intellectual property (IP) in the territory of the Republic of Moldova:

- Inventions, plant varieties, topographies of integrated circuits, product and service trademarks, industrial designs, geographical indication, appellations of origin, traditional specialties guaranteed;
- Literary, artistic, scientific works, computer programs and other objects of copyright and related rights.

AGEPI issues titles of protection for IP objects, provides information and legal advice about protection and enforcement of IP rights, publishes the Official Bulletin of Intellectual Property (BOPI), promotes and propagates intellectual property, organizes the attestation of patent attorneys, conducts trainings and professional development courses, provides IP pre-diagnosis and other related services.

Since 2015, it is possible to validate European patents in the Republic of Moldova through the European Patent Office (EPO). The single procedure for issuing European patents provides for simpler and more cost-effective protection of inventions in the EPO Member States but also in extension and validation states, including in the Republic of Moldova.

AGEPI services are provided according to the Quality Management System ISO 9001:2015, which ensures a quality according to international standards.

**Agencia de Stat pentru Proprietatea Intelectuala a Republicii Moldova** (AGEPI) este o autoritate administrativă centrală din subordinea Guvernului, responsabilă de promovarea și realizarea activităților în domeniul protecției juridice a proprietății intelectuale.

Prin intermediul AGEPI vă puteți proteja eficient proprietatea intelectuală (PI) pe teritoriul Republicii Moldova:

- Invenții, soiuri de plante, topografii ale circuitelor integrate, mărci de produse și de servicii, desene și modele industriale, indicații geografice, denumiri de origine, specialități tradiționale garantate;
- Opere literare, artistice, științifice, programe pentru calculator, alte obiecte ale dreptului de autor și drepturilor conexe.

AGEPI eliberează titluri de protecție a obiectelor de PI, oferă informații și consultații juridice ce țin de protecția și realizarea drepturilor de PI, editează Buletinul Oficial de Proprietate Intelectuală (BOPI), promovează și popularizează proprietatea intelectuală, organizează atestarea mandatarilor autorizați, cursuri de instruire și perfecționare a specialiștilor în domeniu, acordă servicii de prediagnoză a PI și alte servicii aferente.

Din 2015 este posibilă validarea brevetelor europene pe teritoriul Republicii Moldova prin intermediul Oficiului European de Brevete (OEB). Procedura unică de eliberare a brevetelor europene asigură obținerea printr-o modalitate mai simplă și cu mai puține costuri a protecției invențiilor în statele membre ale OEB, dar și în statele de extindere și validare, inclusiv în Republica Moldova.

Serviciile AGEPI sunt prestate conform Sistemului de Management al Calității ISO 9001:2015, ceea ce garantează calitate în conformitate cu standardele internaționale.



## 2003 – 2023 20 years of creativity

**Romanian Inventors Forum (FIR)** is a professional association which aims to support, stimulate the development and valorization of scientific and technical creative activities, and cultural - artistic, but also copyright problems of its members, diversification of research and technological development, design, scientific investigation, micro-production etc.

Research and development institution **certified** by the National Authority for Scientific Research (ANCS), according to HG. 551/2007, Decision ANCS no. 9708/29.07.2009.

FIR was established in 2003 by a group of university professors, elite inventors and researchers from the University Center in Iasi.

**FIR is official delegate for more than 20 international invention shows**

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Universiti Malaysia Perlis (UniMAP) is Malaysia's 17<sup>th</sup> public institution of higher learning. It was approved by the Malaysian Cabinet on May 2001. Originally known as Kolej Universiti Kejuruteraan Utara Malaysia (KUKUM), or Northern Malaysia University College of Engineering, it was renamed as Universiti Malaysia Perlis (UniMAP) in February 2007. The first intake consisted of 116 engineering students who started classes on June 2002. Currently, UniMAP has approximately 15,000 students and a workforce of more than 1,900 academic and non-academic staff members. It offers 21 undergraduate programs that lead to Bachelor in Engineering, one undergraduate programs that leads to an Engineering Technology degree and two undergraduate programs that lead to a Bachelor in Business. We also offer six Diploma in Engineering programs and 13 postgraduate programs that lead to the Master of Science in Engineering and PhD degrees.



Center of Excellence Geopolymer & Green Technology (CEGeoGTech) lead by Vice Chancellor Universiti Malaysia Perlis (UniMAP), Professor. Dr. Kamarudin Hussin. CEGeoGTech located at the School of Materials Engineering, Kompleks Pusat Pengajian Jejawi 2, Taman Muhibbah, 02600 Arau, Perlis. CEGeoGTech has been established on July 2011 with the intention to induce innovation in green material technology among researchers in Universiti Malaysia Perlis. CEGeoGTech are able combining their expertise and skills in various fields to support the academic structure in the generation of human capital that contributes to the development of high quality research. This center also can become a pillar of academic activities, especially regarding research, development and innovation. CEGeoGTech have 8 fields of research includes:

- ☐ Geopolymer
- ☐ Polymer Recycling
- ☐ Electronic Materials
- ☐ Ceramic
- ☐ Electrochemistry Materials & Metallurgy
- ☐ Environmental
- ☐ Manufacturing and Design
- ☐ Green ICT

## PARTNER EVENTS





## PARTNER EVENTS







The aim of this project is the **valorisation of high-volume mineral residues from mining** and different industrial residues (such as coal combustion by-products (CCP) and demolition waste (DW)) for the development of (i) **new geopolymers** with low **CO<sub>2</sub> footprint**, and (ii) **advanced refractories**, suitable for **3-D printing** applications.

This will be done through the development of two innovative processing techniques that will be able to make the **mine tailings** and the **industrial wastes** suitable for replacing the concrete based on Ordinary Portland Cement (OPC), **reducing** the requirements of primary **raw materials**, the waste generation and landfilling. It will be ensured that the developed materials (the geopolymers and the refractories) match the technical and environmental criteria for its use in steel industry or civil engineering applications and develop appropriate business models to secure profitability and sustainability.

Accordingly, the **overall objective** of the project is to use wastes from **five different European countries** (Romania, Bulgaria, Portugal, Turkey and Spain) for the obtaining of **new green materials**, considering the advantages introduced by **3D printing** method. Therefore, it is expected to obtain **technological progress** in the manufacture of geopolymers and refractories which use mine tailings and industrial wastes (CCP and/or DW) as raw materials, due to the presence of a SME as end-user. Moreover, knowing that the synthesis of the materials with similar characteristics (Ordinary Portland cement-based materials) involves consumption of virgin raw materials (kaolin, limestone, sand, gravel, clays) or high temperatures for curing or calcination, the project aims the improvement of currently developed materials by obtaining **ambient cured geopolymers** with **100% recycled raw materials** and **self-flowing refractories** (high-temperature ceramics) with low or ultra-low cement content that are suitable for 3D-printing.





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Angola, Argentina, Australia, Bulgaria, Belgium, Cambodia,  
Canada, China, Croatia, India, Indonesia, Iran, Iraq, Japan,  
Korea, Lebanon, Macau, Macedonia, Malaysia, Moldova,  
New Zealand, Philippines, Poland, Portugal, Saudi Arabia,  
Sudan, Taiwan, Thailand, Turkey, Ukraine, United Kingdom,  
United States of America, Vietnam

## Angola

### AR.1

**Title**

**Permanent air cleaner in schools and Office**

**Authors**

Ricardo Augusto Antunes Figueiredo

**Institution**

-

**Patent**

Pending

Air cleaning device for classrooms or offices, is a device that is installed in the windows of classrooms or offices, where half is inside the respective room and the other half is outside.

It is permanently on as soon as someone enters the room and remains on until thirty minutes after the last person leaves the room.

**Description EN**

It uses an automatic system to draw air from inside the room to incinerate the air with a heating of 110 degrees Celsius, taking the air out of the room and burning any virus that is contained in the air.

Note that the path from the air inlet to the air outlet has a three-meter path made up of several gates and transoms that delay the air outlet by five seconds.

**Class no.**

9. Chemical and Textile Industry



## Argentina

**AR.1**
**Title**

**Organic amendments for soils containing humic-substances and humic-like products derived from animal slaughter, organic agro-industrial residues and household waste**

**Authors**

Víctor Bautista Díaz

**Institution**

-

**Patent**

Pending

**Description EN**

Chemical transformation of by-products derived from animal slaughter, organic agro-industrial residues and household waste (organic garbage) for the preparation of organic amendments for soils containing humic acids and humic-like substances. This chemical conversion is operated according to the following steps: • Hydrolysis and oxidation in diluted nitric acid solution. • Separation of the liquid phase: preparation of organic fertilizers. • Heating of the solid product obtained through dilute potassium hydroxide (preferred concentration: 1M). • Further reaction with hydrogen peroxide. • Colloidal grinding of the end-product of the reaction. • Optionally, the method also makes it possible to obtain organic fertilizers applicable by foliar or soil administration.

**Class no.**

9. Chemical and Textile Industry

## Australia

### AU.1

**Title**
**Synergistic Dual-Modes Sustainable Interchange**
**Authors**

INV. VALIANT YUK YUEN LEUNG

**Institution**
**Synergistic Traffic Limited**
**Patent**

CN202210744386.1 &amp; HK32022055769.0

**Description EN**

This application relates to a freeway interchange capable of coordinating two-phase traffic circulation and is reserved for future sustainable development. This interchange is mainly formed by two freeways themselves and or intersected with another staggered road, in which traffic lights managed intersection with pedestrian crossings are available. Under the two-phase cycle, the plane intersection connects the freeway to and from or enter and exit the freeways from the staggered road; while the two continuous forward flows split and cross over the intersected road/freeway outside the core intersection region and meet again at the other end. The entry and exit connecting passages and the ring passages with remedy mechanism are arranged in between the forward and backward flows of the freeway, making the intersection far more compact and concentrated, shortening the intersected distance and the time required for entry and exit. Integrated with the prior patent Synergistic Traffic Intersection, these sorts of freeway interchange can be cooperated with two-phase circulation. It saves one red phase waiting time and is 50% more efficiency compare with 3-phase cycle design - Single Point Urban Interchange.

**Class no.**

8. Aviation, Car Industry and Transportation

## Bulgaria

<b>BG.1</b>	
<b>Title</b>	<b>Using Mine Tailing And Coal Fly Ash From Bulgaria As Raw Materials In Geopolymer's Production</b>
<b>Authors</b>	Temenuzhka RADOYKOVA, Darya ILIEVA, Lyudmila ANGELOVA, Andriana SURLEVA
<b>Patent</b>	-
<b>Institution</b>	<b>University of Chemical Technology and Metallurgy, Sofia, Bulgaria</b>
<b>Description EN</b>	<p>The use of waste materials from manufacturing processes or by-products as raw materials solves important ecological problems. Since these wastes are stored in landfills, they can be easily spread by wind and hence contaminate water or soil by the elements which they contain.</p> <p>The aim of this article is to evaluate potential application of mine tailings and fly ash from Bulgaria as a raw material for the preparation of geopolymers.</p> <p>An open aqua regia digestion method of mine tailings and fly ashes followed by ICP-OES measurement was validated and used for determination of As, Cd, Cr, Cu, Pb, Ni, Zn, etc.</p> <p>The aqua regia digestion is not total digestion technique but is powerful method for digestion of all environmentally available elements with exception of that bounded in silicate structures, which are considered non-mobile in the environmental conditions. This method could be applied not only for fast assessment of the toxicity of mine tailings and the geopolymers on its base, but also for evaluation of the degree of encapsulation of hazardous materials.</p>

## Belgium

*By Technofest Institute of Technology (TITU)*

### BE.1

#### Title

**Tiam Infertility Pack and Removal of Cysts and Fibroids**

#### Authors

Dr. Hamideh Atefipour

#### Institution

**Technofest institute of technology (TITU.) Belgium**

Elimination of infertility in women and men, Removal of Cysts and Fibroids, Removal of uterine and pelvic infections, Eliminate ovarian laziness and strong sperm production.

It is made of several products.

1. Mariana oil: It is made from a plant that is extracted from 7 types of oil and contains female hormones. This product is astringent and disinfectant.

2. Arugula: menstruation: It destroys all the cysts in the uterus, ovaries and breasts. It withdraws ovals into fragments and generates them into whole delegation, and it generates estrogen and testosterone and eggs.

3. Makapower: It is made of 33 plants that increases the number of y-type sperms, male fertility, sperm mobility, relieve coldness, strengthen the forward sperm jerk and increase sexual power.

#### Description EN

4. Love story herbal capsule: strengthening the main organs of the body and strengthening the stomach, uterus and kidneys, a strong sexual stimulant for women and a cure for sexual coldness.

5. Hematopoietic capsule: anti-bleeding, removing general weakness of the body, strong digester, sexual enhancer, removing cold feet, effective in infertility.

The mentioned package has a very low cost compared to common surgeries. This pack is suitable for single and married women and can easily remove cysts and fibroids. This pack is able to remove ovarian laziness and increase ovarian reserve. With its formula and medicinal compounds, it has the best results in treating premature menopause and removing all kinds of infections and removing genital warts.

**BE.2****Title****Cigarettes Vaccine****Authors**

Prof.Dr.Azim Akbarzadeh khyavi, Dr.Roya Hemmatpour

**Institution**

Technofest institute of Technology (TITU) Belgium

**Description EN**

After several years of round-the-clock efforts and many repetitions (sacrificing our youth because it was the first research to produce the cigarette vaccine gene in the world), by God's grace, the cheapest, rainproof, most stable, healthiest, with  $98 \pm 1$  potency and creating immunity in various laboratory animals, the cigarette vaccine gene succeeded Offer to humanity in accordance with(FDAI)( the protocol of the Food and Drug Administration of Iran).According to the research conducted, the smoking vaccine has no risk, mutagenicity, carcinogenicity, or malformation. Also, its efficacy and potency were checked and it has  $98 \pm 1$  efficacy and potency.

**BE.3****Title****Disease diagnosis device through iris image processing and artificial intelligence****Authors**

Dr. Behzad Jaybashi, Dr.Roya Hemmatour, Prof.Dr. Mehrdad Fojlaley

**Institution****Technofest Institute of Technology (TITU) Belgium****Description EN**

The iris-K500 iriscopes equipment allows us to easily create sharp images of eyes and iris because of the strong magnification, we can see barely visible details.in naturopathy, the iriscopes equipment is often used for iris diagnosis.iridologist assess the health status of patients on the basis of colors characteristics in the iris of the eye.

The contoured hood on the microscope camera ensures that the camera can be closed to the eye.

Because of the built in LED lighting two milky color LEDs, we can easily create good images without the

need of an external light source.

The milky color LEDs are used to provide better images of dark irises. the practitioner can watch the iris image on at the screen of a computer or laptop with windows

#### BE.4

##### Title

**Polymer floor covering and wall covering using waste of stone industry**

##### Authors

Morteza Toorani, Vahid Cheraghi, Seyedahmad Azimi, Seyed Sajjad Mousavi Haghdost, Dr.Mehdi Farzpourmachiani

##### Institution Patent

**Technofest Institute of Technology (TITU) Belgium**  
Iran Patent App.No. 140150140003008912

##### Description EN

Covering surfaces with a continuous polymer chain together with aggregate particles recycled from stone mines to reduce the waste of these industries, as well as making various types of coatings resistant to acidic and alkaline environments with a compressive strength of more than 32 Mpa with excellent and beautiful coating of the interior and exterior spaces of the building, parking, hospitals, office spaces, companies, environments with high humidity and ... with anti-bacterial and anti-uv properties.

## Cambodia

*Norton University*

<b>KH.1.</b>	
<b>Title</b>	<b>SMART HYDROPONIC SYSTEM</b>
<b>Authors</b>	Chan Mithona, Hach Phanong, Srun Muoykieng, Oeun Thea, Poly Pheary
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	Hydroponics is the practice of growing plants using only water, nutrients, and a growing medium. The idea behind hydroponics is to remove as many barriers as possible between a plant's roots and the water, oxygen and nutrients it needs to grow (and thrive). Some of the hydroponics is a small garden for homemade and the owner control by manually. Hence, our team designed a project called Smart Hydroponic System to provide the ability to easily grow and sustain the plants and it will be working as automatically.
<b>KH.2.</b>	
<b>Title</b>	<b>AUTO PLASTIC BOTTLE BANK</b>
<b>Authors</b>	Chan Mithona, Poly Pheary, Leang Sengthai, Ratha Sophanith, Poly Pheanin
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	The plastic bottle is very useful in everyday life and make life so much easier, but the environmental impact they produce is unsustainable. The large number of plastic bottles we send to landfills and oceans has become a burden on the environment. Plastic bottle has affected the environment such as climate change, ocean pollution, Greenhouse gas emissions, drain blockage, human health etc. Hence, our team created a project called Auto Plastic Bottle Bank that is easy for controlling and change cashback while the user inserts the plastic bottle into our system.

<b>KH.3.</b>	
<b>Title</b>	SMART PAYMENT SYSTEM FOR HIGHWAYS IN CAMBODIA
<b>Authors</b>	Chan Mithona, Sambath Vibol, Yet Chanseyha, Poly Pheary
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>Cambodia is progressing on many infrastructures including highway roads, buildings, technology, and industrial or modern medical equipment. Due to Cambodia being in an upgrading period, the highway road is charged to Cambodian people when they cross the road. The price for charging is depending on the type of car and the charging system will be used by the traditional system by using people in the control center for controlling and managing on the gate. Hence, we would like to create a project called Smart Payment System for Highway in Cambodia without the need people for controlling on the gate.</p>
<b>KH.4.</b>	
<b>Title</b>	NU STUDENT PROFILE
<b>Authors</b>	Luy Mithona, Keo Lakhena, Huy Mouyheng, Map Leangheng
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>We are hoping to open more doors for Norton University students and alumni via “<b>NU Student Profile</b>”. This website allows students to showcase their dedicated work, assignment, achievement, and fruit of labor during their journey in the built-in CV feature. Through the 2nd feature “Post Announcement” NU could post relatively new jobs and opportunities to ensure their students are up-to-date with the company that is interested in hiring our students. Moreover, offering students to become “service providers” allows them to increase their chances of exposing their skills and service to employers.</p>
<b>KH.5.</b>	
<b>Title</b>	NU STUDENT MANAGEMENT
<b>Authors</b>	Luy Mithona, Chao Seavthinh, Ly Mengngoun
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>For this project, we create it for our school to manage all of the students and it's convenient to check Students' information such as ID, Result, Department, and Examination. And another way their parents and check their attendance is by login into their</p>



accounts and finding the information.

---

<b>KH.6.</b>	
<b>Title</b>	NU PAL HELP PAL
<b>Authors</b>	Ung Yean, Luy Mithona, Long David, Chheng Hak Chhorvorn
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>Pals Help Pals mobile application is a potential app that connects mentors and individuals around the world so they can learn from one another with our amazing features. Users can become tutors to teach in their own classes, or be one of the students to learn their desired subjects. Pals Help Pals provides real-time</p> <p>In-App Chat that helps students and tutors interact more easily. Additionally, we encourage and help our users to learn more conveniently by creating a function for each user to share their cultures, resources, e-books, as well as university/school events or workshops around the world.</p>

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<b>KH.7.</b>	
<b>Title</b>	E-COMMERCE SYSTEM: MULTI-VENDORS ONLINE
<b>Authors</b>	Sek Socheat, Oeun Panha, Hang Senghong, Sem Dararoth Panha, Tru Pouyy
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>E-commerce System: Multi-Vendors Online is a modern web application which is built using new technologies. It is mainly focused on e-commerce and online shopping. On the other hand, it allows users to browse so many types of products they want to purchase over the internet. For example, like physical products, services, digital products, electronics, hardware, baby products, beauty products and a lot more. Through this e-commerce website, users can process orders, accept online payments, ship and so on. Moreover, we also provide users to be vendors. This means that they can be the owner of their shops and post about the products they want to sell to their consumers as well.</p>

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<b>KH.8.</b>	
<b>Title</b>	THE SMART CONTAINER CLASS OF COCONUT SCHOOL
<b>Authors</b>	Cheav Seavkin, Ran Narin, Lun Sochetra, So Sokuntheary, Chuop Sopheak

<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	Conclusion of this project, our team has thought of ways to alleviate these problems in Sala Dong to continue, as well as to stop the problems that occur, we have the idea to use the container cabinet to transform into a classroom. Modern chairs, chandeliers, as well as LEDs and other modern materials based on the use of solar panels.

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<b>KH.9.</b>	
<b>Title</b>	KHMER TEMPLE INFO WITH QR CODE SYSTEM
<b>Authors</b>	Chhoun Virak, Lim Thiden, Mao Sothea, So Sokuntheary, Chuop Sopheak
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>Cambodia located in Southeast Asia, is well-known as the Kingdom of Wonder. The country has been blessed with the environment that provides natural resources such as forests with ancient history, beautiful waterfalls, sunny islands as well as exotic plants and wildlife. In addition, this nation has uncountable spots with rich ancient history including local Khmer villages, and areas with more than 6000 temples with unique designs that should be more widely spread just as Angkor Wat is represented to the world.</p> <p>We as Cambodian, are inspired by the spirit of our ancestors. That is why we came up with an idea which delivers affective ways for world tourists to visit more mysterious temples that has not been given enough attention. We developed a QR code system which enables mobile phone users to view the technical details of Khmer temples.</p>

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<b>KH.10.</b>	
<b>Title</b>	ELECTRONIC LIBRARY ASSOCIATION
<b>Authors</b>	Mao Sothea, Lim Thiden, Chhoun Virak, So Sokuntheary, Chuop Sopheak
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	<p>Preah VIHEAR Province is located in the north of Cambodia, 294 km from Phnom Penh. A province where is huge of nature resources such as rainforests, waterfall, wildlife, ancient temple, many wonderful places for long journey and especially It's also a new experience for tourist to visit of ethnic minorities communities. However, there are</p>

untold places that our citizen and global tourist couldn't discover yet, according to no any specific detail and destination. This is why we came up with the idea of establishing a local E-library (electronic library) association for students to study more comfortably and as an opportunity for tourists to discover new experiences of the local way of life.

<b>KH.11.</b>	
<b>Title</b>	PUBLIC ELECTRIC BIKE PARKING
<b>Authors</b>	Chhoun Virak, Lim Thiden, Mao Sothea
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	Due to the increasing of many tourists come to Phnom Penh, so our team had an ideal to create Public electric motor station for our people and foreigner that come to Phnom Penh can be use. To be part of part facilitating for their travel, and they are part of helping promote Cambodia tourism sector to grow.
<b>KH.12.</b>	
<b>Title</b>	NU STUDENT SMART ATTENDANCE
<b>Authors</b>	Vong Chakravuth, Ly Sunleng, Ly Chandavin
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	NU smart attendance is an automated attendance system that displays data and records student attendance at specific hours. The system will display LEDs that will be installed in the classroom through face scanning using Face ID
<b>KH.13.</b>	
<b>Title</b>	NU SMART ID CARD ACCESIBLE SYSTEM FOR PARKING
<b>Authors</b>	Ly Chandavin, Ly Sunleng, Vong Chakravuth
<b>Institution</b>	<i>Norton University</i>
<b>Patent</b>	-
<b>Description</b>	NU student smart ID card accessible system for parking is a innovative project which is converting the use of a recent normal student's ID card use to be a full potential ID card use for parking accessible and show the information of student's vehicle beyond student personal information. This project is proposing to use for Norton University parking.

## Canada

by

*Toronto International Society of Innovation & Advanced Skills (TISIAS)*

### CA.1.

**Title** **HotRock Griddle**

**Authors** Glen Hammond

**Institution** **Hotrock Innovations Inc.**

**Patent no.** N/A

### Description

A versatile accessory to create an oven from your barbeque. The multifunctional grill enhancer that allows you to cook juicier and healthier foods safely on your barbeque or campfire. The HotRock Griddle is made of high-quality cooking grade metals with a unique composition of matter on the inside. This creates a more balanced distribution of heat. Hamburgers are juicier and more evenly cooked. The tray is designed to capture all drippings making it easier to clean up and a longer-lasting barbeque. The HotRock griddle can also be used for any food normally cooked in an oven, only with better results. It is the perfect accessory for cooking outdoors.

### 3. Agriculture and Food Industry

### CA.2.

**Title** **Home Paste Production Machine & Water Cycle Energy**

**Authors** Jawad Fayaz

### Description

The machine reduces the pressure by creating a vacuum and increases the production speed of the paste and requires less energy and time. This device is a boiler in which a vacuum pump is connected. The pump increases the speed and quality of paste production by creating a vacuum. It is a power plant that uses the water cycle (steam and liquid). to reduce electricity generation costs. In this system, the water cycle is used to generate electricity. It starts with heating and converting steam water to high pressure. Like all conventional thermal power plants, steam enters the turbine with pressure and generates electricity. This project starts from here. The steam with 300 temperature that comes out of the turbine enters a tunnel and rises to a height of 500 or 1000 meters and turns into cooled water. The water that flows down the rotating water turbines and generates electricity.

### 2. Energy and Sustainable Development

## China

**CN.1.**

<b>Title</b>	Human Compass
<b>Authors</b>	<i>LIN RUOHAN</i>
<b>Institution</b>	<i>Jiangsu Road No.5 Primary school</i>
<b>Patent</b>	

**Description**

The reason why the compass can guide is because the north-south magnetic field lines are evenly distributed on the earth's surface. If there is a magnet with two magnetic poles placed horizontally and can rotate flexibly, because it has a horizontally distributed magnetic field and magnetic field lines, it is consistent with the magnetic field lines of the earth's magnetic field. They will interact to generate torque on the magnet, causing it to rotate until it faces the direction of the magnetic field lines of the earth's magnetic field, thus achieving the effect that the compass will guide.

Because the strength of the earth's magnetic field is very weak, the torsion to the compass is very small, so the general compass is not only required to be able to rotate flexibly, but also requires the mass of the magnetic needle to be small, so there is no compass that can carry people with a magnetic needle at present.

## Croatia

Represented by  
CROATIAN INVENTORS NETWORK

## HR.1.

## Title

SmartArt

## Authors

TOMISLAV BRONZIN

## Institution

CITUS d.o.o.

## Patent no.

Patent application

## Description

SmartArt is an innovative digital platform that enables museums to independently create additional multimedia content that enriches the user experience of museum visitors. It uses elements of artificial intelligence (AI) that include computer vision to quickly identify each artwork without applying any markers.

The application enables the creation of content on the museum's collection, where all multimedia content that will be assigned to a particular exhibit is defined and enables the creation of exhibitions, catalogues, etc. according to needs. It supports multimedia records (sound, video, image, animation, 3D objects, link, text) and associated formats.

Consists of two parts: WEB application - background solution intended for content creators in the museum. It contains components for cataloging exhibits, organizing digital content, linking digital content with individual exhibits, and creating and managing exhibitions. The most important component is the multimedia editor that edits the museum collection, digital content, and defines the exhibitions, and connects all the necessary elements into one logical and functional whole.; MOBILE application - intended for museum visitors. It is easily adapted to the currently available exhibitions and contents, and every museum visitor can very simply and easily install it on their mobile device (smartphone or tablet)

Due to its concept and built-in technological solutions, SmartArt meets the real needs of the museum, both in terms of technology and business.

The key elements of innovation are the application of artificial intelligence (AI) in art recognition and a flexible platform that enables the management of a large number of exhibitions.

10. Information Technology and Communication

**HR.2.****Title****GASIFICATION OF WASTE SLUDGE****Authors**

VJEKOSLAV MAJETIC

**Institution****DOK-ING d.o.o.****Patent no.**

Patent application

**Description**

The way in which the unprocessed waste is deposited on the depargalist without prior treatment has become unacceptable, ecological and economical.

The newer approach to the treatment of waste in a completely ecological and economically acceptable way is the use of gasification technology

Gasification plant. The device is intended for safe and economic processing of all types of waste materials and electrical energy production.

Characteristics: Fully automatic and 24 hours continuous production adopting advanced technology can produce good quality fuel oil; Fully automatic, no need labor, high-temperature and enclosed discharging, which is environmental-friendly, clean and dust-free; Unique anti-sticking devices, which can achieve continuous production of special materials; Large capacity with 20-50 tons per day; during production, there is no need for fuel because the non-condensable gas produced gasification can support the whole process of production; Raw material input– Sludge from biological waste water treatment; Waste treatment unit-Reactor. The gasification process is completely closed, unfolding without the presence of oxygen.

Environmental-friendly and pollution-free (general hazardous waste processing standards), with national patent smoke scrubbers which can remove acid gas and dust from smoke,

Products are: synthetic gas (main fuels: methane, hydrogen and carbon monoxide); solid residue (consisting of non-combustible materials (eg minerals) and small amounts of carbon)

No unpleasant odors are released during operation.

Part of the generated electricity is used in the process, and the rest is delivered to the electric power system.

Investment in an individual facility is returned within less than 2 years.

**Class**

1. Environment – Pollution Control

**HR.3.**

<b>Title</b>	<b>AUTOMATED BEVERAGE MIXING SYSTEM</b>
<b>Authors</b>	Author: BORNA HESKY, Menthor: ZELJKO SITUM
<b>Institution</b>	<b>University of Zagreb Faculty of Mechanical Engineering and Naval Architecture</b>
<b>Patent no.</b>	Patent application
<b>Description</b>	<p>An automated beverage mixing system is a small device that uses a control algorithm to obtain a combination of beverages in a defined ratio. By automating the fluid mixing process, it is possible to eliminate the possibility of human error while achieving high accuracy of the desired fluid ratio. The device has two containers from which liquids are taken. On the LCD screen, the user selects the standard volume of the glass and the ratio in which he wants the mixture. By starting the process, the mass of the glass in which the fluids are mixed is first subtracted and the pumps are started which deliver the required volume of fluid from the tank, in order to achieve the desired ratio of the beverage mixture. An Arduino microcontroller with an LCD screen is used as a control device.</p> <p>The special feature of the device is its low manufacturing cost, it is easily portable and does not use capsules, as is the case with similar devices. The device also has an option for cleaning pumps and lines with a suitable solvent.</p>
<b>Class</b>	14. Other

**HR.4.**

<b>Title</b>	<b>REMOTE CONTROLLED UNDERWATER VEHICLE</b>
<b>Authors</b>	Author: PAVAO KASTELAN, Menthor: ZELJKO SITUM
<b>Institution</b>	<b>University of Zagreb Faculty of Mechanical Engineering and Naval Architecture</b>
<b>Patent no.</b>	Patent application
<b>Description</b>	<p>Remotely controlled and autonomous underwater vehicles make it easier to explore or work underwater. In order to create a prototype of an underwater vehicle, it is necessary to solve numerous engineering problems. The created prototype serves as a base for a research vehicle that, with the sonar upgrade, would scan the sea floor or record things of interest with a camera. An Arduino Uno was used as the control device, and the structural parts are made of polycarbonate</p>



and PLA polymer. Communication takes place via a 2.4Ghz signal with a buoy on the surface, which is connected by a cable to the submarine through which information is shared. The drive of the vehicle is an electric motor, and it is powered by a battery, like the rest of the submarine. Ballast tanks are used for depth management, while the pressure sensor provides feedback on the depth at which the vehicle is located. The design was performed in the Solidworks program, which has the possibility of 3D modeling and calculations in the Fluid Simulation and Solidworks simulation packages.

14. Other

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**HR.5.**
**Title**

**A SOURCE OF ELECTRICITY BASED ON THE MOVEMENT OF THE LIMBS**

**Authors**

ZELJKO KNEZIC, DUBRAVKO ROGALE, ROBERT MATASIC

**Institution**

**University of Zagreb Faculty of Textile Technology**

**Patent no.**

Patent application

**Description**

The source of electricity is placed on clothing near the limbs (arms or legs). It consists of a freely moving cylindrical permanent magnet and an induction coil made of thin varnish-insulated wire profiled into a suitable coil.

The movement of the limb causes the movement of the permanent magnet inside the cylindrical cavity around which the coil is located, where a voltage appears that can be used to power devices on clothing or the body (wrist watches, different types of sensors, charging batteries, lamps, or mobile phones, etc.).

**Class**

9. Chemical and Textile Industry

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**HR.6.**
**Title**

**GRAPE AND ROSE PETALS FLAVOURED KOMOVICA BRANDY**

**Authors**

KRESIMIR CICKOVIC

**Institution**

**OPG Kresimir Cickovic**

**Patent no.**

Patent application

**Description**

The product is an excellent combination of fine domestic komovica brandy (grape-based or some other strong natural brandy), carefully hand-selected berries of freshly picked domestic table grapes, as well as carefully selected quality

petals of fragrant roses from a local plantation, picked with the first rays of the morning sun.

The effort and time invested, along with the ideal ratio of quality grapes, brandy and rose flower essence, ultimately result in an eye-catching, delicious dessert drink with an intense aroma of the flower of all flowers. You have it right in front of you, enjoy!

It is interesting to point out that special emphasis has recently been placed on a prominent group of compounds known as polyphenols, which are abundant in grape skin and seeds, and which have been found to have a significant positive effect on human health, especially when it comes to the cardiovascular system. Since the above-described process of obtaining grape and rose petals flavoured komovica brandy implies a certain period of time for the grapes to stand in a jar together with the brandy, apart from the fact that during this time the brandy itself acquires aromas and malt, at the same time the berries from their skins and seeds enrich the drink with polyphenols, giving the drink a beautiful natural color.

**Class** 3. Agriculture and Food Industry

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## HR.7.

### Title

**DESIGN AND PRODUCTION OF A MILLIREACTOR SYSTEM WITH A pH-SENSITIVE COATING**

### Authors

MARIJAN-PERE MARKOVIC, IVAN KARLO CINGESAR, PETAR KASSAL, DOMAGOJ VRSALJKO

### Institution

**University of Zagreb Faculty of Chemical Engineering and Technology**

### Patent no.

Patent application

### Description

The innovation is the development of a millireactor system with a pH-responsive sensor coating on the surface of the channel. The use of the sol-gel method with specific precursors and a pH indicator to produce a sensor layer and stereolithography (SLA), a 3D printing technology to produce the millireactors, are both innovative approaches. The main goal is to obtain a functional pH sensor film that can react in real time (on-line) in the millireactor channels. The innovation lies in the development of a highly sensitive and reliable pH sensor film that can detect pH changes within a short period of time. The use of 3D printing technology to fabricate the millireactors also demonstrates an

innovative approach to the design and fabrication of microfluidic devices. This innovation has significant implications for various applications such as drug discovery, chemical synthesis, and biological analysis, where precise control of pH is critical to the success of experiments. It also facilitates the development of flow systems that can be used in Industry 4.0.

**Class** 9. Chemical and Textile Industry

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**HR.8.**
**Title**

**TACTILE PENDANTS FOR VISUALLY IMPAIRED AND BLIND PEOPLE**

**Authors**

MARKO MARICEVIC

**Institution**

**University of Zagreb Faculty of Graphic Arts**

Patent application

**Description**

Tactile pendants consist of braille and typographic elements. The innovation's distinctiveness lies in the personalization of the pendant to the user's needs and the ability to be produced using various additive manufacturing technologies. Additive manufacturing technologies allow for the production of personalized products without increasing the production time and cost.

Advantages:

An easy possibility of creating with a 3D printer. Selection of environmentally friendly thermoplastics that are wear-resistant. Possibility of individualization and personalization without increasing the cost and time of production. On-demand manufacturing.

Purpose:

Improving communication with visually impaired and blind individuals

**Class** 11. Printing and advertising

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**HR.9.**
**Title**

**COLOR AND DYE TWINS FOR THE VISUAL AND INFRARED SPECTRUM**

**Authors**

DENIS JURECIC, MAJA MATAS, IVANA ZILJAK STANIMIROVIC, DIJANA BRATIC

**Institution**

**University of Zagreb Faculty of Graphic Arts**

**Patent no.**

Patent application

**Description**

Security printing is performed on textiles, for which dual printing technology has been developed, which includes the

visual and infrared spectrum. New dyes are proposed that form groups of color twins, which have equal tones for visual observation. These dyes absorb infrared light differently. The merging of two images is subordinated to the technology of dyeing with digital print and for the execution of unique solutions in the dyeing of textiles and silk.

The advantage of clothing and uniforms dyed with dual color twins is individualization with a hidden code and hidden image information. The detection of the two states of the colored textile is performed with a dual ZRGB camera which distinguishes the infrared graphics from the graphics for the visual light spectrum. The dual digital ZRGB recording is performed in parallel both day and night.

Security design is introduced into the textile industry, Such solution is unrepeatable. The duality, visual and infrared, cannot be scanned or copied. Each piece of clothing is unique. In this respect, the innovation is intended to establish the authenticity of the wearer of the garment, of the seller or manufacturer. It is intended for different types of uniform, equal for visual observation but different for the spectrum which the naked eye can't see. The same individualization represents a new direction of creativity in the fashion field.

11. Printing and advertising

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## HR.10.

### Title

**WASTEWATER TREATMENT PLANT FOR  
TREATING TECHNOLOGICAL WASTEWATER**

### Authors

ZVONIMIR LUKADINOVIC

### Institution

**BP Group d.o.o.**

### Patent no.

Patent application

### Description

Wastewater treatment plant for treating technological wastewater, integrated in container. The container is insulated, ventilated, air-conditioned and intended for delivery in medium temperature climate. Raw wastewater is pumped from inlet pump shaft to mechanical pre-treatment, i.e. rottary drum. Mechanically treated wastewater from rottary drum goes on further treatment. Mechanically treated wastewater through flow-meter enters physico-chemical treatment – tubular flocculator where required chemicals are dosed using three dosing pumps. After dosing and mixing, wastewater enters Dissolved Air Flotation (DAF) unit where

treated wastewater is separated from sludge. Treated wastewater drains to clean water tank, while sludge drains to sludge tank using blades. In order to successfully perform physico-chemical treatment, preparation of aqueous solution of polyelectrolyte is required. Preparation of 0,1% polyelectrolyte solution takes place in a three-chamber device from concentrated liquid polyelectrolyte. After physico-chemical treatment, treated wastewater comes to the final filtration through a sand filter from which it returns to the production process. The entire wastewater treatment plant is controlled via electrical-control cabinet which contains a touch screen through which all the parameters of the plant can be controlled and monitored. The device is equipped with SMS alarm notification and remote control. Innovations in water technology are vital to finding solutions to the challenges we face today: climate change, ageing infrastructure, urbanization, resource shortages, the economic and financial crisis, new emerging substances, the need for sustainable development and demographic changes. Our experienced Research and Development technologists are continuously working on the development of game-changing solutions for purifying (waste) water and recovering valuable resources.

## India

### IN.1.

**Title** **Physitech IoT Trainer with Smart Dashboard**  
**Authors** Mr Raman Teja Venigalla, Mr Aashay Reddy  
**Institution** **Physitech Consultancy Services Pvt Ltd**  
**Patent no.** NA

### Description EN

This innovation is compatible with multiple sensors, has built-in support for PCS Smart IoT dashboard along with a customizable development board. It also includes a plug and play mechanism tailor made for easy learning. The PCS Smart IoT Trainer can work with both cloud based and local deployment of app.

Class no. Electronics, Automation and IoT

## Indonesia

Represented by

*Indonesian Invention And Innovation Promotion Association (INNOPA)*

**ID.1.**

**Title**

**Automatic Mining Sprayer Drone (AMSPONE):  
Environmental-Friendly Drone Technology to Reduce  
Dust Pollution and Work Accidents on Mining Roads**

**Authors**

Radisya Ikhsan, Renaldi Manurung, Naomi Jesika Sitompul,  
M. Fathurrachman S, Mochamad Nafis Akmalussyifa,  
Muhammad Nadhif Athalla, Matius Romoranda Sitopu

**Institution**

**Institut Teknologi Sumatera**

**Patent no.**

-

**Description  
EN**

The Automatic Mining Sprayer Drone (AMSPONE) is an unmanned aircraft that can fly and is used to water haul roads in mining to reduce dust pollution and work accidents. AMSPONE is equipped with several sensors, such as dust, ultrasonic, water level, and temperature sensors. AMSPONE has the ability to forecast the weather and can send notifications to the operator through the AMSPONE Monitoring application to avoid the need to use the drone or return it to the station as soon as possible. AMSPONE will be designed with a fairly large size with a length of 1,028.01 cm, a width of 1,019.17 cm, and a height of 328.17 cm with eight propellers or propellers equipped with a spraying device connected to a 2,400-liter water tank. The design of the AMSPONE prototype considers aspects of environmental friendliness. This can be proven by designing a solar panel-based charging station, so that in its implementation later, AMSPONE does not produce carbon emissions from the use of electricity from non-renewable energy which has implications for climate change.

**Class no.**

1. Environment – Pollution Control

<b>ID.2.</b>	
<b>Title</b>	<b>SIHY PLAF</b> <b>(Soap With Water Hyacinth plant Formula)</b>
<b>Authors</b>	<i>Kurnia Putri Gita Ikromi, Ruly Nur Fadhillah, Elis Fatmawati, Bagas Adi Rency Saputra</i>
<b>Institution</b>	<b>Islamic Lamongan Univercity</b>
<b>Patent no.</b>	-
<b>Description</b>	<p>Water hyacinth is a plant that grows quickly and spreads easily through waterways. Therefore, it is often considered a weed that can damage the aquatic environment. Its presence in waterways can block sunlight and reduce oxygen in the water. In addition, water hyacinth can also cause an increase in water volume and block the flow of rivers, which can eventually lead to flooding. Although various attempts have been made to eradicate this plant, success has always been limited due to its rapid growth. Therefore, with its abundant population and less than optimal control, water lyacinth needs to be utilized. One of its benefits is its high fiber content, which can help minimize flooding. Water hyacinth fiber extract contains 60% cellulose. 8% hemicellulose, and 17, lignin. With the right innovation, the use of water hyacinth can reduce water pollution. prevent flooding. and become a more hygienic and economical economic commodity.</p>



**ID.3.****Title**

**LIWS: Lightning Ionization Water System A Solution of Water Crisis to Increase the World's Clean Water Supply**

**Authors**

Egi Bachtiar, Wahyu Nur Rohman, Anwar Abdur Rosyid, Bimo Aditama Prabowo, Diva Nurafriani Shafa, Ria Rohayati, Annisa Tiara Qurrota A'yun.

**Institution**

Universitas Jenderal Soedirman

**Patent no.**

-

**Description**

The model of LIWS works on an island with installed plant machinery, electrical desalination, and ionizer poles area. The area built by ionizer poles on an island would generate ions. Then, the negative ions will be carried airborne and bind the water vapor. Water vapor with negative ions increases the number of thunderclouds. The clouds of lightning gathered on account of the ionizers system would have great energy lightning. Lightning editors will pick up a lightning strike.

The captured lightning channelled to the generating machine, then converted into electrical energy. Treated lightning energy then channelled to electrically powered seawater distillation machines. Electric distillation machines turn seawater into clean water, which is then produced and distributed over the island.

## Iran

By ANIA Association

### IR.1.

#### Title

A gadget to correct and improve hand movement in blind patients

#### Authors

Faezeh Amirpour, Zahra Nejatifar, Reza Azarkhosh, Tayebah Shahraki, Iman Kouchaki, Milad Alasvand

#### Institution

TOUSAN

#### Patent

1401500030089526

According to the latest statistics from the International Agency for Blindness, 43 million people worldwide live with blindness and 295 million with moderate to severe visual impairment. Most people with visual impairment and blindness are over 50 years old. However, vision loss can affect people of any age. As a result, according to the stated statistics, the necessity of this plan will be quite clear.

Here we are going to introduce a gadget that in addition to being used by blind people, we can also use it by people with disabilities. This gadget is located on the patient's hand by using the neural network, and by having motion and neural sensors, it helps the patient to be able to move and ability in his hand organs in the long run, and to some extent move the hand. In such a way that without using a gadget, a person can move his hands and fingers and do daily tasks.

#### Description EN

The gadget is connected to a smart application for practice and repetition that practices movements from the initial to the advanced stage with the patient and practices recovery operations as a home therapist. In addition, the gadget uses two sensors to help blind and visually impaired people in daily activities. These sensors include:

1-Ultrasonic sensors are a non-contact method for monitoring and measuring position and displacement. They emit sound waves for this purpose. Sound waves are reflected to the sensor, and based on the received signals, the ultrasonic sensor can make accurate measurements in detecting and measuring distances.

2- Using the touch sensor:

A fiber-optic sensor has been developed that consists of LEDs that, along with a stretchy skin, make it possible to detect deformations such as pressure, curvature, as well as stretching of the human hand.

## Iraq

### IQ.1.

<b>Title</b>	Drawing the Negative Biochemical Consumption Bacterial Growth Curve technique.
<b>Authors</b>	Omar Sadik Shalal
<b>Institution</b>	<b>College of Health and Medical Techniques, Middle Technical University</b>
<b>Patent</b>	Pending
<b>Description EN</b>	It is an alternative method to the old method, where the new method depends on the amount of sugars consumed by bacteria during a certain time. Thus, this method is more accurate in measuring the bacterial growth curve than the old method, which depends on turbidity, which has many flaws, whereas New technique depend on sugar consumption through the increase in the numbers of living bacteria that will be explain later.

### IQ.2.

<b>Title</b>	<b>A New Design of Three Phase Separator with High Efficiency and Generate Green Electrical Power</b>
<b>Authors</b>	Tahseen Hameed Khlaif
<b>Institution</b>	University of Kerbala, Iraq
<b>Patent</b>	Pending
<b>Description EN</b>	In this innovation a new design for petroleum separator diverter and mist extractor was manufactured to generate a green electric power without burning oil and gas by taking advantage of the high pressure of the fluid inlet stream which they may reach to 4000 psi .rotary diverter designed from a concave bowl is installed on pouring wheel which linked to dynamo ,when the inlet stream of fluid enter separator and hits an inlet diverter which start at rotation and electric power generating ,turbulent flow was decreased therefore more efficient separation than fixed diverter was done. mist extractor designed as con shape with baffles, it revolves around 1ts axis which linked to dynamo and its put out of separator with inlet and out let pipes connected to separator. gas with mist which separated from liquids enter extractor by pipes its started to rotation and the gas hits the baffles and pass after removed mist as a result to centrifugal

force and the integration of liquid molecules. electric energy generated and more efficient gas - liquid separation than cubic fixed coalesce (mist extractor).

**IQ.3.****Title**

**The use of a new technique (immune-UV light ) for a direct diagnosis of skin diseases**

**Authors**

**Ali Abdulhussein Mahdi**

**Institution**

**Middle Technical University**

**Patent**

**7319/ 2020**

**Description  
EN**

A new laboratory method was used in the diagnosis of some pathogenic microorganisms to the skin through the use of immune modulatory antibodies that were associated with a special pigment that has the ability to shine when the ultraviolet light waves were shed

**IQ.4.****Title**

**Preparing Titanium dioxide nanofibers for bacterial & fungal selectivity**

**Authors**

Thamir Abdul Ameer Hassan, Ali Q Tuama, Ghaith A. Fadhil

**Description  
EN**

We have prepared titanium oxide nanofibers using hydrothermal method for bacterial and fungal selectivity. Titanium oxides has two main polymorphs, anatase and rutile and represents a promising choice for bacterial and fungal inhibition. The oxides used in this experiment were prepared different conditions and were compared using materials characterization, mainly: Field Emission-Scanning electron microscopy and x-ray diffraction. The selectivity of these oxides was tested against Staphylococcus, E. coli and Pseudomonas bacteria and Candidiasis fungus. The results sheds a new light on the activity of Titanium oxide nanofibers as an anti-bacterial and -fungal agent for biological and environmental purposes.

## Italy

### IT.1.

#### Title

**Green oxidation and derivatization of sodium alginate for industrial applications**

#### Authors

Ferrara Vittoria<sup>1,2,3</sup>, Quaratesi Ilaria<sup>2</sup>, Iuliano Veronica<sup>1</sup>, Bartiromo Andrea<sup>3</sup>, Gliubizzi Rocco<sup>3</sup>, Talotta Carmen<sup>1</sup>, Carsote Cristina<sup>2</sup>, Badea Elena<sup>2</sup>, Gaeta Carmine<sup>1</sup>

#### Institution

<sup>1</sup>University of Salerno, Department of Chemistry and Biology (IT),

<sup>2</sup>National Research&Development Institute for Textile and Leather (INCDTP) - Research Institute for Leather and Footwear Branch (ICPI) (RO),

<sup>3</sup>BIQEM Specialties S.P.A. (IT)

#### Description EN

The tanning sector is one of the most polluting due to the use of basic chromium sulphate tanning agents, phenol- and formaldehyde-based tanning agents and other hazardous chemicals used in beamhouse and finishing operations. Recently, the regulation and discharge limit of hazardous substances are becoming increasingly stringent, which requires their replacement in a very short time. Development of sustainable and highly performing collagen crosslinkers is therefore a global challenge for many industries. In this context, alginate, a linear biodegradable polysaccharide, abundantly available, which has already a number of applications in food and biomedical fields, especially due to the possibility of improving its natural properties through oxidation and functionalisation, becomes a candidate for other industrial applications as well. In this project we modified sodium alginate by controlled hydrolysis and oxidation with H<sub>2</sub>SO<sub>4</sub> and subsequent functionalization with polyphenols from oak bark obtained by ultrasound assisted extraction. Esterification was performed at low pressure and mild temperature in a microwave reactor. Such a product contains both aldehyde functions, able to interact with collagen by covalent cross-linking, and hydroxyl groups, forming H-bonding with collagen polypeptide chains. It can pave the way to the development of an novel class of mixed crosslinkers. By controlling the degree of oxidation, molecular weights and degree of functionalization, alginate derivatives suitable for industrial applications have been obtained. All the steps (H<sub>2</sub>SO<sub>4</sub> oxidation, microwave assisted esterification, and US assisted extraction) are easy to scale at industrial level.

**Research Project within P.O.N. 2020 PhD programme – "Dottorati di ricerca innovativi a caratterizzazione industriale" – (CUP: D43D20002240006) and BIOTAN project PN-III-P2-2.1-PED-2021-2224**

## Japan

### JP.1.

**Title**
**Sundials and spherical sundials**
**Authors**

Yukio Showa Hiroki Sorada, Yoshikatsu Oyama

**Institution**

Sundials and spherical sundials

**Patent no.**

Technical background: Guo Shoujing, a famous scientist in the Yuan Dynasty of China, developed Yangyi: the height line and azimuth line are painted on the inner wall of a hemispherical iron pot, and a pot cover with a middle hole is covered on the top. Spot ie. The azimuth of the sun can be observed through the hole. Its volt point scale is evenly divided. The disadvantage is that it is not easy to observe.

Innovation:

1. Replace the opaque iron pan with a translucent hollow hemispherical line, which can be observed from the outside
2. Replacing pinhole imaging with convex lens imaging has higher brightness and precision
3. Using a transparent glass ball lens and a hemispherical light screen can solve the problem of manual adjustment of the direction
4. Using spherical glass bottles with transparent liquid instead of glass balls can solve the problem of high prices
5. Thermal recording paper can be used to achieve the effect of automatically recording the illuminance.

**Description EN**

## Korea

by

*Toronto International Society of Innovation & Advanced Skills (TISIAS)*

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**KR.1.**
**Title**

**Functional Shoe Insoles & Manufacturing Method  
(Customized Insoles using AI)**

**Authors**

SIWOO LEE

**Institution**

**Korea University**

**Description EN**

N/A

Machine Vision enables customization and performance evaluation of customized insoles in a non-face-to-face manner, and collects and calculates more precise pressure data over time. The hardness (Shore D) can be adjusted according to the shape of the foot (arch shape, height, pressure distribution, etc.) to optimize it for any purpose. It is economical and hygienic because it is easy to replace for performance and correction.

9. Chemical and Textile Industry

## Lebanon

Represented by

*National Association for Science and Research*

### LB.1.

#### Title

**Zaka@**

#### Authors

Ninette Kamel

#### Institution

National Association for Science and Research

#### Patent no.

7451

ZAKA@ is an educational application aiming to help students to learn sciences on their own depending on the type of their Multiple Intelligence.

Due to the Covid-19 pandemic, teachers and students found themselves facing many problems, one of them is spending all the time in front of the screen and students became just listeners. Hereby with the presence of the Multiple Intelligences a theory first initiated by Gardner in 1983. Came the idea of using this theory even during online learning. This will help students to learn through the manner they love and by doing several activities not just watching the teacher speaking. In addition, the materials of this app (activities and videos) are the result of a PhD research which was applied in a Lebanese school, where students were taught sciences via tablets for 6 months, during the year 2018-2019.

This first version is formed from 6 science chapters for Grade 5 students, in addition to activities targeting the four Multiple Intelligences (linguistic, Naturalistic, kinesthetic, and spatial). The chapters are:

#### Description

- Respiratory system
- Circulatory system
- Animals Food Chain
- Light and its colors
- Electrical circuits
- Refraction and lenses

Each chapter contains 4 activities LI (linguistic intelligence), NI (Naturalistic Intelligence), KI (Kinesthetic Intelligence), and SI (Spatial Intelligence) with a quiz at the end. When entering the app the student and/or parent can see the description of the app, with two icons on the bottom of the page (About us, contact us), in addition to the chapters. When choosing the chapter from the interface, the student can choose the activity of the Multiple Intelligence he/she wants.

The activities suggested for students in this app like inventing songs about a theme, walking in the nature and discover many materials, make crafts about a lesson... would motivate students to learn sciences in an innovative and easy way. They will be motivated to enhance their knowledge not from memorizing but from having fun.



## Macau

### MC.1.

**Title**
**A Bag Of Using Multi-Sensor To Prevent Pilferage**
**Authors**

Sio Kei Chon

**Institution**

PUI CHING MIDDLE SCHOOL MACAU

**Description  
EN**

A Bag Of Using Multi-Sensor To Prevent Pilferage, an anti-theft backpack with a Long-Distance Alarm Bracelet is composed of a backpack with three different sensors and a bracelet. The main function of the bracelet is to receive anti-theft alarm signals. The bracelet and the backpack use radio-transmit and receive technology as a connection. Three different sensors are included, including a Mercury Switch and a Magnetic Switch applied to the zipper. In addition, Electrically Conductive Printing Ink is used to print the circuit on the back of the backpack material so that the flexible material of the backpack can also become one of the anti-theft sensors, effectively preventing people from stealing items by cutting them open. The multi-sensing intelligent anti-theft backpack has an anti-theft function that can issue a reminder alarm in time to avoid property damage and has strong practicability.

### MC.2.

**Title**
**AI Smart Meter Management System Ver2.0**
**Authors**

Ho Keng In, Hoi Chon Wai

**Institution**

Macao Baptist College

**Description  
EN**

Our system (AI Smart Meter Management System Ver2.0) can effectively increase the mobility of parking spaces by detecting overtime violations and issuing fines, or even locking cars automatically. After many discussions and data measurements, we finally decided to use the gyroscope to raise the flap in the middle of the car, so that the car cannot move.

In this project, solid-state physics and mechanokinetics are used. The similarity of the project is that it can be used for online payment, license plate recognition, etc. The difference is that our system is added to the parking space, with automatic billing and auto-lock. A time limit is set to ensure the mobility of cars, auto-lock for overtime parking,

AI night vision image recognition of license plates in the parking space and fines using the system, reducing the manpower and time required.

From this, the solution to this problem is found: the ability to automatically record license plates and lock cars, eliminating the car owner's sense of luck; the ability to automatically lock the car after timeout, and the ability to automatically unlock the car after the owner pay the fine, greatly improving efficiency, mobility, convenience, and enforcement.

Main features:

It has a camera that automatically identifies the license plate in the night vision of the parking space, app which automatically fines illegal vehicles and transfers the data to the database, as well as automatically locks the stopper of the car and automatically unlocks and other efficient and fully automatic functions.

Main purpose:

This work mainly focuses on the situation of insufficient parking spaces in Macau, as it has the functions of automatic fines and car locking, which improves the enforcement of the law and allows the public to comply with the parking regulations. If the work is improved, it is believed that our AI intelligent meter management system can be applied all over the world.

Innovation point:

The system adds a night vision camera to the metered parking spaces, allows for fines to be levied after timeout, and automatic locking of vehicles that are still parked.

<b>MC.3.</b>	
<b>Title</b>	<b>Al-treated, ionic liquid electrolyte with Al-deposited carbon cloth 3D anode used in Aluminum-ion battery</b>
<b>Authors</b>	LAI IAN MAN CATARINA, WONG HO WA, LEONG POK HEI, PUN CHI KIN, HU KA WAI
<b>Institution</b>	Pui Ching Middle School, Macau
<b>Description EN</b>	Aluminum-ion batteries(AIBs) have drawn increasing attention in the field with abundant in Al resources, relatively high energy density, satisfactory safety performance and low price, expected to substitute lithium-ion batteries. However, the Al anode corrosion with hydrogen release and dendrite formation have prohibited the

constructing of high-performance AIBs. In this study, we propose an optimization of the electrolyte and anode used in AIBS by increasing the concentration of  $\text{Al}_2\text{Cl}_7^-$  and free ions and deposited Al on carbon cloth ( $\text{Al}_4/\text{CC}$ ), respectively. The treated electrolyte provides a higher positive corrosion potential and lower corrosion current comparing to a non-treated ionic liquid in a mixing of  $\text{AlCl}_3$  and  $[\text{EMIm}]\text{Cl}$ , while the as-obtained  $\text{Al}_4/\text{CC}$  anode presents an enlarged cycling life (450h), high CE (99.7%) and a superb capacity ( $61 \text{ mAh g}^{-1}$ ) with graphite as the cathode, with less dendrite formation.

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**MC.4.**
**Title**

**Are you dry ? A controllable floor drain device to prevent virus intrusion**

**Authors**

Pun Kei Wai, Ao Man Him, Man Chi Chong, Lam Chou Ngai, Lin Bai Tao

**Institution**

Pui Ching Middle School Macau

**Description  
EN**

Since the outbreak of COVID-19, public awareness of infectious diseases has gradually increased. Many people think that staying at home is completely safe from being infected. However, even if you keep your doors and windows closed, there is a snare that is often overlooked — the U-pipe in the intercepting trap under household drains. Usually, the water in the intercepting trap forms a seal that averts odours and other gases from flowing back, preventing viruses and bacteria from entering the house through the air. But once water in the traps dries up, it becomes a major breach of virus infection or odour, causing hygiene problems to our daily life.

However, most people do not know, or if they do know, they forget to fill their floor drains regularly to keep enough water in the air trap. At present, it is very difficult for people to know what is going on inside the traps and in most cases it is too late to find out. After a data search, there are no products or devices on the market that can inform people at home to fill their traps with water in a timely manner.

To prevent odour, bacteria and viruses from affecting our home environment, we get to the root of the problem. We then came up with the idea of using the Arduino to set up a device that reminds people to pour adequate water into the

trap when necessary. Hopefully, our device can raise the public awareness of U-pipe, inhibit the possibility of virus spread, and reduce the chance of outbreaks of infectious diseases.

**MC.5.****Title**

**Communicator for Blind and Aphasic Persons with Alarm**

**Authors**

Wong Hio Wai, Chan Seng Ian, Leong Ka Wun, Si U Hin

**Institution**

Pui Ching Middle School, Macau

**Description  
EN**

Communicator for Blind and Aphasic Persons with Alarm is a box hung on the chest, which allows the blind to communicate with other people normally. It prevents the blind from hitting the wall, and helps the blind in danger. When the blind person is about 3 meters away from the wall, it will make a sound and vibrate. For example: when a blind person communicates with a dumb person and the dumb person makes sign language, the box on the blind person's chest will translate the dumb person's sign language and make a sound to tell the blind person what sign language the dumb person is doing. Moreover, blind people can press the yellow button to make a beep when they are in danger.

**MC.6.****Title**

**Stopping Monoxide Posioning Bathroom System**

**Authors**

Ng U Wai, Chow I Hin

**Institution**

Pui Ching Middle School, Macau

**Description  
EN**

"Stopping monoxide poisoning Bathroom system" has the effect of:

- The intelligent equipment can sense whether the toxic gas exceeds the safety standard,
- If it exceeds, the window will be automatically opened to discharge poisonous gas.
- When it is perceived that someone has fallen (maybe due to fainting by gasses), the automatic alarm device will be activated and the warning light will emit a red light
- And sound the alarm, achieving the goal of allowing the witnesses to be rescued in time.

**MC.7.****Title**

**To be or not to be, that's the water thing -- A Regulating System of The Fish Tank's Water Quality**

**Authors**

LAM KAM HIM, CHAN KUAN WAI, YONG WILLIAM, HUANG TENG WA, PAO HOI KIN

**Institution**

PUI CHING MIDDLE SCHOOL MACAU

**Description  
EN**

The environment and water quality in a fish tank are crucial factors that determine the health and safety of the fish. Although there are numerous water testing kits available in the market, most of them require manual operation and do not provide continuous monitoring or automatic alerts to the owner when the water quality is abnormal. This can be a problem if the owner forgets to check the water regularly or is away from home, as it may compromise the safety of the fish. To address this issue, we aim to create a sustainable and automated system that continuously monitors environmental factors such as water temperature, pH, and ammonia levels and alerts the owner when any abnormalities are detected. This will ensure that the water quality in the fish tank remains optimal and the fish are healthy and safe.

**MC.8.****Title**

**Tunnel Air Purification Device**

**Authors**

CHIANG HOI PAN, CHEN YANG WAN LI

**Institution**

Macao Baptist College

**Tunnel Air Purification Device**

**Description  
EN**

Our works can be applied in semi-enclosed tunnels to effectively decompose the harmful gases emitted by cars in the tunnels, thereby reducing carbon emissions. After entering the purification device, the harmful gas will be washed by the water atomization device, the suspended particles will be washed. Then, the photocatalyst reaction will be carried out, in which the harmful polluting gas will be purified and sterilized to minimize the content of toxic substances in the air. The purified gas will emit carbon dioxide, and quicklime is used to absorb carbon dioxide through the combination of quicklime and carbon dioxide, thus solving the carbon emission problem. The device is located at the top of the tunnel and is a structure embedded

at the top of the tunnel. The exterior of the work model is a square structure, and its built-in purification device is an inverted  $\Pi$ -type PVC tube structure. The PVC tube is the main purification device, which is responsible for decomposing air hazards. At the same time, the external cuboid structure is responsible for loading spare parts, the water circulation system, and the quicklime filter plate.

Our innovations are:

- i) purifying the air while reducing carbon emissions and achieving carbon neutralization;
  - ii) eco-friendly use of water resources cycle;
- Efficient solution to tunnel pollution problems.

### MC.9.

#### Title

**UV light disinfection sole carpet**

#### Authors

Wan Chi Hou Anderson

#### Institution

Pui Ching Middle School, Macau

#### Description EN

During the epidemic, many people, especially healthcare workers who are at high risk of carrying germs, are worried about bringing bacteria or viruses back home and infecting their families and children. Minimising the possibility of carrying germs home, most people disinfect their clothes and hands through clothes-washing and hand-washing. However, shoes are often overlooked or not cleaned properly, which can contribute to the spread of germs. To prevent such inadvertent situations, shoe soles should be disinfected before returning home. UV light disinfection sole carpet is the product that I developed to disinfect shoe soles in just a few seconds, providing effective sterilization while remaining convenient to use.

The main purpose of this invention is to use ultraviolet light(UV) to disinfect shoe soles. UV light disinfection sole carpet uses the advanced technology, including a TCRT 5000 infrared module(IR), 16 relays, UV-C light, Arduino Mega 2560, and a 3D-printed mat. Based on my observation, the shoe size of most Chinese adults is between 36 and 50. With this idea in mind, the specially designed mat is to accommodate a shoe size of 50 with the sole length of 33 cm so as to effectively disinfect the entire sole of the shoe. To use this product, the user step on the mat, and the

IR module that covers the sole of the shoe will send a signal to the Arduino, which will then send a signal to the relay to turn on the UV light, achieving the effect of disinfection. This design avoids exposing users to UV light by controlling the UV light switch. The IR modules and UV lights are installed in all areas where the mat may be stepped on, ensuring sufficient coverage to disinfect every part of the shoe sole. The positions of these IR modules and UV lights are drawn according to actual measurements, considering the detection hole of the IR module, so the UV light is placed as close to the detection hole as possible to maintain the accuracy of detection.

In the face of the harmful germs and bacteria, every individual who use this UV light disinfection sole carpet will be benefitted as most of the bacteria can be killed in around 5 to 10 seconds. That is to say, this product can improve our life by providing us with a germ-free living environment. In the future, two main improvements will be done to this product. The first is to commercialise the product by introducing a shorter and thinner version. The second is to install a screen to show the state of the disinfection process.

<b>MC.10.</b>	
<b>Title</b>	<b>Walk You Tall Pen</b>
<b>Authors</b>	HUANG MAN WAI, WONG MAN HIN, SOU CHI WAI, CHAN MAN KA, CHAN CHI CHON
<b>Institution</b>	Escola Tong Sin Tong
<b>Description</b>	According to a 2018 report by the World Health Organization, more than 1.4 billion people are nearsighted. Twenty-two people in every 100 are nearsighted. The global cervical spondylosis patients are more than 1 billion people! Adolescents, however, predominate in both serious diseases. It is obvious that myopia and spinal disease have become one of the biggest problems for teenagers around the world. That's why we created the “Walk You Tall Pen”, which can best help teens prevent these diseases.
<b>EN</b>	

## Malaysia

Represented by University Malaysia Perlis

### MY.1.

<b>Title</b>	<b>SAOIL</b>
<b>Authors</b>	<i>Hariz Azfar Hasrul Nizam, Alia Soraya Shudin, Muhd Harith Hazim Mohd Azmuni, Nayli Husna Haffizullah, Muhd Danish Mirza Muhd Asyraf, Farah Aleeya Mohamed Zulheile, Khairun Hanisah Mujib, Nurul Syairrah Shukor</i>
<b>Institution</b>	<b>SBP Integrasi Gombak Malaysia</b>
<b>Patent no.</b>	-
<b>Description</b>	<p>The production of SAOIL highlights the usage of waste cooking oil as a base. An organic soap capable of effectively removing grease, SAOIL also has antimicrobial properties, available commercially at a low cost. This is attributed to the fact that the oil used is usually known as waste. The production of SAOIL was conducted by mixing the filtered cooking oil with the extract of <i>Cymbopogon nardus</i>, granulated sodium hydroxide and glycerin before being cooled down to room temperature to generate a bar of soap that is functional, similar to the commercially available ones. The effectiveness of SAOIL was tested in several experiments and was compared to other types of soaps available on the market. We believe SAOIL is competent, and will be a huge aid in waste management</p> <p><i>Environment, Pollution</i></p>

### MY.2.

<b>Title</b>	<b>MASCRETE</b>
<b>Authors</b>	<i>Nurul Huda Yadaini Mazhalimi, Nur Iries Batrisyia Erwan, Muhd Emmer Zaqwan Mohd Iswandi, Nurin Jazlina Jasri, Wadhiah Wasilah Rosdi, Ahmad Najmi Afifi Ahmad Yusri, Suraya Shabingin, Noor Azizah Mat Hassan</i>
<b>Institution</b>	<b>SBP Integrasi Gombak Malaysia</b>
<b>Patent no.</b>	-
<b>Description</b>	<p>Since the COVID-19 pandemic hits the world last year, innumerable number of used masks was thrown away leading to the buildup of enormous waste. This issue has impacted our nature in various ways and need to be resolved with eco-friendly approach. Maskcrete is a concrete that</p>



utilised used masks as product base. Surgical masks, the commonly used masks contain polypropylene fibres which capable in replacing cement in the composition of concrete to achieve the maximum strength on par with cement-based concrete. Hence, repurposing of used masks by inventing Maskcrete will lead to the reduction of mask waste as well as reducing the world dependability towards cement and promoting eco-friendly constructions. Polypropylene fabrics will be mixed with sand, aggregate stone, eggshell and water to create Maskcrete that can be used as concrete based but only at a fraction of the normal costs. We have tested Maskcrete for its strength, inflammability and hardness by comparing it to the normal cement-based concrete. The result has proved the uses of polypropylene have improved the mechanical properties of concrete. We believe that Maskcrete will be an imperative solution to solve this current waste management issue in an eco-friendly way.

*Environment, Building and Engineering*

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**MY.3.**
**Title****Co-Parking Lot****Authors**

Muhammad Aqid Abdul Halim Putera, Irfan Hazmi Johan Saleimi, Noor Asyraff Noor Azezee Abdul Aziz, Qaireen Nia Mohd Rahmat, Nuraqillah Asyiefa Mohd Khairul Anwar, Nor Azra Zalifah Norazam, Lisneza Roseli

**Institution**

*Hulu Selangor Science School Malaysia*

**Patent no.**

-

**Description  
EN**

Co-Parking Lot is an idea to create an advanced system to look for available parking in the building with parking facilities. This system is created by us due to difficulties for shoppers and users to find vacant parking lot. Our system requires a new level of technology to make this system works efficiently. In addition to our smart Co-Parking system, IoT is use as an essential technology tool for the operation development systems. Our innovation is great for fully occupied parking lot in shopping malls or office buildings. Co-Parking Lot also helps users to save car's petrol and avoid wasting time. How does the system work? Firstly, user has to scan the qr code at the parking entrance. It will automatically detect user's membership or staff ID through the Co-Parking System Application. User will acknowledge by the application of the availability parking

space. Sometimes, the current parking lot detector does not work properly and shows a green light, informing users that the parking is empty, but actually the parking lot is occupied. With the intelligence of our system, users are able to find parking at the parking lot without being mislead. Whereas, valet parking is a service in which driver's car will be parked by an attendant. The valet service does cost money, which can be a burden to some shoppers and parking users. As a result, our innovation can be very helpful and ease to user.

Information Technology and Communication

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**MY.4.**
**Title****Fish Feed Fertilizer (SEER)****Authors**

Rayyan Amsyar Mohd Rusdy, Dzakwan Mohd Saad, Qhilfi Ukasyah Ghazali, Muhammad Aisy Afif Mohd Fared, Muhd Izzuddin Muhd Masrizal, Amir Zafri Mohd Johari, Azrie Danish Aqasha Shahril Nizam, Lisneza Roseli

**Institution**

*Hulu Selangor Science School Malaysia*

**Patent no.**

-

**Description  
EN**

Nowadays, farmers and other personnel in the agricultural industry are having problems to survive in the industry due to the high cost of normal chemical fertilizer and fish feed. Our product SEER was produced to ease their worries and help the industry. To solve this problem, we produced a product that are capable of being used as both fertilizer and fish feed. This product is very environmentally friendly because it is made with bio-organic waste such as soy dregs, coconut dregs, coffee dregs and rice bran that contained macronutrients such as potassium, phosphorus, and nitrogen needed by plants. We invented this product because the normal chemical fertilizer is expensive to make and not environmentally unfriendly. Dried waste raw materials such as coffee bean dregs, soy dregs, coconut dregs and rice bran are mixed in one container. The mixture is shaped into pellets using the respective mould and finished pellet is inserted into the dehydrator. Our aim is to produce multifunction chemical-free fertilizer and as a fish feed. Our product is affordable and beneficial to both plant and fishes. In the current market, there have been fertilizers made from bio-organic waste, but the product only has one function and

is expensive to produce. Our product on the other hand is multifunction and has a low cost. SEER is not merely a fertilizer and fish feed, but it is a start of showing care for the environment.

Agriculture and Food Industry

#### MY.5.

##### Title

**Nutrichoco Bio-Brownies**

##### Authors

Nur Amanina Batrisyia Mahadzir, Shesashthiny Manicka Rao, Nur Alya Batrisyia Azman, Nur Alysha Noor Affandie, Nurul Athirah Mohd Yusof, Nur Firzanah Izzati Abdul Karim, Dania Nur Khadeeja Ghazali, Lisneza Roseli

##### Institution

Hulu Selangor Science School Malaysia

##### Description EN

In this project, we tried on ways to reduce the amount of food being wasted. We decided to use soybeans and watermelon rinds as our main ingredients in flour making. **Soybean** is a very rich source of plant-based protein, vitamin E and B, calcium, iron and potassium. By consuming soybeans, we can improve gut health as well as reducing the risk of cancer. Whilst, **watermelon rinds** contain low levels of calories, but high concentrations in vitamin A, C and B6, potassium and zinc. It has the ability to improve skin appearance, strengthen the immune system, lower blood pressure and aid in weight loss. These food wastes are turn into useful ingredients to create flour. **Nutrichoco Bio-Brownies** is a product created to benefit certain wastes that can be deemed useful rather than being thrown away. It is beneficial since it contains less amount of fat and sugar compared to other desserts. Recently, flour price is increasing drastically in the food market. By using this homemade flour, we can save our budget and obtaining benefits from the soybeans and watermelon rinds. Using this homemade flour can avoid coarse texture brownies which make it enjoyable dessert that can be a great option for everyone. In order to make these brownies, we need to make homemade flour by using soybeans and watermelon rinds. This product is eco-friendly as it does not contain any chemical substances. It brings us to a healthier diet as well as ensuring our body to get enough nutrients.  
Environment – Pollution Control

**MY.6.****Title****ORGANIC ROACH REPELLENT****Authors**

Fyha Afia Zulzaidi, Wan Aleesya Rania Wan Abu Manshor, Linda Nuriliya Sofea Suhaimi, Qaseh Nadzirah Muhammad Zulkiflee, Mukhlis Nazmi Zulzaimi, Rizq Luqman Linezam, Muhammad Aqil Luqman Ahmad Sapari, Lisneza Roseli

**Institution**

Hulu Selangor Science School Malaysia

**Patent no.**

-

**Description  
EN**

ORGANIC ROACH REPELLENT is a small circular-shaped cube that functions to exterminate cockroaches, through the use of natural and safer ingredient alternatives. The ingredients have been strategically chosen to serve two purposes which are to attract and kill insects. We made this product to decrease the production of traditional pesticides. Traditional pesticides pose a threat from harming children to harming the environment. This innovation uses soy wax as its main ingredient, in addition to baking soda, sugar and essential oils. The ingredients were scientifically selected based on each ingredient's beneficial feature that ultimately serves to attract and eradicate cockroaches. In this project, we experimented on finding solutions to decrease the infestation of cockroaches specifically as this type of insect carries various diseases and even invade homes that are well-kept. Moreover, our aim was to innovate a product that is able to poison cockroaches effectively, without affecting the ecosystem or to mankind as a whole, through the use of natural, safe and easily attainable ingredients. Furthermore, conventional pesticides in the market may contain harmful chemicals which emit strong fumes that affect breathing in some individuals, in addition to affecting the ozone layer. Unlike conventional pesticides, our Organic Roach Repellent is made from natural and safer ingredients such as soy wax, baking soda, sugar and also essential oils. After extensive research, we have found that soy wax and essential oils are two components that cockroaches are usually attracted to, due to its strong and sweet smell. The combination of baking soda and sugar creates a great alternative to boric acid, which as a result, will affect the cockroaches' digestive system upon ingestion of the repellent cube, thus exterminating the insects effectively.

Environment – Pollution Control

**MY.7.**

<b>Title</b>	<b>Green Hybrid Composites Usage As Environmentally Friendly Materials In Construction Of Eco Design Fishing Boat</b>
<b>Authors</b>	Suriani Mat Jusoh, Che Mohd Ruzaidi Ghazali, KhalinaAbdan, Ayu Rafiqah Shafi, Romisuhani Ahmad, Fathin Sakinah Mohd Radzi, Muhammad Asyraf Azman, Syakir Hakimi Zubaidi, Muhammad Hakeemie Rosli
<b>Institution</b>	Universiti Malaysia Terengganu (UMT)
<b>Patent no.</b>	Nil
<b>Description EN</b>	<p>The scope for this innovation is to encourage widespread use of green hybrid composite in various applications specifically in boat construction and related maritime structure. The use of fibreglass is expensive and, in terms of environmental concern, it gives a high impact on the ecosystem as well as crosses over the area of environmental pollution, occupational health and safety concern. Today, the use of natural or green fibres has become a trend in boat manufacturing and other equipment, due to their light weight; good relative mechanical properties more important factors, such as being eco-friendly and sustainable materials as well as lower cost, compared to fiberglass. The demand for boat from green hybrid materials has gone in striking. General conditions in green composites are proposed, along with some preliminary data on the mechanical properties and water absorption properties. The new formulation for green hybrid for eco design is fabricated using an alternative Kenaf fibre/ Fibreglass hybrid reinforced polyester for the outer layer while the epoxy reinforced by Kenaf Fibre is made as an inner layer for fishing boat hull construction. The product novelties as introduced an green hybrid composite materials for eco-design of small fishing boat construction replacing synthetic fibre. The application of this green hybrid composite materials contributes towards an environmentally practice and towards Malaysia Sustainable Goal Development (SGD).</p> <p><i>Environment - Pollution Control</i></p>

<b>MY.8.</b>	
<b>Title</b>	<b>Graphitic Compound Produced From Carbon Based Materials Waste Via Moderate Temperature Pyrolysis</b>
<b>Authors</b>	Che Mohd Ruzaidi Ghazali, Chan Jack Lee, Norizah Karim, Farizan Munajat, Salisa Abd Rahman, Suriani Md Jusoh, Ahmad Azrem Azmi
<b>Institution</b>	Universiti Malaysia Terengganu (UMT)
<b>Patent no.</b>	Nil
<b>Description EN</b>	<p>The scope for this innovation is to produce graphitic compound from the carbon based waste materials such as bio mass waste and plastic bottle waste. The use of direct furnace pyrolysis with the moderate temperature were used. Graphitic compound produced were characterized due to the electrical properties to know the potential application in electronic field. This approach will convert all carbon based waste especially in landfill to becomes high end product especially for advance applications in electronic fields and others. The application of waste will contribute to the activities of waste to wealth towards achieving world Sustainable Development Goals (SDG)</p> <p>Buildings and Materials( Waste to wealth)</p>
<b>MY.9.</b>	
<b>Title</b>	<b>Copperas/Calcium Hydroxide Bybrid Coagulant For Palm Oil Mill Effluent (POME) Treatment</b>
<b>Authors</b>	Sofiah Hamzah, Goay Teoh Shu Yee, Nurul Aqilah Mohamad, Mohammad Hakim Che Harun, Nazaitulshila Rasit, Asmadi Ali, Wan Rafizah Wan Abdullah, Mohd Salleh Amri Zahid, Dewi Suriyani Che Halin
<b>Institution</b>	Universiti Malaysia Terengganu (UMT)
<b>Patent no.</b>	-
<b>Description EN</b>	<p>This study reports the coagulation treatment of POME using integrated copperas and calcium hydroxide. The properties of copperas were determined using scanning electron microscopy (SEM), Fourier transform infrared (FTIR), X-ray diffraction (XRD), and X-ray fluorescence (XRF). Coagulation was conducted using jar test experiments for various coagulant formulations and dosages (1000–5000 mg/L), initial pH (4–10), stirring speed (100–300 rpm), and sedimentation time (30–180 min). The characterisation</p>

results show that copperas has a compact gel network structure with strong O–H stretching and monoclinic crystal structure. The effectiveness of integrated copperas and calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ) with the formulation of 80:20 removed 77.6%, 73.4%, and 57.0% of turbidity, colour, and chemical oxygen demand (COD), respectively. Furthermore, the integration of copperas and  $\text{Ca}(\text{OH})_2$  produced heavier flocs (ferric hydroxide), which improved gravity settling. The utilisation of this by-product as a coagulant in effluent treatment can unlock the potential of copperas for wider applications, improve its marketability, and reduce gypsum waste generation from the  $\text{TiO}_2$  industry.

Sustainable material for wastewater treatment

**MY.10.****Title****Driving Cycle Tracking Device (DC-TRAD)****Authors**

Salisa Abdul Rahman, Muhammad Syahmi Mohd Pakri, Arunkumar Subramaniam, Nurru Anida Ibrahim, Siti Norbakyah Jabar, Che Mohd Ruzaidi Ghazali, Ahmad Luqmanul Hakim Ahmad Tarmizi, Nurul Syazrah binti Mat Yatim, Mohamad Nur Khairul Hafizi Rohani

**Institution**

**Universiti Malaysia Terengganu**

**Patent no.**

-

**Description**

41% of greenhouse gas emissions are caused by vehicle emission in which plays an important role in global warming phenomena. To encounter this, environmentalists, engineers, and vehicle manufacturers are always working towards green energy and zero emissions. Driving cycle is the main tool used to conduct studies on vehicle emission and fuel consumption. Driving cycle is defined as the speed-time relationship curve or profile of a selected region and city. Few steps are involved in the development of an accurate driving cycle; data collection, feature extraction, and driving cycle development. Driving cycle tracking device (DC-TRAD) is a device which focusses on data collection method in which the huge volume of data collected is managed and stored in MySQL database instantly. Also, DC-TRAD is built with GPS U-BLOX sensor which is highly accurate and proven to increase the data accuracy by 80% in which it can capture a non-zero speed values when the vehicle is idling with zero acceleration due to the high accuracy of the sensor of less than 1 meter.

Aviation, car industry and transportation

**MY.11.****Title**

**Novel Cantor Alloy Based Materials For Cryogenic Application**

**Authors**

Nur Izzati Muhammad Nadzri, Dewi Suriyani Che Halin, Nurlyana Izyan Mohd Ali, Mohd Arif Anuar Mohd Salleh

**Institution**

Universiti Malaysia Perlis (UniMAP)

**Patent no.**

PI2022004718

**Description  
EN**

The motivation of this motivation is to produce a sustainable material with cheaper elements composition for cryogenic application. The use of Aluminium as one of the components of High Entropy Alloy (HEA) elements will not only enhance their structural properties but also mechanical properties that will influence greatly in the cryogenic application. The usage of aluminum is possible because it is more environmentally friendly element which is non toxicity, which eliminates occupational health and safety hazards. Besides, aluminium is also cheaper elements and the methods of producing it via powder metallurgy making the combination of HEA based alloy with Aluminum addition more sustainable to produce in longer term for future cryogenic application.

Green Energy Materials

**MY.12.****Title**

**Low Sintering Temperature Geo-Ceramics**

**Authors**

Romisuhani Ahmad, Mohd Mustafa Al Bakri Abdullah, Wan Mastura Wan Ibrahim, Nur Bahijah Mustapa, Suriani Mat Jusoh, Liyana Jamaludin

**Institution**

Universiti Malaysia Perlis (UniMAP)

**Patent no.**

PI2021004551

**Description  
EN**

The diverse applications for advanced ceramic have been developed to continue growing at a reasonable rate with the processing and economical tolerance. To feature the required properties, the fabrication of conventional ceramics needs a long heat treatment up to 10 hours with the high sintering temperature up to 1800 °C. The use of geopolymer method is an alternate way in producing ceramic materials since the amorphous to semi-crystalline behavior of geopolymer will transforms into crystalline (nepheline) phases upon sintering. The unique composition of the geopolymer system with the help of geopolymerization



reaction will improve the crystallization process as well as reducing the sintering temperature required. The homogeneous of the geopolymer system will influence the structural rearrangement during the phase change hence promote the nucleation and densification of the geopolymer. Besides, the higher content of silica oxide deviating from nepheline ( $\text{NaAlSiO}_4$ ) compositions will also facilitate the densification process and provide the system with self-fluxing properties.

*Buildings and Materials*

**MY.13.**

**Title**

**Surface Modification of  $\text{TiO}_2$  as a Self-Cleaning for Solar Cell Application**

**Authors**

Dewi Suriyani Che Halin, Mohd Arif Anuar Mohd Salleh Ayu Wazira Azhari, Kamrosni Abdul Razak, Nur Izzati Muhammad Nadzri, Mohd Mustafa Al Bakri Abdullah, Shayfull Zamree Abd Rahim, Sofiah Hamzah

**Institution**

Universiti Malaysia Perlis (UniMAP)

**Patent no.**

PI2021004375/ MY-172024-A

**Description  
EN**

The titanium dioxide ( $\text{TiO}_2$ ) is a self-cleaning thin film developed for surface cleaning applications which is used to prevent dirt, debris or organic pollutants from contaminated onto glass wall, door, tiles or any surfaces.  $\text{TiO}_2$  is one of semiconductor which is widely used as a photocatalyst in the research since  $\text{TiO}_2$  can exhibit both photocatalytic and photo-induced superhydrophilicity properties. The  $\text{TiO}_2$  is a favorable properties like non-toxicity, chemical inertness, and stability over a wide pH range under irradiation conditions. It is a strong bactericidal activity when exposed to irradiation close to UV light. This invention was focusing on the surface modification on  $\text{TiO}_2$  thin film doped with silver (Ag) and adding a small amount of polyethylene glycol (PEG).

Green Energy Materials

**MY.14.**

**Title**

**Smart Power Windows**

**Authors**

**Mohammad Alif Abdullah, Muhammad Aiman Ahmad Fozi**

**Institution**

Universiti Malaysia Perlis (UniMAP)

**Patent no.**

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<b>Description</b> <b>EN</b>	<p>The goal of this project was to simplify the process for users to get used to opening the car window before the trip begins. Users can save time and effort by using the heat sensor and rain sensor for power windows to quickly expel hot air from the car. Vehicle users no longer have to wait for the heat to escape from the vehicle by opening the window manually, with this project the vehicle window will open when it reaches its temperature and close when it rains. In addition, it can provide comfort to the driver and passengers from being hot or wet due to unpredictable rainy weather.</p> <p>AUTOMOTIVE TECHNOLOGY</p>
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**MY.15.**

<b>Title</b>	<b>Green Lead-Free Sn-Cu Transient Liquid Phase Die-Bonds For Future High-Power Electronic Devices</b>
<b>Authors</b>	Muhammad Amirul Aiman A.Ramlee, Rita Mohd Said, Nursyahirah Mohamad Zaimi, Mohd Arif Anuar Mohd Salleh
<b>Institution</b>	<b>Universiti Malaysia Perlis (UniMAP)</b>
<b>Patent no.</b>	<b>P12021004223</b> (Transient Liquid Phase Solder Paste Composition and a Method of Production).
<b>Description</b> <b>EN</b>	<p>Lead-free Sn-Cu Transient liquid phase (TLP) soldering is a bonding approach that enable the solder joint to be processed at a lower temperature while still resulting in the formation of a joint with a higher re-melting temperature. In this work, Sn-Cu based lead-free solder paste was used as solder material due to the relative simplicity of this Sn-Cu system and the resulting reaction products responsible for the metallurgical bonding.</p> <p>Green Technology, Electronic and Automotive.</p>

**MY.16.**

<b>Title</b>	<b>Implementation Of Smart Rfid Charging System Based Raspberry Pi For Mobile Charger And Laptop</b>
<b>Authors</b>	Khairunnisa Afiqah Idris, Liew Hui Fang, Lee Jun Rong, Aimi Salihah Abdul Nasir, Muhammad Izuan Fahmi Romli
<b>Institution</b>	<b>Universiti Malaysia Perlis (UniMAP)</b>
<b>Description</b> <b>EN</b>	<p>Copyright Registration Number LY2023P00723</p> <p>This is a smart RFID charging system based Raspberry Pi for electronic devices. It consists of two charging circuit which is 5 VDC and 19 VDC charging circuit. The 5 VDC charging circuit is charging the mobile devices. The DC</p>

supply from AC-DC converter circuit will step down to 5 VDC and the current is limit to 1 A through the voltage regulator LM317. For the 19 VDC charging circuit is charging laptop devices. The DC supply from AC-DC converter circuit will step down to 19 VDC and the current is 3 A through the step down switching regulator IC LM2596. The RFID charging system based Raspberry Pi can control the charging time, voltage and current during process of charging mobile phone and laptop applications. The RFID module is as a payment method and also user of this system will be limited to 5 users. LCD display will show the voltage, current and charging time during charging process. This system will limit the charging time to each user with 5 minutes and the LCD display showing the actual time left. This system will cut off the current automatically which is in fully charged. System also will stop when press the stop button and the count down time is ended.

Renewable energy, energy storage

**MY.17.****Title**

**Compositional Modified CeO<sub>2</sub> Solid Electrolyte For IT-SOFC Application**

**Authors**

Salmie Suhana Che Abdullah, Maatesh A/L Sivalingam, Mohammad Hafiz Ismail, Nur Fathin Syuhada Samsudin, Imaduddin Helmi Wan Nordin, NorzarulasriKamris

**Institution**

**Universiti Malaysia Perlis (UniMAP)**

**Patent no.**

-

**Description  
EN**

High efficiency and environmental-benign characteristics of solid oxide fuel cell (SOFC) as an energy source have been receiving enormous attention to overcome global warming, pollution and fuel availability issues. Intensive research and innovation in SOFC focuses on developing cells that have high electrochemical performance and durability. These determinants are controlled by the properties of cell's electrolyte. Currently, as SOFC operates at up to 1000 °C it leads to mechanical deterioration of materials, slow start-up time, high cost, and limited fuel flexibility. To address these limitations, it is important to lower the operating temperature of SOFC. Therefore, we have invented compositional modified CeO<sub>2</sub> ceramics electrolyte by single, double as well as triple dopant of small amounts of

other elements, such as Sm, Y, La, Fe, Mn and so on. For example, we successfully found that CeO<sub>2</sub> modified with double dopant using Sm, and La gives positive impact on its properties such as improvement in density and electrical conductivity. These improvements of properties will leads to development of high performance SOFC, especially at lower operating temperature. Overall, the development of compositional modified CeO<sub>2</sub> materials represents an important advance in the field of SOFCs, enabling the creation of more durable and efficient fuel cell systems. This invention also supports the sustainable development goals (SDG); SDG7 (Affordable and clean energy) and SDG13 (Climate action).

Green energy, fuel cell, advanced material

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**MY.18.**
**Title****Parkinson's Smart Watch****Authors**

Chee Kar Kei, Norshahrizan Nordin, Tunku Salha Tunku Ahmad, Marzaim Marzuki, Mohamad Hafiz Mohamad Shokri, Ahmad Mu'adz Nazari, Mohd Saiful Izwaan Saadon, Mohammad Iqbal Omar, Wei Chern Ang, Fadhlur Rahim Azmi

**Institution**

**Universiti Malaysia Perlis (UniMAP)**

**Patent no.**

-

**Description  
EN**

As Parkinson disease are getting more common from time to time it eventually awake the society awareness. Meanwhile, the Parkinson disease are more likely to diagnose with people that are in their 60s however there is still a partially number of people has suffered the disease before their 50s. Moreover, by tracking the Parkinson disease through the previous condition the disease is more likely to occur towards men than women based on the primary studies and prevalence. By giving an insight looks toward Parkinson disease they have problems towards muscle control, movement and balance. While the best way of treating this problem is by giving the right amount of medication. Which upon the idea of wearable computing device that can track and assist the patient by giving accurate data to the doctor. The "Parkinson's Smart Watch" that provides a life-changing chances where the smart watch can allow them to have remote access condition that have sensors worn to monitor the patient movement daily life. Therefore, the

“Parkinson’s Smart Watch” having a function that can suits the patient lifestyle by having sensorimotor feedback loop that can involve the position of body and the perception of movement. Hence, this information may work as buzzes for the patient to remind their medication hour. The function that provided by the “Parkinson’s Smart Watch” can help to enhance the patient sickness condition since the doctor have a clear data which will indicates an appropriate treatment plan.

*Healthcare*

**MY.19.**

**Title**

**Thymol-Based Deep Eutectic Solvents AsNew Extractants For Textile Dyes From Aqueous Environment**

**Authors**

Naqibah Salim, Minolii Karthigesan

**Institution**

**Universiti Malaysia Perlis (UniMAP)**

**Patent no.**

N/A

**Description  
EN**

Organic solvents, also known as traditional solvents, have been used in a wide variety of science and technology applications such as varnishes, inks, iodine solution, and perfume. The usage of these traditional solvents had posed dangers to their users and environment as well because it emits harmful toxic chemicals such as benzene, carbon tetrachloride, trichloroethylene. methyl chloride, 2-ethoxyethanol, and 2- methoxyethanol. As a result, an alternate solvent was sought to replace the organic solvent. Due to their advantages such as fast preparation time, low costs, biodegradability, and low toxicity, deep eutectic solvents (DESs) have been discovered and demonstrated to be an excellent solvent for replacing these hazardous organic solvents. Thymol-based DESs were synthesized by combining thymol as hydrogens bond acceptor (HBA) and menthol as well as phenol as hydrogen bond donor (HBD).

CHEMICAL ENGINEERING

**MY.20.**

**Title**

**Geopolymer-Crumb Rubber Panel**

**Authors**

Reshikesan A/L Ravi, Ahmad Azrem Azmi, Mohd Mustafa Al Bakri Abdullah, Romisuhani Ahmad, Che Mohd Ruzaidi Ghazali, Siripat Thongchaom

INTERNATIONAL EXHIBITS

<b>Institution</b>	Universiti Malaysia Perlis (UniMAP)
<b>Patent no.</b>	US008337621B2
<b>Description</b> <b>EN</b>	Composite sandwich panels have gradually become more popular due to their typical benefits including strength, weight, and ease of handling, durability, versatility, thermal and acoustic properties. Sandwich panels are made of two materials that are relatively weak in their separated state, but are improved when they are constructed together in a sandwich panel. Geopolymer rubber sandwich wall panels are made of two fibre reinforced cement facing sheets, on either sides of a lightweight geopolymer mortar core. The core is made from a mix of fly ash, binders and siliceous & Crumb rubber waste from tire. These panels are primarily used as walling material but can also be used as floor and roof panels. These are non-load bearing panels to be used with structural support frame only. architecture, civil engineering, interior architecture, material

**MY.21.**

<b>Title</b>	<b>Et-Cat V2.0 - Electrical Tree Computer-Aided Analysis Tool for Laboratory-Induced Microscopy Specimens</b>
<b>Authors</b>	Sivaganeson A/L Kumarasamy, Mohamad Nur Khairul Hafizi Rohani, Mohd Annuar Mohd Isa, Siti Khadijah Abdullah, Salisa Abdul Rahman
<b>Institution</b>	<b>Universiti Malaysia Perlis (UniMAP)</b>
<b>Patent no.</b>	Patent application No.PI2019006231, LY2021P00577, LY 2022P01680
<b>Description</b> <b>EN</b>	Short Electrical trees are the degradation events most linked with partial discharge (PD) activity in cross-linked polyethylene (XLPE) insulation of high voltage (HV) cables. To investigate tree structures and forms, study of electrical tree structures for morphological analysis often carried out using optical microscopy. However, since the noise induced by the occlusion and illumination, as well as by non-uniform intensity from optical device's setting causes the deterioration of the original microscopy images, resulting in critical loss of information pertaining the tree structures making it difficult to obtained accurate measurement. This analysis tool specially designed to provide assist to researchers in conducting laboratory-grown electrical tree under high voltage (HV) stress for

XLPE insulation investigative study. It allows researcher to perform reliable tree measurement compared to conventional method by applying image segmentation technique: Multi-scale Line Tracking Algorithm (MSLTA) to eliminate the noise in the original microscopy image thus providing very accurate measurement of tree features (length, width and area) under image degradation conditions. Added features include spatial distance measurement and image quality assessment (IQA) evaluation. This analysis tool possesses novelty, inventive step and industrial capability in order provide aid in electrical tree analysis especially in HV cables insulation manufacturing.

**MY.22.****Title****Hybrid Geopolymer Coating****Authors**

See Jie Xin, Farah Farhana Zainal, Mohd. Mustafa Al Bakri Abdullah, Sri Hastuty

**Institution**

**Universiti Malaysia Perlis (UniMAP)**

**Patent no.**

PI2022004719, US20110290153A1, EP2644583A1, LY2020003754

**Description  
EN**

Hybrid Geopolymer Coating (HGC) from processing of fly ash geopolymer paste as major solution to minimize deterioration by protecting surface of materials and increased strength of materials. HGC can be used as the coating paint to prevent the reinforcement in the reinforced concrete from corrosion. This coating paint coated in materials can be effectively used to create a resistant surface to the reinforcement of the concrete due to its properties which is low in water absorption and porosity. The hybrid geopolymer coating paint can withstand high temperatures which is an advantage of this coating application due to higher strength and improved thermal properties and other properties. This coating can prevent water from penetrating concrete to the reinforcement bar of the concrete due to its low water permeability properties.  
Building and Construction

MY.23.	
Title	<b>Compressive Strength Prediction Cement Concrete: Machine Learning Models</b>
Authors	Hoo Weng Lok, Erdy Sulino Mohd Muslim Tan, Marni Azira Markom, Allan Melvin, Pubalan A/L Nadarajan
Institution	<i>Universiti Malaysia Perlis (UniMAP)</i>
Patent no.	Copyright MYIPO: CRLY00027898 Copyright UK: waiting for approval
	Concrete is a widely used construction material in various structures such as buildings, bridges, dams, and roads due to its high compressive strength and durability. The strength of concrete is influenced by various factors such as the type and proportion of cement, aggregates, water, and additives used in its production, as well as the curing time. The prediction of concrete strength is crucial for the design and construction of safe and efficient structures.
Description EN	<p>In recent years, machine learning techniques have been increasingly applied to concrete strength prediction due to their ability to handle large datasets and complex relationships between input variables and output. In this study, we propose a machine learning model based on regression techniques for concrete strength prediction. The dataset used in this study includes various components such as cement, blast furnace slag, fly ash, water, super plasticizer, coarse aggregate, fine aggregate, age in days, and strength.</p> <p>Our objective is to develop a machine learning model that can accurately predict concrete strength based on the composition of the components used in its production and the age of the concrete. The proposed model will be trained on a portion of the dataset and validated on the remaining data to assess its accuracy and performance. The results obtained from the model will be compared with traditional methods of concrete strength prediction to evaluate the effectiveness of the proposed approach.</p> <p>Innovation research</p>



**MY.24.****Title****Next Generation Ceramic-reinforced Solder Materials for Green Electric Transportation****Authors**

Mohd Arif Anuar Mohd Salleh, Flora Somidin, Rita Mohd Said, Nur Syahirah Mohamad Zaimi

**Institution****University Malaysia Perlis (UniMAP)****Patent no.**

MY-169688-A and PI2021001280

**Description  
EN**

Electrification of vehicles is one of the main routes to future green transportation. The inclusion of embedded power electronics and other safety critical electronics systems in these vehicles, particularly autonomous drive, are pushing a growing need in reliability for long term survivability. The weakest link for these electronics devices are the solder interconnects. A novel composite solder was invented using powder metallurgy microwave sintering technique. A green composite solder with reinforcing materials of geopolymer ceramics, formed a geopolymer ceramic composite solder. The main purpose of this invention is to produce a novel solder material that results in strong and robust solder joints for harsh environment applications such as high power electronics with cost effective materials and processing.

**MY.25.**

<b>Title</b>	<b>Soil Revitalization for High Crop Yield</b>
<b>Authors</b>	Ahmed Osumanu Haruna, Liza Nuriati Lim Kim Choo, Latifah Binti Omar, Adiza Alhassan Musah, Rose Abdullah, Ng Ji Feng, Cristalina Jalil Marsal, Syahirah Binti Haji Shahlehi
<b>Institution</b>	<b>Universiti Islam Sultan Sharif Ali</b>
<b>Patent no.</b>	EP 12822678.4 (Europe), US 9,139,485 B2 (USA), 140100682 (Thailand)
<b>Description EN</b>	<p>The essential nutrients needed by humans, plants, and animals are primarily obtained from soils. There would be no life without soil because we need soil like the air we breathe. Moreover, the soil is a non-renewable resource and maintenance of its productivity is a collective responsibility of the human populace living anywhere in the world. Nutrient-deficient soils caused by soil degradation will not produce healthier food and high yield with all the needed nutrients for healthier life. Our innovation transforms high carbon and high nitrogen in unwanted agro-industrial wastes such as zeolites, slag, vegetables, fruits, pineapple, and peat waste into high quality soil organic and inorganic conditioners. When the conditioners are applied to marginal soils before and during crop cultivation, the conditioners restore the soils' productivity. Our innovation also improves crop yield, yield quality, and net profit of farmers.</p> <p>3. Agriculture and Food Industry</p>

**MY.26.**

<b>Title</b>	<b>EX-DHRES - EXPRESS YOURSELF, AVOID STRESS</b>
<b>Authors</b>	Effa Rina Mohd Matore, Mohd Effendi Ewan Mohd Matore
<b>Institution</b>	<b>Muallim District Education Office, Jln Stesen, Kampung Manggis</b>
<b>Patent no.</b>	<b>Research Centre of Education Leadership and Policy, Faculty of Education, The National University of Malaysia (UKM)</b>
<b>Description EN</b>	<p>PROJEK 4D OUTREACH IYRES COMMUNITY ENUMERATOR (ICE) 2016: KBS.IPPBM:800/1/2 (8)</p> <p>The main key inventions are related in developing 20 new intervention programmes for expressing students' potential and avoiding stress. The creative features called EX-DHRES - EXPRESS YOURSELF, AVOID STRESS related to more</p>

20 counselling fun-based idea with a lot of innovative activities. This innovation highlights the characteristics such as a power of expression methods as feelings expression through writing (text), words (verbal), drawing (art) and gestures (dance etc.). EX-DHRES has two main series namely EX-DHRES 1.0 and 2.0. EX-DHRES 1.0 involved many activities that in line with the main aims of the Malaysian Ministry of Education (KPM) and the Malaysian Ministry of Health (KKM) in implementing the expansion of the Healthy Mind Program for the students. The objective of this innovation is (a) to measure student satisfaction with the EX-DHRES program, (b) measure the changes in student stress levels before and after attending the EX-DHRES program, (c) examine the effectiveness of the EX-DHRES program to reduce stress among students, (d) examine changes in student behavior after undergoing the program as well as (e) assessing the impact on the implementation of EX-DHRES. Findings show that students are very satisfied with the implementation of EX-DHRES and that this program successfully reduces stress among school students.

## Moldova

### Technical University of Moldova

#### MD.1.

**Title** *Smart System for Planting Agricultural Crops*  
**Authors** *ABABII Victor, AXENTE Ion, SUDACEVSCHI Viorica, MUNTEANU Silvia, CĂRBUNE Viorel*  
**Institution** *Technical University of Moldova*  
**Project No.** *20.80009.5007.26*

The Smart system for planting agricultural crops is composed of the Electro-Mechanical system (Figure 1) and the Hardware-Software system (Figure 2), and is part of the field of Intelligent and Digital Agriculture.

The Electro-Mechanical System (Figure 1) consists of the Metallic Case on which all the basic components are fixed, the Delta Arm that positions the System for Planting Agricultural Crops, the System for moving the robot consisting of four wheels and four DC motors that, when rotating, determine the speed and its direction of moving, the Intelligent Control System, the Video Camera and the autonomous Power Supply.

#### **Description** **EN**

The Hardware System (Figure 2) consists of the set of Control Buttons that allow the selection of the system's operating mode, the Smart Control Unit based on the Jetson Nano Single-Board Computer and the Drivers board for controlling the motors of the Delta Arm device, and Driver - for controlling the system's movement motors in the activity space.

The Software part of the system performs an algorithm based on Artificial Intelligence models (Neural Networks, Fuzzy Logic and Evolutionary Computing) which provides for the acquisition of the image from the Video Camera, the processing and identification of the position of the agricultural crop planting system, the formation of command signals with the driving the Delta Arm device and moving the system in the activity space.

**MD.2.****Title****Method of drying sea buckthorn seeds****Authors**

Popescu Victor, Balan Tatiana, Țislinscaia Natalia, Vișanu Vitali, Melenciuc Mihail, Sandu Andrei-Victor, Țurcanu Dinu, Balan Mihail, Țărnă Ruslan

**Institution**

Technical University of Moldova

**Patent no.**

Patent application no. 2409 from 2023.03.13

**Description  
EN**

The invention relates to the food industry, namely to a method of drying sea buckthorn seeds. It can be applied to enterprises in the food industry, in laboratories and research centers related to drying processes.

The process of drying the sea buckthorn seeds in a suspended layer with the application of microwaves, according to the invention, consists in the execution of the following stages: Stage I, involves loading the sea buckthorn seeds into the vertically oriented square section tube and the formation of the suspended layer, by a current of air, in which a speed of 9.6 m/s develops, with a flow rate of 360 m<sup>3</sup>/h. Stage II requires turning on the microwave generator, at 350 W, with a frequency of 2460 MHz for a duration of 140 min. Stage III assumes that after a time of 140 min. the first seeds from the suspended layer automatically separate, they have the lowest mass and moisture concentration, after which they are followed by the rest of the seeds, independent of mass and moisture content for each one separately, and finally, after a period of 190 min., the seeds are also separated, which initially had a greater mass and a high moisture content. Thus we obtain a product with a high degree of uniformity of drying, in a short period of time.

**MD.3.****Title****Process for producing a non-alcoholic drink****Authors**

BOISTEAN Alina; CHIRSANOVA Aurica; RESITCA Vladislav; STURZA Rodica; DESEATNICOVA Olga; CAPCANARI Tatiana

**Institution****Technical University of Moldova, Faculty of Food Technology, Food and Nutrition Department****Patent no.**

MD 1630 Y 2022.07.31

**Description  
EN**

The problem solved by the invention consists in the improvement of the nutritional value and the widening of the assortment of non-alcoholic beverages and respectively

the widening of the circle of consumers. The advantage obtained by the invention is the use of local fruits / berries without heat treatment, so the drinks are enriched with vitamins such as: vitamin C, vitamin A, vitamin K, folic acid, etc. and minerals such as K, Ca, Mg, P, etc.

*The invention relates to the food industry, namely to a process for obtaining non-alcoholic beverages based on components of natural.*

#### MD.4.

##### Title

**Process for obtaining of the antioxidant extracts based on natural pigments**

##### Authors

BEŞLIU Alina, CHISELIȚA Natalia, CHISELIȚA Oleg, EFREMOVA Nadejda, TOFAN Elena, RUDIC Valeriu

##### Institution

Institute of Microbiology and Biotechnology of Technical University of Moldova

##### Patent no.

**Patent application No. a 2022 0058 from 29.12.2022**

##### Description EN

The invention relates to microbial biotechnologies, specifically to obtaining of new antioxidant extracts based on pigments from *Arthrospira platensis* cyanobacteria biomass, a residue from the production of the BioR remedy. The essence of the invention is the proposal of a new process for obtaining antioxidant extracts based on pigments from *Arthrospira platensis* cyanobacteria.

The remaining biomass, dried at the temperature of  $+50\pm 5^{\circ}\text{C}$ , is ground, and mixed with 96% ethyl alcohol in the 1:10 v/v ratio. The suspension is supposed to sonication (50 W) for 5 minutes or placed in a water bath at the temperature of  $+45^{\circ}\text{C}$  for 30 minutes with periodic stirring. At the end of the process, the extract is separated from the biomass by centrifugation at 3500 rpm. for 5 minutes. To obtain of the concentrated extract, the ethyl alcohol is removed using a rotary evaporator.

The technical result of the invention consists in obtaining of the antioxidant ethanolic extracts based on natural pigments with a content of  $\beta$ -carotene of  $0.645\pm 0.001$ - $0.6875\pm 0.010$  mg/100g, with 222-236% more than the closest solution. The extracts have catalase activity of  $659.02\pm 13.20$ - $720.14\pm 7.10$  mmol/min/mg protein, superoxide dismutase activity of  $107.52\pm 20$ - $545.95\pm 1.16$  U/mg protein and the concentrated extract contains  $14.21\pm 0.020$  mg/100g of  $\beta$ -carotene,  $0.569\pm 0.001$  mg/100g of lutein,  $14.243\pm 0.066$

mg/l of chlorophyll a,  $442.5 \pm 0.58$  mg/l of sulfated polysaccharides, total antioxidant activity of  $195.93 \pm 9.15\%$  inhibition, catalase activity of  $1235 \pm 30.59$  mmol/min./mg protein, superoxide dismutase activity of  $618 \pm 2.6$  U/mg protein. This process can be used to obtain extracts based on pigments for use in the zootechnical sector, the food industry and cosmetics.

*The research was carried out within the project 20.80009.5107.16 "New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest", funded by NARD.*

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**MD.5.**
**Title**

***Streptomyces massasporeus* CNMN-Ac-06 – source of biologically active substances for agriculture**

**Authors**

BÎRSA Maxim, BURȚEVA Svetlana, SÎRBU Tamara, GARBUZNEAC Anastasia, ȘEPTIȚCHII Vladimir

**Institution**

Institute of Microbiology and Biotechnology of Technical University of Moldova

**Patent no.**

**MD 1672 Y from 2022.09.08;**

**Decision to grant patent no. 10219 / 2023.02.14**

**Description  
EN**

Microbiological feed preparations are widely used in animal husbandry. These preparations include vitamins, amino acids, enzymes, lipid fractions, macro- and micro elements. They possess antioxidant, antibacterial, anti-stress, anti-inflammatory properties. There are microbial preparations based on streptomycetes, which in the process of synthesis of antibacterial substances form a large number of metabolites diverse in chemical structure, distinguished by high biological activity and the ability to correct a number of impaired physiological functions. The current invention relates to the strain *Streptomyces massasporeus* CNMN-Ac-06 and includes two directions:

- 1) Microbiological (MD 1672 Y) – increasing the productivity of bioactive substances in the strain *Streptomyces massasporeus* CNMN-Ac-06, by supplementing the nutrient medium with 1.37 g/l 4-aminobenzoic acid. The proposed medium contributes to the stimulation of: lipids by 32.28%, phospholipids by 111.5%, and steroids by 366.66%, in absolutely dry biomass.
- 2) Biotechnological (no. 10219) – feeding white rats (both

male and female) with a standard diet supplemented with biomass of the *Streptomyces massasporeus* CNMN-Ac-06 (250 mg/kg body weight per day), cultivated on nutrient medium supplemented with 4-aminobenzoic acid, contributes to a significant increase in body weight of experimental animals, especially from the 5th to the 10th week of feeding, at males with 73.34–488.14%, and females with 52.71–108.86%.

*Advantages:* Supplementing the nutrient medium of the strain *Streptomyces massasporeus* CNMN-Ac-06 with 1.37 g/l 4-aminobenzoic acid stimulates the lipid content in the obtained biomass, and its use as a supplement in the food ration of Wistar rats contributes to increasing body mass.

*Application:* Microbiology, Biotechnology, Physiology, Agriculture.

*The research was carried out within the project 20.80009.7007.09, funded by NARD*

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**MD.6.**
**Title**

**PROCESS FOR SUBMERGED CULTIVATION OF FUNGAL STRAIN *RHIZOPUS ARRHZUS* CNMN FD 03, PRODUCER OF LIPASES**

**Authors**

CILOCI Alexandra, BULHAC Ion, CLAPCO Steliana, DANILESCU Olga, DVORNINA Elena, LABLIUC Svetlana, MATROI Alexandra, URECHE Dumitru

**Institution**

Institute of Microbiology and Biotechnology of Technical University of Moldova,  
Institute of Chemistry of Moldova State University

**Patent no.**

**MD 4828 from 31.10.22.**

**Description  
EN**

The invention relates to biotechnology, and in particular to a process for submerged cultivation of *Rhizopus arrhizus* CNMN FD 03 fungal strain, producer of lipases. The process, according to the invention, includes the preparation of a spore suspension of the strain grown for 30 days on a malt-agar medium, inoculation of the suspension in an amount of 5 vol.% in a nutrient aqueous medium containing, g/L: soy flour – 35.0, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> – 1.0, KH<sub>2</sub>PO<sub>4</sub> – 5.0, with the simultaneous addition of 0.005-0.015 g/L of [Ca(L)<sub>3</sub>][Co(NCS)<sub>4</sub>], where L – dimethylpyridine-2,6-dicarboxylate, and cultivation with continuous stirring at 180- 200 rpm at the temperature of 28-30°C for 24 hours. The result of the invention consists in increasing the



biosynthesis of lipolytic enzymes by 34.0...78.4% compared to the control, and reducing the duration of cultivation of the strain by 24 hours.

The invention can be used in the microbiological industry for obtaining lipolytic enzymes with wide application in the food industry, production and processing of fats and vegetable oils, in medicine as a therapeutic and diagnostic agent.

*The inventions were created based on scientific results obtained within the project 20.80009.5007.28 "Development of new multifunctional materials and effective technologies for agriculture, medicine, technique and the educational system based on "s" and "d" metal complexes with polydentate ligands" funded by NARD, Republic of Moldova.*

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**MD.7.**
**Title**

**PROCESS FOR SUBMERGED CULTIVATION OF STRAIN *LENTINUS EDODES* (BERK.) SING. CNMN-FB-01**

**Authors**

CILOCI Alexandra, DVORNINA Elena, RUDIC Valeriu, BULHAC Ion, URECHE Dumitru, COCU Maria

**Institution**

Institute of Microbiology and Biotechnology of Technical University of Moldova,  
Institute of Chemistry of Moldova State University

**Patent no.**

**MD 4843 from 31.01.23**

**Description  
EN**

The invention relates to biotechnology, namely to the submerged cultivation of *Lentinus edodes* (Berk.) Sing. CNMNFB-01 fungi strain, producer of biomass. The method for submerged cultivation of *Lentinus edodes* (Berk.) Sing. CNMN-FB-01 fungi strain includes the inoculation of seed material in the amount of 10% v/v into a nutrient medium, containing, g/L:  $\text{NH}_4\text{NO}_3$  – 0.20,  $\text{KH}_2\text{PO}_4$  – 1.30,  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$  – 0.35, tris(2,6-dimethylpyridinedicarboxylate-1kONO)-di- $\mu$ -(isothiocyanato-1.2kN)-(diisocyanato-2kN)barium(II)cobalt(II) – 0.005-0.015, beer wort 5°Balling the rest, and cultivation with continuous stirring at a temperature of 28-30°C for 144 hours.

The technical result of the invention consists in reducing the duration of cultivation by 48 hours and increasing the production of biomass by 35.7-38.2%.

The invention can be used for producing medicinal preparations with curative and nutraceutical properties.

*The inventions were created based on scientific results obtained within the project 20.80009.5007.28 "Development of new multifunctional materials and effective technologies for agriculture, medicine, technique and the educational system based on "s" and "d" metal complexes with polydentate ligands" funded by NARD, Republic of Moldova.*

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**MD.8.**
**Title**

**Procedure for obtaining the proteoglycan preparation and its testing in the zootechnical field**

**Authors**

EFREMOVA Nadejda, CHISELIȚA Natalia, BEȘLIU Alina, CHISELIȚA Oleg, TOFAN Elena, RUDIC Valeriu  
Institute of Microbiology and Biotechnology of Technical University of Moldova

**Institution****Patent no.**

**Patent application No. a20220059**

**Description  
EN**

The invention refers to development of a process for The invention refers to development of a process for obtaining the proteoglycan preparation with high content of sulfated polysaccharides. The process is based on the use of cyanobacteria biomass remaining from the production of BioR bioremedy. Proteoglycans are used for substitution therapy in medicine; as an additive in animal feed, as well as in cosmetic industry. The technical result of the invention consists in the elaboration of the procedure for obtaining the proteoglycan preparation with a content of sulphated polysaccharides of:  $661 \pm 2.30 \dots 733 \pm 1.55$  mg/L which is  $28.96 \dots 32.12$  times respectively more than closest solution. The extracts possess superoxide dismutase activity of  $54.68 \pm 2.82 \dots 38.41 \pm 0.42$  U/mg protein and increased protein content  $20.66 \pm 0.12 \dots 26.50 \pm 0.06$  % dry weight., carbohydrates  $23.69 \pm 0.73 \dots 20.71 \pm 0.42$  % dry weight., the advantages of process are the obtaining proteoglycan preparation with antioxidant properties.

*Applications: Agriculture and Food Industry*

*The research was carried out within project 20.80009.5107.16 "New biologically active microbial preparations for increasing the reproductive and productive potential of animals of zootechnical interest", funded by NARD, Republic of Moldova*

**MD.9.****Title**

**Process for obtaining the biomass of the red microalga *Porphyridium cruentum* - source of omega 3 lipids with polyvalent properties**

**Authors**

RUDI Ludmila, CHIRIAC Tatiana, CEPOI Liliana, RUDIC Valeriu, VALUȚA Ana, DJUR Svetlana, MISCU Vera, IAȚCO Iulia

**Institution**

Institute of Microbiology and Biotechnology of Technical University of Moldova

**Patent no.**

**Patent Decision No. 10200 from 2023.01.28**

The invention relates to a proceeding for cultivating the red microalga of biotechnological interest *Porphyridium cruentum*, in order to obtain biomass with a high omega-3 lipid content.

The proceeding involves the cultivation of microalga *Porphyridium cruentum* CNMN-AR-01 on a nutrient medium containing citrate-stabilized gold nanoparticles 5 nm in size, in the concentration range of 4.8 - 5.1 nM, for 14 days at a constant temperature of 25-28<sup>0</sup>C and continuous illumination with an intensity of 50-57 μmol photons/m<sup>2</sup> and periodic slow stirring.

**Description  
EN**

The result of the invention consists in increasing the lipid content of algae biomass by about 52%. This result is due to the use of gold nanoparticles 5 nm diameter as a stimulator of lipid biosynthesis by the marine microalga *Porphyridium cruentum*, a valuable producer of omega-3 lipids. *Porphyridium* biomass obtained according to this proceeding can be used as a raw material for the manufacture and development of new nutraceuticals and original remedies based on omega-3 lipids with antioxidant, anti-inflammatory, antiatherogenic and regenerative properties.

*The research was carried out within the project 20.80009.5007.05 "Biofunctionalized metal nanoparticles – obtaining using cyanobacteria and microalgae", funded by NARD, Republic of Moldova*

**MD.10.****Title**

**METHOD AND DEVICE FOR PREDICTIVE  
MONITORING OF WIND TURBINE CONDITION  
AND IMPLEMENTATION OF  
COUNTERMEASURES**

**Authors**

Dulgheru Valeriu, Zaporozhan Sergiu, Larin Vladimir,  
Manoli Ilie, Munteanu Eugeniu, Rabei Ivan, Marin Guțu,  
Ciobanu Oleg, Ciobanu Radu.

**Institution**

**Technical University of Moldova**

**Patent no.**

Patent application nr. s 2022 0030, of 2022.05.18.

**Description  
EN**

The invention relates to devices for converting wind energy into electrical energy, in particular, to methods and devices for monitoring the condition of wind turbines.

In the method of predictive monitoring of the state of the blades, the reception and measurement of the signal regarding the appearance of a microcrack in the composite cover of the aerodynamic blade (4) is carried out by means of at least one non-contact deformation sensor (14) installed in the area with maximum stresses of the blade. The strain sensors (14) executed in a filiform manner can be impregnated in the composite cover of the blade. In the predictive monitoring method, the reception and measurement of the signal regarding the appearance of the ice layer on the outer surface of the aerodynamic blade (4) is performed by means of at least one temperature sensor (17). The device includes the tower (1), on which the nacelle (2) is installed, the wind rotor (3) with aerodynamic blades (4) connected with the driving shaft (5) of the mechanical multiplier (6), the electric generator (7), on the end of the rotor (8) a fan wheel (9) is freely installed, which can be screwed by means of a controlled coupling (10). At the same time, near the fan wheel (9) in the nacelle housing (2), at least one hole is made, which is "closed - open" with an adjustable cover (11). At least one temperature sensor (12) is installed on the housing of the electric generator (7), and strain sensors (14) and temperature sensors (17) are installed on the aerodynamic blades (4). Inside the aerodynamic blades (4) are installed elements for destroying the ice layer (16) deposited on the blade. Monitoring and processing equipment (EMP) (28), processor (29) and control system (SC) (30) provide processing of signals received from sensors, control and development of countermeasures.

**MD.11.****Title****VERTICAL AXIS WIND TURBINES WITH POWER CONTROL****Authors**

Bostan Viorel, Bostan Ion, Dulgheru Valeriu, Rabei Ivan, Guțu Marin, Ciobanu Oleg, Ciobanu Radu.

**Institution**

**Technical University of Moldova**

**Patent no.**

Patent nr. 1616Y, BOPI nr. 4/2022. of 2022.04.30.

**Description  
EN**

The wind turbine comprises a support tower, on the platform of which is installed a vertical rotating shaft, one end of which is connected to a generator with permanent magnets, and the other end, by means of levers is connected to inclined blades or to vertical blades. The lower part of the blades is rigidly connected by means of rods to a lower bushing, rigidly fixed on the shaft, and the upper part of the blades is rigidly connected by means of tubular rods to an upper bushing, installed on the shaft. Inside the tubular rods are placed inertial elements, connected by means of elastic elements to the upper bushing.

**MD.12.****Title****PRECESSIONAL PLANETARY TRANSMISSION****Authors**

Bostan Ion, Dulgheru Valeriu, Vaculenco Maxim, Bodnariuc Ion, Ciobanu Radu, Ciobanu Oleg, Malcoci Iulian, Slobodeaniuc Stanislav

**Institution**

**Technical University of Moldova**

**Patent no.**

Patent nr. 1610Y, BOPI nr. 3/2022. of 2022.03.31.

**Description  
EN**

The technical result of the invention consists in the following:

- compensation of the execution errors of the transmission parts, which influence the position of the contact point in the gear (eccentricity of the inclined part of the crankshaft, eccentricity of the base surface of the satellite block, eccentricity of the installation surface of the conical rollers of the toothed crowns etc.), by ensuring the possibility of micro-displacements in the three directions of the XYZ coordinate system;

- priming the shock loads on the gear by ensuring the micro-displacement of the units in the form of cells in the direction of the action of the normal force in the gear;

- reduction of slip friction losses by ensuring the micro-displacement of the cell-shaped units in the direction of the action of the friction force.

<b>MD.13.</b>	
<b>Title</b>	<b>BEE FEEDING PROCESS</b>
<b>Authors</b>	Eremia N., Macaev F., Sucman N., Pogrebnoi S., Coșeleva O.
<b>Institution</b>	<b>Technical University of Moldova</b>
<b>Patent no.</b>	<b>Patent application no. s 2022 0080</b> The bee feeding procedure includes feeding them in the spring with a mixture of 50% sugar syrup and 1.0-3.0 ml/L of an aqueous solution consisting of 1.0% hexaminecobalt(III) chloride and 1.5% of Steviozide glycosides, in the amount of 1.0 L of mixture to a family of bees, over every 7 days, from April until the main harvest.
<b>Description EN</b>	
<b>MD.14.</b>	
<b>Title</b>	<b>BEE FEEDING PROCESS</b>
<b>Authors</b>	Eremia N., Macaev F., Sucman N., Pogrebnoi S., Znogovan A., Modvala S., Mardari S.
<b>Institution</b>	<b>Technical University of Moldova</b>
<b>Patent no.</b>	<b>Patent application no. s 2022 0081</b> The bee feeding procedure includes feeding them in the spring with a mixture of sugar syrup in a concentration of 1:1 and 2.0...4.0 ml/L of biostimulator which is a 1.0% aqueous solution of hexaminecobalt(III) chloride and 1.5% of Rebaudioside A glycosides, in the amount of 1.0 L of the mixture to a family of bees, over every 6 days, starting in April until the main harvest.
<b>Description EN</b>	
<b>MD.15.</b>	
<b>Title</b>	<b>Dried fruit bar production process</b>
<b>Authors</b>	Ceșko Tatiana, Sturza Rodica, Gurev Angela, Dragancea Veronica, Ghendov- Moșanu Aliona
<b>Institution</b>	Technical University of Moldova
<b>Patent no.</b>	MD 10140 of 2022.10.06 The process consists in the preparation of vegetable bars from dried fruits with a dry matter content of 80...82 %, dried berries: sea buckthorn or rosehip or aronia berries with a dry matter content of 92...95 %, irradiated with microbiological lamps with a power of 35 W for 5...30 min, dried fruits are crushed to a granularity of 10...70 μ, mixed with 20...30 % of the total amount of suspension with active acidity pH 3.1...3.7 prepared from pectin, citric acid,
<b>Description EN</b>	

concentrated hydroalcoholic extract with a dry matter content of 70...85 % obtained from berry powders (sea buckthorn, or rosehip, or aronia) and water heated to a temperature of 45...50 °C; the mixture is shaped, cut into pieces, glazed with the rest of the pectin suspension, dried at a temperature of 40...65 °C to a final humidity of 18...23 % and packaged. The hydroalcoholic extract were obtained from powders of forest fruits (sea buckthorn, or rosehip, or aronia) taken in a ratio of 1:12...1:15 with an ethyl alcohol solution of 20...80 % v/v, microwave extraction is carried out at a magnetron power of 150...800 W, frequency of 2400...2500 MHz, microwave pulse duration 100 ms...10 s, temperature 30...65 °C for 1...10 min, filtering and concentrated in a rotary evaporator at a temperature of 60...65 °C to a dry matter content of 70...85 %.

**MD.16.****Title**

**Method for decreasing the working temperature and increasing the sensitivity to n-buthanol and hydrogen gas by gamma radiation field treatment of Pd functionalized ZnO:Eu sensors**

**Authors**

Lupan Cristian, Bîrnaz Adrian,  
Buzdugan Artur, Lupan Oleg

**Institution**

**Technical University of Moldova**

**Patent no.**

Patent application No. a 2022 0051/28.11.2022

**Description  
EN**

The invention relates to the method of improving the performance of n-butanol and hydrogen gas nanosensors based on Pd functionalized ZnO:Eu at lower operating temperatures by treatment for 60 seconds in gamma radiation field from Cs-137 source.

The gas response (S) is determined as the ratio of the signal in the presence of the detected object to the signal in the absence of the detected object  $S = I_{\text{gas}} / I_{\text{air}}$ .

After treating the nanosensor in gamma radiation field, the response value increased from 2.3 to 3.3 for 100 ppm hydrogen gas at 150 °C.

After treatment in the gamma radiation field the response value for 100 ppm n-butanol was 1.5 at 150 °C and 1.4 at 200 °C, compared to the response level below the detection threshold of the nanosensor untreated in the gamma radiation field.

**MD.17.****Title****Process for fabrication of magnetic nanostructures****Authors***Eduard Monaico, Veaceslav Ursaki, Vadim Morari, Ion Tiginyanu***Institution***Technical University of Moldova, National Center for Materials Study and Testing***Patent no.***Patent application No. a 2022 0012/22.02.2022***Description  
EN**

The invention refers to the technology for fabrication of nanostructured materials, especially to methods of magnetic nanostructures obtaining, which can be used in microelectronics, spintronics or data storage.

The novelty of the technological process lies in the combination of two technological steps for producing arrays of magnetic nanotubes. An inorganic nanotemplate consisting of arrays of semiconductor nanowires is prepared in the first step by anodization of a GaAs wafer with crystallographic orientation (001) or (111)B in aqueous HNO<sub>3</sub> electrolyte. The produced nanowires are coated with a magnetic metal layer in the second step via electroplating in the galvanostatic regime.

The axis of the obtained arrays of magnetic nanotubes is oriented either in the direction perpendicular to the substrate surface in the case of using GaAs wafers with (111)B orientation, or in the direction parallel to the substrate surface in the case of GaAs wafers with (001) orientation.

The advantages of the proposed process as compared to other existing processes consist in obtaining of arrays of nanotubes with controlled anisotropic magnetic properties, due to their orientation both in the plane perpendicular to the surface of the substrate, or in the plane of the substrate, as well as in the simplicity of the technological process of electrochemical deposition of the magnetic metal, which is performed in a single technological step, since the GaAs semiconductor template is conductive and does not require any prior deposition of a thin conductive gold layer.

This work received partial funding from the PostDoc Grant #21.00208.5007.15/PD and State program Grant #20.80009.5007.20.



**MD.18.****Title** *Wooden park bench***Authors** Guțu Ecaterina, Podborschi Valeriu**Institution** **Technical University of Moldova****Patent no.** Patent application**Description**  
**EN**

The invention consists in creating the design of a wooden bench in a rustic style for parks, by using two states of wood: processed with modern methods and the one created by nature.

The load-bearing structure of the bench is made of wood processed by machines and assembled-disassembled by bolts, and the seats are made of practically unprocessed logs, which gives us the feeling of being close to nature.

The seats move in relation to each other in order to bring you closer or further away from the person next to you, which also creates a moment of play.

**MD.19.****Title** *Specialized armchair for beauty salons***Authors** Mărgineanu Zinaida, Podborschi Valeriu, Zubcu Mircea**Institution** **Technical University of Moldova****Patent no.** Patent application**Description**  
**EN**

The invention represents the conception of the design of a multifunctional armchair exclusively for specialists who work in the field of manicure and pedicure, equipped with an adjustable backrest for the comfort of the client, neck support adjustments for facial treatments, with a removable sliding drawer for storing utensils, with client foot support for pedicure works, but also with a table on wheels as a work surface for manicure.

The armchair as a whole is perfect for working with four or six hands.

**MD.20.****Title** *Modular electric car***Authors** Zubcu Mircea, Podborschi Valeriu**Institution** **Technical University of Moldova****Patent no.** Patent application**Description**  
**EN**

The invention aims to develop the design of a modular electric car that can be adapted to different needs, by

modifying one or several modules, the car changes its appearance and the functions it fulfills.

The basic structure of the car body, which can be modified, changes in size, destination and function, thus obtaining a wide range of environmentally friendly means of transport, such as mini cars (courier and delivery, personal use with one or two seats and trunk), family (4-5 people and trunk), vans and means of public transport (1.5 tons of cargo or 12-15 seats for people with luggage), trucks, buses, fire trucks and tankers (up to 3.5 tons).

**MD.21.****Title**

**Process for obtaining functional sauce from sea buckthorn berries**

**Authors**

COVALIOV Eugenia, POPOVICI Violina, SIMINIUC Rodica, MACARI Artur

**Institution**

Technical University of Moldova

**Patent no.**

Patent MD Decision nr. 10194, 2023.01.12

**Description  
EN**

The process of obtaining the functional sauce from sea buckthorn berries takes place through the primary processing of the sea buckthorn berries (sorting, washing, straining). The sea buckthorn puree is passed through a sieve to remove the seeds and the skin of the fruits. Puree without seeds and skins is combined with sugar, mixed spices (cinnamon, cloves, nutmeg), agar-agar and stevia. The resulting mixture is cooked for 10 minutes at a temperature of 70...75°C, followed by cooling, at the same time the components are taken, in the following ratio: sea buckthorn berries (64.00...73.85%), sugar (25...35%), cinnamon (0.2...0.3%), cloves (0.1...0.2%), nutmeg (0.1...0.2%), agar-agar (0.35...0.45%), stevia (0.1%).

**MD.22.****Title**

**Precessional gear transmission**

**Authors**

*Bostan Viorel, Bostan Ion, Vaculenco Maxim, Bodnariuc Ion, Ciobanu Radu, Ciobanu Oleg, Vengher Dumitru*

**Institution**

**Technical University of Moldova**

WO 2021/137682 A1 /  
Patent application No. PCT/MD2020/000004

**Description**

*The precessional gear transmission comprises a body, a*

**EN** *satellite wheel with two bevel gear rings driven by a crankshaft in sphero-spatial motion around a fixed point, two central bevel wheels, one immobile fixed in the body and the other mobile mounted on a driven shaft. The teeth of the gear rings have a circular arc flank profile, those of the central bevel wheels are variable curvilinear. The configuration of the parameters of angles, the number of teeth, the ratio of the numbers of teeth of the mating wheels in the gears and the radius of the circular arc of the teeth profile of the gear rings determines the geometry and the kinematics of the contact of the teeth, the degree of frontal overlap, expressed by the number of simultaneously engaged pairs of teeth and defines the pressure angle between the mating flanks.*

Class

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**MD.23.**

**Title**

**Precessional transmissions with toothed gearings**

**Authors**

*Ion Bostan, Viorel Bostan, Maxim Vaculenco, Ion Bodnariuc, Valeriu Dulgheru, Sergiu Mazuru, Mihai Țopa, Radu Ciobanu, Oleg Ciobanu, Nicolae Trifan, Malcoci Iulian, Dumitru Vengher, Valeriu Odainâi, Victor Pavelco, Alina Bregnova, Vasile Muntean.*

**Institution**

**Technical University of Moldova**

**Patent no.**

*No. entry registration 2394, 06.02.2023*

**Description**

**EN**

The precessional transmission contains a housing, in which are located a satellite wheel with two bevel gear crowns, a crank shaft and two central bevel gears, one fixed rigidly connected to the housing and another connected to a driven shaft, the teeth of the satellite wheel crowns is described by a concave circle arc of radius  $r_a > r$  with the origin located on their axis of symmetry, so that the common points of the arcs  $G_{a_1}$  and  $G_{a_2}$  located in the mirror and spaced from each other according to the size of the radius  $r_a$  and the difference of the radii ( $r_a - r$ ), also if the precession angle  $\psi_k = 0^\circ$  the contact point  $G_{a_2}$  on the profile of the teeth of the satellite wheel coincides with the contact point  $k_1$  on the profile of the wheel with the angular coordinate  $\psi_{k_1} = 360^\circ Z_2 / Z_1^2$  then the tooth profiles for the variable precession angle  $\psi_k$  in the range  $0 \leq \psi_k \leq 360^\circ Z_2 / Z_1^2$  the tooth profiles will not contact

each other, respectively, they will not be overloaded, and if the contact point  $G_{a_2}$  is located on the portion of the teeth of the central wheel with the variable angular coordinate in the range  $0 \leq \psi_k \leq 360^\circ Z_2 / Z_1^2$ , only the portion of a pair of teeth proportional to the ratio  $\cup G_{a_1} G_{a_2} / 2$  and  $\cup k_0 k_1$ , is excluded from the gearing, and thus a cavity is formed in the interdental space of the teeth of the conjugate wheels for  $\psi_k = 0^\circ$  the functions of „pockets” for the accumulation of lubricant and „cushions” for damping of the dynamic loads generated at the high angular speeds of the wheels and their possible execution errors.

## Moldova State University

**MD.24.****Title**

**METHOD FOR DETERMINING THE  
CONCENTRATION OF -SH GROUPS IN SURFACE  
WATERS**

**Authors**

Vladislav BLONSCHI, Viorica GLADCHI, Gheorghe  
DUCA

**Institution**

**Moldova State University**

**Patent no.**

**MD a 2022 0030 / 2022.06.03**

**Description  
EN**

The invention refers to the field of ecological chemistry and can be used in the rapid and accurate determination of the concentration of -SH groups in natural waters to estimate their ecochemical state and in the identification of water pollution with proteinaceous compounds. The invention represents a spectrophotometric method for determining the content of -SH groups in complex solutions, which is modified and adapted to ecological chemistry.

Application of the method in estimating the content of SH-groups in surface waters in the river basin of the Dniester River.

**MD.25.****Title**

**METODOLOGY DETERMINING THE  
COMPREHENSIVE CONSOLIDATED INDEX FOR  
ASSESSING AND MONITORING THE ACTIVITIES  
OF UNIVERSITY INCUBATORS**

**Authors**

Mariana DOGA-MIRZAC

**Institution**

**Moldova State University**

**Patent no.**

**MD O 7267 / 10.05.2022**

**Description  
EN**

Development methodology determining the comprehensive consolidated index for assessing and monitoring the activities of university incubators being a theoretical-applicative structural mechanism in this field, based on in-depth research by arguing the scientific novelty and originality of the completed scientific product.

Application of the Methodology can be used to assess and evaluate the efficiency of Business Incubators, directly oriented towards the support and development of the activity of enterprises and especially of students and teaching staff

who are involved in the university environment it will also improve the scientific, social and economic effects aimed at attracting young people to the university/academic community and the formation of partnership relations between state institutions, universities and the private sector.

The method used involves two stages:

Stage 1 - The used method involves the calculation and highlighting of five indicators with a tactical objective embedded into the strategic objectives to establish and develop the small and medium sized within the University Incubators, namely: Integral Index of Establishment and Monitoring the Incubated Businesses (IIMII);, Integral Index of Efficient Use of the Financial Resources (IUERU); Integral Index of Efficient Use of the Human Resources (IUERU); Integral Index Characterizing the University Environment (ICMU); Integral Index of Efficient Use and Promotion of Innovations (IUPI).

Stage 2 - structured application the comprehensive consolidated index oriented towards evaluation and monitoring the business incubator located in the university environment.

Will allow the simplification of the process of evaluation and monitoring of the activity of innovation incubators by the National Agency for Research and Development, the Entrepreneurship Development Organization and its administrator.

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**MD.26.**
**Title**
**PROCESS REGENERATION OF ACTIVATED CARBON**
**Authors**

Vasile GUTSANU, Maria BOTNARU, Oleg PETUHOV, Gabriela LISA

**Institution**

**Moldova State University**

**Patent no.**

**MD a 2022 0035 / 2022.07.18**

**Description  
EN**

In the work, the regeneration conditions of commercial activated carbon of the Granucol type, which is widely used in the food industry, are determined. The conditions for the regeneration of coal used as a vitamin C sorbent are as follows: heating temperature in air - 350 °C and heating time - 40 minutes. The specific adsorption capacity of regenerated carbon for vitamin C is about 87 %.

<b>MD.27.</b>	
<b>Title</b>	<b>NEW MOLECULAR INHIBITORS AS ANTICANCER AGENTS</b>
<b>Authors</b>	Aurelian GULEA, Vasiliu GRAUR, Olga GARBUZ, Emil CEBAN, Irina USATAIA, Victor ȚAPCOV, Lilia ANDRONACHE, Valentin GUDUMAC
<b>Institution</b>	<b>Moldova State University</b>
<b>Patent no.</b>	<b>MD 4764/2021.08.31; MD 4778/2022.07.31</b>
<b>Description EN</b>	The invention relates to chemistry and medicine, namely to the biologically active coordination compounds that inhibit the growth and multiplication of human rhabdomyosarcoma RD cells. These agents exceed 8.75-28 times the analogous characteristics of the prototype that is used in medical practice, and 4.25-13.6 times analogous characteristics of the structural analog. Thus, they can find application in medicine for the prophylaxis and treatment of rhabdomyosarcomas.
<b>MD.28.</b>	
<b>Title</b>	<b>NEW ANTIBACTERIAL AGENT</b>
<b>Authors</b>	Aurelian GULEA, Vasiliu GRAUR, Greta BĂLAN, Victor ȚAPCOV, Ion TODERAȘ, Vasile LOZAN
<b>Institution</b>	<b>Moldova State University</b>
<b>Patent no.</b>	<b>MD 4842/2023.01.31</b>
<b>Description EN</b>	The invention relates to chemistry and medicine, namely to the biologically active coordination compounds that manifests high antibacterial activity against the species <i>Streptococcus pneumoniae</i> . The claimed substance exceeds by 66-132 times analogous characteristics of the Ampicillin and 7.9 times the characteristics of the structural analog. The discovered properties of this substance are of interest for medical practice in terms of expanding the arsenal of antibacterial remedies.
<b>MD.29.</b>	
<b>Title</b>	<b>UNIVERSAL MOBILE COMPLEX FOR FISH BREEDING</b>
<b>Authors</b>	Oleg CREPIS, Dumitru BULAT, Elena ZUBCOV, Denis BULAT
<b>Institution</b>	<b>Moldova State University, Institute of Zoology</b>
<b>Patent no.</b>	<b>10196 /2023.01.13</b>

**Description  
EN**

The invention can be used to breed fish with different breeding ecology under the conditions of rivers and lakes.

The complex contains a floating dock, in which a fish producer capture system, a fish reproduction system and a spawn collection and incubation system are located. The fish producers capture system consists of a compartment for the collection of fish producers and a device for moving the fish producers, made in the form of a net trap, and is equipped with physical radiation propagation sources. The fish breeding system contains a cylindrical basin with species-specific artificial substrates and a conical bottom with a central drain hole, in which a vertical perforated exhaust pipe is fixed, as well as compartments with propeller motors. The spawn collection and incubation system contains a rectangular basin, in which containers are placed in rows for collecting and incubating the eggs, as well as a device for collecting the deposited eggs.

**MD.30.****Title****METHOD FOR POND FARMING OF FISH  
PRODUCERS OF CYPRINIDS****Authors**

Elena ZUBCOV, Natalia ZUBCOV, Laurenția UNGUREANU, Nina BAGRIN, Liviu-Dan MIRON, Denis BULAT, Petru CIORBA, Lucia BILEȚCHI, Nadejda ANDREEV

**Institution**

**Moldova State University, Institute of Zoology**

**Patent no.**

**MD 1646 / 2022.10.31**

**Description  
EN**

The invention refers to the application of trace elements in fish farming, which is used to stimulate the development of cyprinid brooders in fish farms. The process of rearing the cyprinid brooders in ponds, according to the invention, includes the administration of cobalt (II) chloride at a concentration of 15-25 µg/kg of fish feed in the feed of brooders during autumn and spring. The performance of fish verified at the end of experiment: weight of obtained eggs, % of alive eggs before hatching, length of larvae (1st and 12th day after hatching), weight of one-summer carp fish fry.

The technical result of the invention consists in increasing the viable and healthy fish larvae and fry by 25%.

The invention patent can be implemented in small fish farms as well as large industrial technologies for contemporary artificial reproduction of carp and phytophagous fish for



intensification of the growth rate and increasing essentially the biological resistance of fish eggs, larvae and juveniles.

**MD.31.****Title****THE PROCEDURE OF COLLECTING****ECTOPARASITES FROM THE ALIVE *Galliformes*****Authors**

Ștefan RUSU, Dumitru ERHAN, Maria ZAMORNEA, Ion TODERAȘ

**Institution**

Moldova State University, Institute of Zoology

**Patent no.**

MD 1568 Z / 2022.05.31

**Description****EN**

The procedure of collecting ectoparasites from the alive Galliformes applied for the diagnostic and control purposes involves spraying these with 50 ml per bird, of the natural extract called *Ectogalimol* 5%, obtained from the dried aboveground parts of Dalmatian chamomile (*Pyrethrum cinerariifolium* Trev.), and elaborated within the Laboratory of Parasitology and Helminthology of the Institute of Zoology of the Moldova State University. Immediately after treatment through spraying, the bird is introduced into a nylon bag of the corresponding size with the opening around the head but leaving the eyes and beak outside the bag. Afterwards, the bird is kept on the horizontal surface for 5-10 minutes at 20-30°C, until the ectoparasites are immobilized. Then, the bird is taken out of the bag and the ectoparasites are shaken off the feather into the white plastic bowl of 35-40 cm diameter and 40-50 cm height. The practical relevance of this procedure is that the use of the extract *Ectogalimol* 5%, besides the fact it is organic, eco-friendly and inoffensive for the birds and the personnel involved in applying the remedy, it allows conducting simultaneously and effectively both diagnostics and disinfestation of galliformes. Importantly, this procedure excludes any restriction in consuming products/by-products of the treated and investigated birds as compared to applying the procedures involving the chemical origin remedies. The described procedure is being successfully applied in the forestry by the practitioners of the Society of Hunters and Fishermen from the Republic of Moldova (Implementation Act nr. 01 as of January 31, 2023).

**MD.32.**

<b>Title</b>	<b>METHOD FOR TREATING SEED POTATOES AGAINST THE NEMATODE <i>Ditylenchus destructor</i></b>
<b>Authors</b>	Maria MELNIC, Dumitru ERHAN, Olesia GLIGA, Ștefan RUSU, Ludmila BALAN, Valerina SLANINA, Leonid ONOFRAȘ, Vasile TODIRAȘ
<b>Institution</b>	<b>Moldova State University, Institute of Zoology, Institute of Microbiology and Biotechnology</b>
<b>Patent no.</b>	<b>MD 1658 / 2023.01.31</b> The invention relates to parasitology, in particular to a method for biological control of nematode <i>Ditylenchus destructor</i> Thorne, 1945 in seed potato and can be used in agriculture.
<b>Description EN</b>	The method for biological treatment of seed potato against <i>Ditylenchus destructor</i> nematode comprises of soaking seed potato before planting in a mixture of culture liquid containing <i>Bacillus cereus</i> var. <i>fluorescens</i> CNMN-BB-07 bacteria strain with a titer of $6 \times 10^8$ cells/ml and water taken in a ratio of 1:400, respectively, for 16 hours.
<b>Class</b>	

**MD.33.**

<b>Title</b>	<b>STRAIN OF FUNGI <i>Beauveria bassiana</i> CNMN-FE-01 – BIOINSECTICIDE AGAINST WEEVILS</b>
<b>Authors</b>	Anna MOLDOVAN, Natalia MUNTEANU-MOLOTIEVSKIY, Ion TODERAȘ
<b>Institution</b>	<b>Moldova State University, Institute of Zoology</b>
<b>Patent no.</b>	<b>MD 4560 / 2018.11.30</b> The invention refers to the biological control of insect pests and can be used in the formulation of products to control pest weevils. The new fungal strain was isolated from the environment and has shown increased insecticidal activity against pest weevils. The result is determined by the strain biochemical properties, mainly the ability to produce insecticidal metabolites. Application of <i>Beauveria bassiana</i> CNMN-FE-01 strain as a biopesticide will reduce the cost of the product and minimize the negative impact on ecosystems, seen from the use of other products, because no allogenic organisms or synthetic substances are introduced in the environment.
<b>Description EN</b>	

**MD.34.**

**Title** **USE OF (Z)-4,4-DIMETHYL-1-(2,4-DICHLOROPHENYL)-2-(1H-1,2,4-TRIAZOL-1-YL)PENT-1-EN-3-ONE AS A FUNGICIDAL REMEDY AGAINST *Alternaria alternata* AND *Fusarium aquaeductuum***

**Authors** Fliur MACAEV, Eugenia STANGACI, Marina ZVEAGHINTEVA, Serghei POGREBNOI, Lucian LUPASCU, Galina LUPASCU, Svetlana GAVZER

**Institution** **Moldova State University, Institute of Chemistry, Institute of Genetics, Physiology and Plant Protection**

**Patent no.** **MD 1636 / 2020.10.15**

The problem solved by the invention consists in the expanding the range of preparations from the class of 1,2,4-triazoles with fungitoxic activity that could be successfully used in agriculture to combat root rot caused by the fungi *A. alternata* and *F. aquaeductuum*.

**Description**  
**EN**

The advantages of the invention are that the compound (Z)-4,4-dimethyl-1-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-yl)pent-1-en-3-one contributes to the increase of fungitoxic activity for some of the causative agents of root rot – *A. alternata* and *F. aquaeductuum* in comparison to the prior art. Also, the compound of the invention has a low cost price compared to that from the prior art, because its synthesis takes place in a single step compared to 3 steps characteristic for the one from the prior art and consists in the use of ketone 3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)butan-2-one, obtained according to patent MD 4505.

The technical result consists in the increasing of the fungitoxic activity of the compound from the invention in comparison with the prior art with 10...25% for the fungus *A. alternata* and 18...33% for *F. aquaeductuum*.

**MD.35.**

**Title** **USE OF (Z)-1-(2,4-DICHLOROPHENYL)-5-METHYL-2-(1H-1,2,4-TRIAZOL-1-YL)HEX-1-EN-3-ONE AS AN ACTIVE INGREDIENT AGAINST *Alternaria alternata* AND *Fusarium aquaeductuum* fungi**

**Authors** Fliur MACAEV, Eugenia STANGACI, Vsevolod POGREBNOI, Serghei POGREBNOI, Lucian LUPASCU, Galina LUPASCU, Svetlana GAVZER

<b>Institution</b>	<b>Moldova State University, Institute of Chemistry, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>MD 4823 / 2020.10.15</b>
	The problem solved by the invention consists in the expanding of the range of compounds from the class of 1,2,4-triazoles with fungitoxic activity that could be successfully used in agriculture to combat root rot caused by the fungi <i>A. alternata</i> and <i>F. aquaeductuum</i> .
<b>Description</b>	The advantages of the invention are that the compound (Z)-1-(2,4-dichlorophenyl)-5-methyl-2-(1H-1,2,4-triazol-1-yl)hex-1-en-3- one contributes to the enhancement of fungitoxic activity for some of the causative agents of root rot – <i>A. alternata</i> and <i>F. aquaeductuum</i> in comparison to the closest prior art. Also, the compound from the invention has a low cost price compared to that from the closest prior art, because its synthesis takes place in one step compared to the 3 steps characteristic for the one from the closest prior art and consists in the use of ketone 4- methyl-1-(1H-1,2,4-triazol-1-yl)pentan-2-one.
<b>EN</b>	The technical result consists in the increasing of the fungitoxic activity of the compound from the invention in comparison to the closest prior art with 8,53%...30,37% for the fungus <i>A. alternata</i> and with 9,75...23,94% for <i>F. aquaeductuum</i> in the concentration range of 0,0025...0,01% in the last days of fungus cultivation.

**MD.36.**

<b>Title</b>	<b>CULTIVATION PROCESS OF CROP PLANTS</b>
<b>Authors</b>	Anastasia ȘTEFÎRȚĂ, Ion BULHAC, Lilia BRÎNZĂ, Leonid VOLOȘCIUC, Vera ZUBAREVA
<b>Institution</b>	<b>Moldova State University, Institute of Chemistry and Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>MD 1596 / 2022.09.30</b>
	The invention relates to agriculture, namely to the technology of growing cultivated plants, in particular corn and soya, and can be used for increasing the yield and efficiency of water use by plants. The problem that the proposed invention solves is increasing the productivity of plants and a the efficiency of plant water use both in optimal humidity conditions and in conditions of moderate drought. Summary of the invention consists in the presowing treatment of seeds and plants in the initial period of vegetative growth with a 0.0001-0.01% aqueous solution of
<b>Description</b>	
<b>EN</b>	

a preparation, containing 66.7% of thiourea and 33.3% of a mixture of potassium, ammonium, magnesium gallates, potassium molybdate and paramolybdate ammonium, taken in the appropriate mass ratio of 1:1:1:0.1:0.1, at the same time the treatment of plants is carried out twice with an interval of 2-3 weeks, with a consumption of 200 L/ha. The technical result of the invention consists in increasing the yield of corn and soya plants and the efficiency of water use by plants both under conditions of optimal humidity and under conditions of moderate drought. The advantage of the new procedure consists in the better truthful effect of the proposed, named preparation Thiogalmet, on the accumulation of plant biomass during ontogenesis, assimilation processes of carbon dioxide, water use efficiency, plant growth and productivity in both conditions favorable humidity conditions, as well as in drought conditions compared to the closest technical solution. The effect of the Thiogalmet on the plants productivity was tested in Protuvim-Agro SRL.

MD.37.

Title

**PERCHLORATE OF 2,6-DIACETYLPIRIDINE-BIS(PICOLINOYLHYDRAZONE)-BIS(AQUA)IRON(III)-HYDRATE(1/2,5) WITH STIMULATING PROPERTIES ON EXOCELLULAR LIPASE SYNTHESIS FOR THE *Rhizopus arrhizus* CNMN FD 03 FUNGAL STRAIN**

Authors

Olga DANILESCU, Ion BULHAC, Maria COCU, Pavlina BOUROSH, Alexandra CILOCI, Steliana CLAPCO, Svetlana LABLIUC, Elena DVORNINA

Institution

**Moldova State University, Institute of Chemistry and Institute of Applied Physics; Institute of Microbiology and Biotechnology, Technical University of Moldova**

Patent no.

**a 2022 0005 / 2022.02.04**

Description  
EN

The invention relates to coordination chemistry and biotechnology, in particular to the synthesis of a new coordination compound of iron(III) and 2,6-diacetylpyridine bis(picolinoylhydrazone), with biostimulatory properties on exocellular lipase synthesis in mycelial fungal strain *Rhizopus arrhizus* CNMN FD 03 that may be used in the development of biotechnologies to obtain

lipolytic enzymes.

According to the invention, a novel coordination compound perchlorate of 2,6-diacetylpyridine-bis(picolinoylhydrazone)-bis(aqua)iron(III)-hydrate(1/2,5) with the formula  $[\text{Fe}(\text{H}_2\text{L})(\text{H}_2\text{O})_2](\text{ClO}_4)_3 \cdot 2,5\text{H}_2\text{O}$ , where  $\text{H}_2\text{L}$  represents 2,6-diacetylpyridine bis(picolinoylhydrazone), is claimed. The claimed compound is highly soluble in water, which ensures a practical use as a component of nutrient mediums. The biostimulator ensures the increasing of lipases biosynthesis in the producer by 1,8...10,9% and reduction of duration of cultivation by 24 h.

**MD.38.**

**Title**

**REDUCING THE IMPACT OF TOXIC CHEMICALS ON THE ENVIRONMENT AND HEALTH THROUGH THE USE OF ADSORBENTS AND CATALYSTS OBTAINED FROM LOCAL RAW MATERIAL (20.80009.7007.21)**

**Authors**

Tudor LUPAȘCU, Oleg PETUHOV, Nina ȚÎMBALIUC, Raisa NASTAS, Mihail CIOBANU, Lucian LUPAȘCU, Irina GÎNSARI, Tatiana MITINA

**Institution**

**Moldova State University, Institute of Chemistry**

**Patent no.**

**20.80009.7007.21**

**Description  
EN**

Reducing environmental pollution as a result of harmful anthropogenic activity; rational use and capitalization of local mineral resources; improving the quality of water and soils by reducing pollution following the discharge of wastewater into the outfall or into the natural environment; wastewater treatment technologies for the purpose of protecting surface and underground waters.

**MD.39.**

**Title**

**NANOPOROUS AND NANOSTRUCTURED MATERIALS FOR MEDICAL APPLICATIONS**

**Authors**

Tudor LUPAȘCU, Oleg PETUHOV, Nina ȚÎMBALIUC, Raisa NASTAS, Lucian LUPAȘCU, Irina GÎNSARI, Tatiana MITINA, Silvia CIBOTARU

**Institution**

**Moldova State University, Institute of Chemistry  
H2020 /734641**

**Description  
EN**

NanoMed project aimed to stimulate intersectoral and international collaboration within Europe and with third countries in the area of novel nanostructured adsorbents for

the treatment of very serious health conditions associated with acute and chronic exposure to external radiation and uptake of heavy metals and radiation as a consequence of accidental, occupational and deliberate activation and events.

**MD.40.****Title****METHOD OF CORROSION PROTECTION OF STEEL IN WATER****Authors**

Vasile LOZAN, Vladimir PARȘUTIN, Alexandr COVALI, Tudor JOVMIR

**Institution**

**Moldova State University, Institute of Chemistry, Institute of Applied Physics**

**Patent no.**

**s 2022 0093 / 2022.11.08**

**Description  
EN**

The corrosion protection method provides the introduction of two inhibitors into the aqueous medium that contacts the steel surfaces, namely succinic acid dihydrazide at concentrations of 0.10...0.75 g/L and an aqueous extract, obtained from dry walnut leaves, at concentrations of 10...30 mL/L. Inhibitors can be introduced into the aqueous medium in admixture or sequentially. The aqueous extract of walnut leaves is obtained by heating the raw material in water on a water bath, at a temperature of 70...100 °C for 1...3 hours at a solid mass/water ratio of (2... 4):10, followed by separation of the resulting solution.

**MD.41.****Title****BEE FEEDING PROCESS****Authors**

Fliur MACAEV, N. EREMIA, N. SUCMAN, S. POGREBNOI, A. ZNAGOVAN, O. COȘELEVA, V. JEREGHI

**Institution**

**Moldova State University, Institute of Chemistry; Technical University of Moldova**

**Patent no.**

**s 2022 0079**

**Description  
EN**

Bee feeding process, which includes feeding them during the spring with a mixture of 50% sugar syrup and 1,25-3,5 ml/L of an aqueous solution consisting of 4 g of hexaminecobalt(III) chloride in 196 ml of distilled water, in the amount of 1,0 L of mixture for a family of bees, after every 7 days, from April until the main harvest.

<b>MD.42.</b>	
<b>Title</b>	<b>BEE FEEDING PROCESS</b>
<b>Authors</b>	MACAEV F., EREMIJA N., COȘELEVA O., SUCMAN N., POGREBNOI S., CATARAGA I., COJOCARI S.
<b>Institution</b>	<b>State University of Moldova, Institute of Chemistry; Technical University of Moldova</b>
<b>Patent no.</b>	<b>s 2022 0096</b>
<b>Description EN</b>	Bee feeding process, which includes the feeding of them in the spring period with a mixture of 50% sugar syrup and 0,75-2,5 ml/L of an aqueous solution consisting of 2 grams of the potassium salt of citronellic acid in 198 grams of distilled water, in the amount of 1,0 L of mixture per bee family, after every 10 days, from april until the main harvest.

<b>MD.43.</b>	
<b>Title</b>	<b>THE NEW TERPENIC COMPOUNDS BEARING 1,3,4-THIADIAZOLE/THIOSEMICARBAZONE FRAGMENT WITH ANTIFUNGAL PROPERTIES</b>
<b>Authors</b>	Aculina ARICU, Lidia LUNGU, Alexandru CIOCARLAN, Svetlana BLAJA, Nicoleta VORNICU
<b>Institution</b>	<b>Moldova State University, Institute of Chemistry</b>
<b>Patent no.</b>	<b>MD 4765/2021.08.31; MD 4769/2021.10.31</b>
<b>Description EN</b>	The inventions relate to chemistry, medicine and agriculture, in particular to terpenic compounds with 1,3,4-thiadiazole/thiosemicarbazone fragments and their use as antifungal agents. The 5-(homodrim-6,8-dien-11-yl)-1,3,4-thiadiazole-2(3H)-imine and (Z/E)-2-(1-((1R,2R,8aS)-2-hydroxy-2,5,5,8a-tetramethyl-decahydronaphtalen-1-yl)propan-2-yliden)hydrazinecarbothioamides possess high antifungal activity with the values of MIC 0.125 µg/mL and MIC 0.19 µg/mL, respectively. The inventions contributes to the increasing of the number of compounds with high antifungal activity.



<b>MD.44.</b>	
<b>Title</b>	<b>“MALENA” - RHIZOGENIC INTERSPECIFIC GENOTYPE (V. VINIFERA L. X M.ROTUNDIFOLIA MICHX.)</b>
<b>Authors</b>	Eugeniu ALEXANDROV, Vasile BOTNARI, Boris GAINA
<b>Institution</b>	<b>Moldova State University, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>MD 345 / 2020.04.30</b>
<b>Description EN</b>	<p><i>Malena</i> - interspecific grapevine genotype resistant to phylloxera and can be grown on its own roots, as well as for expanding the northern limit of grapevine plantations. The created variety withstands extreme temperatures during the winter period and can be grown vertically, pergolas, arches, etc. It shows good growth and ensures the formation of competitive harvests even in conditions with high temperatures above the multi-annual norms with low precipitation during the summer, on lands with low creditworthiness, etc. The Malena variety can be used in the creation of ecological grapevine plantations.</p> <p><i>Research was carried out within the project of the state Program 20.80009.5107.03 „Efficient use of plant genetic resources and advanced biotechnologies to increase the adaptability of crop plants to climate change”, financed by the National Agency for Research and Development.</i></p>
<b>MD.45.</b>	
<b>Title</b>	<b>NEW VARIETY OF GARLIC MOLDOBELA</b>
<b>Authors</b>	Vasile BOTNARI, Alexsei CHILINCIUK
<b>Institution</b>	<b>Moldova State University</b>
<b>Patent no.</b>	<b>Institute of Genetics, Physiology and Plant Protection MD 360/2021.06.30</b>
<b>Description EN</b>	<p>The variety is resistant to large temperature amplitudes in winter and summer, shows tolerance to the main diseases widespread in bulb crops. Bulbs have a long shelf life, flat-round shape with a weight of 35-65 g, Depending on the quality of the planting material, climatic conditions and the technological level of crop maintenance, in the absence of irrigation they form a production of 9.0-10, 5 t/ha.</p>
<b>MD.46.</b>	
<b>Title</b>	<b>VARIETY OF WINTER DURUM WHEAT (<i>Triticum durum</i> Desf.) - HORDEIFORME 335</b>
<b>Authors</b>	Piotr BUIUCLI, Efimia VEVERIȚĂ, Anatol JACOTĂ, Silvia ROTARI, Andrei GORE

<b>Institution</b>	<b>Moldova State University, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>v 2020 0023/ 2020.09.11</b>
<b>Description</b> <b>EN</b>	<p>The variety HORDEIFORME 335 is intensive. Created by individual selection from the Iantari x Hordeiforme 333 hybrid population. The <i>Hordeiforme</i> variety (red spike with red awns, the kernel is white-yellowish). Spike length – 7.7-8.0 cm, cylindrical shape with a density of 29-31 spikelets per spike. The kernel is oval, the weight of 1000 kernels is 48-51g, contains 12-13% protein and 24-25% gluten. The number of kernels in the spike varies between 41-45, in the spikelet 2-3.</p> <p>The vegetation period: 275-278 days – a medium maturity period. The height of the plants is 87.0-90.0 cm, the twining is 3.0-3.2 stems per plant. It shows resistance to drought, winter and diseases (powdery mildew, brown and yellow rust, root rot, downy mildew), high yield productivity: 5.4 - 6.0 t/ha. It is recommended to be sown in optimal terms with the seeding norm of 5 million grains per 1 ha. It has high qualities for the manufacture of high quality pasta. HORDEIFORME 335 is approved in Moldova.</p>

**MD.47.**

<b>Title</b>	<b>VARIETY OF WINTER TRITICALE (<i>Triticosecale</i> Witt.) - INGEN 33</b>
<b>Authors</b>	Piotr BUIUCLI, Efimia VEVERIȚĂ, Anatol JACOTĂ, Svetlana LEATAMBORG, Silvia ROTARI, Andrei GORE, Galina LUPASCU, Ilie CHIRTOACĂ
<b>Institution</b>	<b>Moldova State University, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>v 2020 0022 / 2020.09.11</b>
<b>Description</b> <b>EN</b>	<p>The variety INGEN 33 has been developed through hybridization of the varieties Ingen 8 (Institute of Genetics) and Plai (Romania), followed by an individual selection in F<sub>2</sub>. The variety belongs to the <i>Leucurum-Leocomeleian</i> variation (a white spike, without pubescence, with white and gray awns, the red kernel). The spike is of a medium size (10.0-11.0 cm), cylindrical of a medium density (28-30 spikelets per 10 cm of the spike rachis length). The kernels is large (the weight of 1000 grains are 45-52 g), oval, contains 24-25% gluten and 12.0-14.0% protein. The number of kernels in the spike varies from 53 to 70. The vegetation period is 273 - 280 days. The plants have a height</p>

of 90-93 cm, the number of stems per plant is 3.0-3.1. It is resistant to drought, wintering, fall and disease (brown and yellow rust, root rot, septoria, fusarium). It records a harvest of 5.9-8.0 t/ha, 1.5-1.8 t more than control cultivar INGEN 93. It is recommended sowing at the beginning of October with a seeding rate of 4.5-5.0 million grains per hectare. The cultivation technology is similar to that of common winter wheat. INGEN 33 is approved in Republic of Moldova.

**MD.48.**

<b>Title</b>	<b>PURPLE COMMON BASIL WITH CINNAMON FLAVOR (<i>Ocimum Basilicum</i> L.) VARAITY PICANT DE GRĂDINĂ</b>
<b>Authors</b>	Lilia CHISNICEAN, Tamara JELEZNEAC, Zinaida VORNICU, Natalia BARANOVA
<b>Institution</b>	<b>Moldova State University, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>v 2022 0017 / 2022.06.20</b>

**Description  
EN**

The variety Picant de grădină is part of the early maturity group. Semi herbaceous shrub with a height – 47,9cm. The diameter of the plant is 62,3cm. Spread with 46,6 inflorescence stems. Tiny dark purple oblong leaves – 59.4mm. Pink flowers - intensely placed in a spiciform racem. The aerial part is tender with clove aroma and spicy taste. Quality indices: essential oil content in the fresh mass – 0.128%, recalculated for dry matter – 0.641%. Productivity indices: fresh raw material – 10.8 t/ha. Productivity of pharmaceutical herbs – 2.1 t/ha. Production of essential oil – 9.99 kg/ha. Yield: 1.28 kg essential oil per 1 t raw material.

**MD.49.**

<b>Title</b>	<b>THYME WITH LEMON FLAVOR OF THYMUS X CITRIODORUS (PERS.) SREB. THE NEW VARIETY - LILY ROZ</b>
<b>Authors</b>	Lilia CHISNICEAN, Zinaida VORNICU, Tamara JELEZNEAC, Natalia BARANOVA
<b>Institution</b>	<b>Moldova State University, Institute of Genetics, Physiology and Plant Protection</b>
<b>Patent no.</b>	<b>v 2022 0016 / 2022.06.20</b>

**Description  
EN**

The variety Lily roz is part of the early maturity group. Perennial semi shrub with a height – 26,4cm. The diameter of the plant is 64,8cm. Spread with 447,3

infloriscense stems. Tiny green oval leaves 5 – 6mm. Pink flowers – intensely placed in a spiciform raceme. Essential oil content 0.326%, (moisture 60%); 1.247% dry matter. The average production of fresh raw material – 4.26 t/ha, pharmaceutical herba – 1.34 t/ha. Essential oil production – 13.9 kg/ha. Yield: 3.26 kg essential oil per 1 t raw material.

**MD.50.****Title****NEW TOMATO CULTIVAR - DIMETRA****Authors**

Milania MAKOVEI, Vasile BOTNARI

**Institution****Moldova State University,  
Institute of Genetics, Physiology and Plant Protection****Patent no.****MD 372 / 2021.05.18****Description  
EN**

Cultivar *Dimetra* of superdeterminant type growth (*ssp*), very compact. Early-ripening variety with a short vegetation period (96 to 100 days). The leaves are large, thick and intense green. The flowers are yellow. The first inflorescence appears after the 5th to 6th node, the next after 1...2. Fruits weight is of 90 to 120g, of the red-intense colour, with high taste properties. The fruits contain: 5.0 ... 5.4% dry matter, 4.4 ... 4.8% of sugars, 33.0 ... 34.8 mg /% of vitamin C and 0,28...0,38% of acidity. The total yield is 52.7 ... 54.9 t / ha, while the standard fruit yield is high 93...97%. It is resistant to the most common disease such as *Fusarium*, *Cladosporium*, tomato mosaic virus and resistant to abiotic stress factors – heat and cold temperatures.

Research was carried out within the project of the State Postdoctoral Program 22. 00208. 5107. 03/PD II

**MD.51.****Title****PHOTOACTIVE POLYMER MATERIAL****Authors**

Ion LUNGU, Stefan ROBU, Tamara POTLOG, Ana POPUȘOI, Iacob GUȚU, Ion BULIMESTRU

**Institution****Moldova State University****Patent no.****a 2022 0046 / 2022.10.26****Description  
EN**

Development of new photosensitizers (PSs) is an important area of study which could enhance cancer treatment. For synthesis of mono-substituted zinc phthalocyanine (ZnPc), mono-substitution phthalimide and paraformaldehyde of zinc phthalocyanine is stirred into 70 parts of 100% sulfuric acid at a temperature of 55°C. When solution is complete is added bis-phthalimidomethyl ether. The reaction is

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completed by heating at 80°C and the solution is drowned in ice water. The product is filtered, washed acid free, stirred in acetone and filtered. A dark blue powder of 70% yield of mono-(phthalimidomethyl) ZnPc phthalocyanine (CBIM-ZnPc) is obtained. Mono-substituted o-carboxybenzamidomethyl ZnPc conjugate to dextran via Friedel-Crafts reaction. The appearance of C=O and -CH<sub>2</sub>-N-CO-Ar groups at 1500-1735 cm<sup>-1</sup> in FTIR spectra confirms the formation of dextran-CBIM-ZnPc. The conjugation of ZnPc derivative to dextran shifts both absorption Soret and Q bands to longer wavelengths, increase the intensity and move subband 735 nm of CBIM-ZnPc with 17 nm to NIR region. Dextran-ZnPc copolymer constitute a new photosensitizer in medicine with absorbance in NIR region and the relatively long-lived excited states of the order of tens of microseconds (around 20 μs).

This research was supported by the research project: 20.80009.5007.16.

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**MD.52.**
**Title**

**AROMATIC PLANT VARIETY WITH HIGH ADDED VALUE**

**Authors**

Elena PELAȘ, Victor MELNIC

**Institution**

**Moldova State University**

**Patent no.**

**v 2022 0018 / 2022.07.20, Mentha variety - Elena 21**

**Description  
EN**

Mint plant variety Elena 21. High productivity of raw material. High volatile oil content. Disease and pest resistant. Widely used in pharmaceutical, cosmetology, food industry. Resistant to drought challenges. Experimental plots in different regions with different climatic conditions.

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**MD.53.**
**Title**

**CYANOPHITE MICROALGAL STRAIN *Nostoc punctiforme* (Kützting) - SOURCE OF PROTEIN**

**Authors**

Victor ȘALARU, Sergiu DOBROJAN, Mihai COSTICA, Evgheni SEMENIUC, Eugeniu CIOBANU

**Institution**

**Moldova State University**

**Patent no.**

**MD 4669 / 2020.07.31**

**Description**

The strain *Nostoc punctiforme* (Kützting) is proposed as a

**EN** source of vegetal protein, can be industrially cultivated that and be applied by the human species in practice. Cyanophite microalgal strain *Nostoc punctiforme* (Kützing) is a source of bioactive substances, having an high content of proteins - 18.50% -24.00%; lipids - 5.00% -10.00%; carbohydrates - 10.00% -13.00% dry mass and other components. The strain has a high tolerance to environmental factors.

Algal biomass can be used in pharmacology (as a source of medicament), agriculture (as a biofertilizer and biological nitrogen fixer in the soil) and in environmental protection (for the purification of waste water and the remediation of contaminated soils).

**MD.54.****Title****PROCESS FOR OBTAINING BIOORGANOMINERAL FERTILIZERS****Authors**

Gheorghe JIGĂU, Nicolai SPRÎNCEAN, Eugeniu SPRÎNCEAN, Sergiu DOBROJAN, Marin SPRÎNCEAN, Boris TURCHIN

**Institution**

**Moldova State University and SRL SCHIT-AGROMEX**

**Patent no.**

**a 2022 0036 / 2022.07.18**

**Description  
EN**

The procedure consists in the prior preparation of the nutrient substrate, waste from the thermoelectric industry, biomass, waste from the bakery industry, green biomass and bioorganomineral addition, inoculated after which the following operations follow: a) fermentation-composting of the bioorganomineral substrate; b) humification - which takes place under anaerobic conditions controlled by periodic oxygenation of the liquid component; c) maturing - carried out after settlement-extraction of the liquid fraction and transport in a storage container where it is maintained in a layer with a thickness of 50-60 cm. d) periodic treatment with effective preparations - the bioorganomineral substrate is periodically treated with preparations of nitrogen-fixing cyanophyte algae of the genus *Nostoc*, preparations of effective microorganisms and humic bioorganominerals obtained within the present process; e) administration of fertilizers.

<b>MD.55.</b>	
<b>Title</b>	<b>CERASUS TOMENTOSA (Thunb.) Wall. 'ANDREIA' PLANT OF PERSPECTIVE FOR THE REPUBLIC OF MOLDOVA</b>
<b>Authors</b>	Ion ROȘCA, Elisaveta ONICA, Alina CUTCOVSCHI-MUȘTUC, Alexei PALANCEAN
<b>Institution</b>	<b>Moldova State University, „Alexandru Ciubotaru” National Botanical Garden (Institute)</b>
<b>Patent no.</b>	<b>v 2022 0007 / 2022.03.17</b>
<b>Description EN</b>	<p>The 'Andreia' cultivar is a shrub characterized by exceptional abundance of flowering. The pink-white flowers are arranged 1-2 at a time. The fruits are spherical drupes, slightly pubescent, sweet sour as well as weight (2,1-2,7 g) and size (13-16 mm) of fruits. The fruits ripen in June-July. Fruits contain carbohydrates, organic acids, vitamins, minerals, beta carotene, melatonin, serving as a natural source of phytonutrients. The cultivar is used as a fruit-bearing, honey-bearing and ornamental plant for landscaping.</p> <p>The benefits of <i>Cerasus tomentosa</i>: Strengthens the immune system; Prevention and treatment of biliary and renal diseases; Regulates blood pressure; Balances body fluids; Maintains the elasticity of blood vessels; Reduces the concentration of C-reactive protein (inflammation marker).</p> <p><b>Application fields:</b> decorative, fruit-bearing, and honey-bearing plant.</p> <p>Financial support was provided by the National Agency for Research and Development, projects no. 20.80009.7007.19</p>
<b>MD.56.</b>	
<b>Title</b>	<b>CHAENOMELES JAPONICA (Thunb.) LINDL. EX SPACH 'ALEX' VALUABLE SOURCE OF NUTRIENTS</b>
<b>Authors</b>	Ion ROȘCA, Elisaveta ONICA, Alexei PALANCEAN
<b>Institution</b>	<b>Moldova State University, „Alexandru Ciubotaru” National Botanical Garden (Institute)</b>
<b>Patent no.</b>	<b>v 2020 0026 / 2020.10.08</b>
<b>Description EN</b>	<p><i>Chaenomeles japonica</i> (Thunb.) Lindl. ex Spach 'ALEX' is a shrub up to 1 m tall. The flowers are short pedunculated red-orange and grouped 2-6 in sessile racemes. The flowering period lasts 20-25 days. The color of the fruit is yellow-greenish. The average mass of the fruit was 41.9 g. The length of the fruit varied from 45-75 mm, the width - 35-45 mm. The surface of the fruit has reddish tinge striations in the southern part of the plant. The percentage of the mesocarp constituted about 90%, and the thickness of the mesocarp reaches 1.0 -1.2 cm.</p>

The purely ecological fruits of the dwarf Japanese quince contain organic acids, aromatic substances, antioxidants, carotenoids, carbohydrates, pectins, tannins, carotene, and in terms of the amount of vitamin C they are clearly superior to those of citrus fruits.

It is used as a fruit-bearing, medicinal, melliferous, forestry, decorative plant

Financial support was provided by the National Agency for Research and Development, projects no. 20.80009.7007.19

**MD.57.****Title**

**LYCIUM BARBARUM L. (Goji Tibetan) 'LICURICI'**

**Authors**

Nina CIORCHINĂ, Maria TABĂRA, Mariana TROFIM

**Institution**

**Moldova State University, „Alexandru Ciubotaru”  
National Botanical Garden (Institute)**

**Patent no.**

**v 2017 0006; MD 476 / 2023.02.14**

**Description  
EN**

Fruits contain multiple and diverse biologically active substances, which can be used in a processed state for health fortification, as well as as a raw material for the food industry and as a raw material. The variety created in pedoclimatic conditions of our countries possesses qualitative, highly productive, decorative indices, resistant to drought, frost, pollution, pathogens and pests. Shrub up to 2,0 m tall. Inflorescences solitary or grouped 3-7. Duration of the vegetation period April-November 230-240 days. The time of the beginning of flowering II decade of May. The color of the coral red fruit.

The average diameter of the fruit is 0,5-0,7 cm, the oblong shapewith medium firmness. The seed of the fruit varies 0,02-0,03 cm small in spherical shape. Prefers sunny places, prefers sandy, clayey or loamy soils, well drained.

Financial support was provided by the National Agency for Research and Development, projects no. 20.80009.7007.19

**MD.58.****Title**

**THE EASTERN GALEGA, *Galega orientalis* Lam.,  
LOCAL CULTIVAR 'SOFIA'**

**Authors**

Victor ȚÎȚEL, Alexandru TELEUȚĂ

**Institution**

**Moldova State University, “Alexandru Ciubotaru”  
National Botanical Garden (Institute)**

**Patent no.**

**MD 00013 / 2022.05.05**

**Description  
EN**

The cultivar 'SOFIA' of eastern galega, *Galega orientalis* Lam., family Fabaceae, has been created by individual breeding. This cultivar may be sown in a pure or mixed culture with several species of grasses and legumes, the established plantations are maintained for 15-20 years, it



possesses symbiotic nitrogen fixation capacity of 100-150 kg/ha/year. It can be used in the phytoremediation of degraded lands and the cultivation of marginal and polluted lands. The productivity of aerial fresh mass (2-3 cuts / season) reaches 78-92 t/ha or 15-20 t/ha dry biomass, may be use as forage for husbandry animals (natural fodder, hay, haylage, vitaminized flour). The biochemical composition and nutritive value of natural fodder harvested in flowering stage, first cut, was 23.4% CP, 26.6% CF, 28.8% ADF, 47.7% NDF, 3.6% ADL, 10.5% ash, 10.0 % TSS, 76.1 % DMD, 72.6 % OMD, RFV=128, 12.92 MJ/kg DE, 10.63 MJ/kg ME, 6.21 MJ/kg NEL, and – of prepared hay – 17.0% CP, 35.2% CF, 35.9% ADF, 54.4% NDF, 4.0% ADL, 9.6% ash, 7.6 % TSS, 63.0 % DMD, 57.6 % OMD, RFV=105, 12.03 MJ/kg DE, 9.88 MJ/kg ME, 5.90 MJ/kg NEL, respectively. The harvested mass may be used as feedstock for renewable energy production in biogas plants with methane potential of 305-350 l/kg. The eastern galega seed plantations provide a source of pollen and nectar for honey bees, for a 40-60-day period (May-July), with a honey production potential of 400-600 kg/ha, residues after harvesting the seeds may be use for solid biofuel – briquettes with 800-870 kg/m<sup>3</sup> specific density, 16.8-18.0 MJ/kg gross calorific value.

*Financial support was provided by the National Agency for Research and Development, projects no. 20.80009.5107.02. and 20.80009.7007.01*

**Contact:** vic.titei @gmail.com;  
gradinabotanicachisinau@gmail.com

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**MD.59.**
**Title**

**THE PLUME POPPY *Macleaya cordata* (Willd.) R.BR.,  
LOCAL CULTIVAR ‘MIHAELA’**

**Authors**

Victor ȚÎȚEI

**Institution**

Moldova State University, “Alexandru Ciubotaru”  
National Botanical Garden (Institute)

**Patent no.**

**MD 00014/2022.05.05**

**Description  
EN**

The cultivar ‘MIHAELA’ of plume poppy – *Macleaya cordata* (Willd.) R.Br., family Papaveraceae, has been created by individual breeding of introduced plume poppy taxa. This cultivar is a multi-purpose crop with medicinal, melliferous, ornamental and energy applications. The plant

possesses antitumor, anti-inflammatory, insecticidal and antibacterial properties, the content of BAS of leaves: sanguine 7.3-9.0 mg/g and chelerythrine 6.0-8.0 mg/g. As a honey plant – it provides pollen and nectar over the period July-August, the production potential: 180-200 kg/ha honey. The productivity of dry stem biomass for energy purposes, as solid biofuel: briquettes with specific density 780-830 kg/m<sup>3</sup> and pellets with specific density 960-975 kg/m<sup>3</sup>, the gross calorific value reaches 18.8-19.1 MJ/kg and 1.5-2.0% ash content. The plume poppy stem dry biomass harvested in March month contained 472 g/kg cellulose and 251g/kg hemicellulose; it can be as well utilized as a substrate to obtain cellulosic ethanol, with a potential of 525 l/t.

*Financial support from National Agency for Research and Development, project no. 20.80009.5107.02*

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**MD.60.**
**Title**

**MOBILIZATION OF PLANT GENETIC RESOURCES,  
PLANT BREEDING AND USE AS FORAGE,  
MELLIFEROUS AND ENERGY CROPS IN  
BIOECONOMY**

**Authors**

Țiței V., Cîrlig Natalia, Guțu Ana, Teleuță A., Lupan Aurelia, Cerempei V., Mocanu Natalia, Coșman S., Cozari S., Doroftei V., Gadibadi M, Coșman Valentina, Covalciuc D., Ababii A.

**Institution**

**Moldova State University, “Alexandru Ciubotaru”  
National Botanical Garden (Institute)**

**Patent no.**

**20.80009.5107.02  
42/IPS**

**Description  
EN**

During the implementation of the research project *“Mobilization of plant genetic resources, plant breeding and use as forage, melliferous and energy crops in bioeconomy”*, from priority II: *“Sustainable agriculture, food security and food safety”* and strategic direction: *“Cultivars and hybrids of high-productivity agricultural, technical and fodder crops”* the new collection of melliferous plants, with 50 plant taxa, was founded in NBGI. The collections of fodder and energy plants mobilized from the local flora and different floristic regions of the Earth were enriched with 100 new taxa, some agro-biological peculiarities were evaluated, the physical parameters of the seed material were established, the itinerary with the technical means for the cultivation and harvesting of

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multipurpose plants, the biochemical composition, nutritional and energy value of different types of fodder for farm animals were determined, the biochemical biomethane potential and cellulosic bioethanol potential from plant substrates were evaluated. Four new cultivars with multiple uses were bred and registered in the Catalogue of Plant Varieties of the R. Moldova

([https://cstsp.md/uploads/files/Registrul\\_2023\\_Tipar\\_Gray.pdf](https://cstsp.md/uploads/files/Registrul_2023_Tipar_Gray.pdf)) and patented by the State Agency on Intellectual Property of the Republic of Moldova (<https://agepi.gov.md/ro/publication/48>); two new cultivars of non-traditional crops were submitted for state testing and patenting. The results of scientific and innovative research were presented at 31 scientific events and 11 editions of international and national invention salons; 4 guides for agricultural producers were drafted and edited, and 96 scientific articles were drafted and published, including 3 articles in ISI journals ([www.incda-fundulea.ro/rar.htm](http://www.incda-fundulea.ro/rar.htm); [www.mdpi.com/journal/agriculture](http://www.mdpi.com/journal/agriculture)) and 31 articles in indexed journals from the Web of Science Core Collection databases, and 22 gold medals, 5 silver medals, 2 bronze medals and 4 special prizes were awarded. The research results were also presented in 15 TV/Radio shows.

*Financial support from National Agency for Research and Development, project no. 20.80009.5107.02.*

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## MD.61.

### Title

**NEW VARIETY OF PEONY (*Paeonia lactiflora* Pall.) - ANDROMEDA**

### Authors

Tatiana SÎRBU, Irina SFECLĂ, Doina ȘABAROV, Vasilii SLIVCA

### Institution

**Moldova State University, "Alexandru Ciubotaru" National Botanical Garden (Institute)**

### Patent no.

**MD 370/2021.06.30**

### Description

The variety was obtained in the "Alexandru Ciubotaru" National Botanical Garden (Institute) of the Republic of Moldova. It was registered at the State Agency on Intellectual Property of the Republic of Moldova, in order to be patented: v. 2018.12.11 nr. 0031

### EN

It is a rhizomatous geophyte of the horticultural class of

peonies with double flowers. The plants have a semi-spreading growth habit and grow about 80-100 cm tall. Abundant foliage. The leaves are biternate, glossy green. The 10-year-old plants form about 25 flower stalks. The flowers have a diameter of 15-17cm. Delicate aroma. The petals are large, obovate, purple-lilac, pearly. Stamens – present. The plants bear fruit, but not every year. They produce viable seeds. They bloom in middle-late May. It is a spectacular cultivar, designed for landscaping, but also for the production of cut flowers. This cultivar is suitable for container gardening. It grows best in full sun and in well-drained soils rich in organic matter. The cultivar is resistant to pathogens and pests and tolerant to temperature and soil moisture fluctuations.

This cultivar is recommended for cut flowers production, in various floral decorations, in landscape planning: flower beds, mixed flower beds, solitary groups, can be promoted as a container plant.

The research was conducted within the project 20.80009.7007.14. "*Research on mobilizing plant diversity with ornamental potential for ex situ conservation*".

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**MD.62.**
**Title**

**NEW VARIETY OF INDIAN CHRYSANTHEMUM**  
(*Chrysanthemum indicum* L.) - **CAPITOLINA**

**Authors**

**Ina VOINEAC, Svetlana GARGALÎC, Ion ROȘCA**

**Institution**

**Moldova State University, "Alexandru Ciubotaru"  
National Botanical Garden (Institute)**

**Patent no.**

**MD 369 / 2021.06.30**

**Description  
EN**

This cultivar has been obtained in the experimental fields of the "Ornamental Plants" Laboratory of the NBG (I). It is a perennial plant, which produces rhizomes. The plants are bushy, compact and hemispherical in shape. Their height and diameter is about 35-45 cm. The leaves are medium-sized, dark green, numerous, their width is 4-7 cm and their length – 5-8 cm. A plant usually consists of 5-9 shoots with about 50 anthodia on each of them. The flowers are fragrant, pink-lilac, semi-double, the centre – yellow, with a greenish hue. The diameter of the inflorescence – 3-6 cm. The colour of the anthodia changes during the flowering stage. The ligulate flowers, in three rows, at the beginning of the

flowering stage are bright pink, later – pale pink - lilac, and at the base and outside – cream. It is a late-flowering cultivar (September-October), the flowering stage lasts for 40-60 days. It is resistant to adverse conditions, pathogens and pests. It is recommended for cultivation in containers, for cut flower production and for landscaping.

The research was conducted within the project 20.80009.7007.14. *"Research on mobilizing plant diversity with ornamental potential for ex situ conservation"*.

**MD.63.****Title**

**HETEROJUNCTIONS BASED ON InP and GaN NANO/MICROMETRIC THIN FILMS FOR PHOTODETECTOR APPLICATIONS**

**Authors**

Vasile BOTNARIUC, Leonid GORCEAC, Simion RAEVSCI, Sergiu VATAVU

**Institution**

**Moldova State University**

**Patent no.**

**MD 4686 / 2020.12.31, MD 4772 / 2022.05.31; s 2023 0010 / 2023.02.02**

**Description  
EN**

The preparation of nCdS-pInP, nITO-TiO<sub>2</sub>-pInP, nZnO-pInP, nGaN-pSi heterojunctions with SiO<sub>2</sub> antireflective layers by use of HVPE (n/pInP, n/pGaN), MOCVD, magnetron sputtering (nZnO, TiO<sub>2</sub>), CSS (nCdS), spray pyrolysis (ITO), e-beam evaporation (SiO<sub>2</sub>) methods.

**MD.64.****Title**

**MODULATION OF THE IMMUNE STATUS USING NATURAL BIOACTIVE PRINCIPLES FOR THE PREVENTION AND PROPHYLAXIS OF ACUTE INFECTIONS IN THE CONTEXT OF THE COVID-19 PANDEMIC**

**Authors**

Iurie BACALOV, Elena CHIRIȚA, Adriana DRUȚA, Ana BÎRSAN, Ana ILIEȘ, Victor CIOCÎRLAN, Aurelia CRIVOI

**Institution**

**Moldova State University**

**Patent no.**

**20.70086.06 / COV(70105)**

**Description  
EN**

The purpose of the investigations consisted in the valorification of biologically active substances with an immunomodulatory effect, the strengthening of the immune system by them, with the possibility of further use in medicine, for the prevention of diseases and the prophylaxis of acute infections, determined by COVID-19, on the

background of carbohydrate metabolism disorders. The development of preparations based on biologically active compounds from plants and beekeeping products have allowed their use for medicinal and food purposes, a fact that argues the importance of scientific studies within the addressed problem. Thus, the natural solutions for maintaining the immune response represent, at present time, a special interest and have become the object of study of the present researches. As a result of the given study, we can conclude the following: One of the risk groups in the context of SARS COV-2 infection is diabetes mellitus, a pathology characterized by dysregulation of metabolism, as well as immunity. The administration of natural phyto- and apipreparations contributes to their normalization, which is expressed by the reduction, until the disappearance, of the primary symptoms and, respectively, reduces the risk of complications, caused by acute infections. The clinical-functional results highlighted the hypoglycemic and immunomodulatory effect of biopreparations, which are very important both in diabetes and in some viral infections.

**MD.65.****Title**

**NEW POSSIBILITIES OF CHANNELLING  
ULTRAVIOLET C RADIATION THROUGH  
METAMATERIALS TO IMPLANT CONTACT WITH  
CELLULAR TISSUE**

**Authors**

Ion MUNTEANU, Elena STARODUB, Nicolae Enaki

**Institution**

**Moldova State University, Institute of Applied Physics**

**Patent no.**

**20.80009.5007.01**

**Description  
EN**

The result of the process of poor adhesion to the surface between the implant and the cellular tissue may generate the appearance of pathogens that can cause various human diseases. A set of modern effects is proposed in the molecular interaction of Ultraviolet C (UV-C) radiation with human tissue on implant surfaces. Aspects of the interaction of UVC radiation with implant surfaces for the purpose of disinfection were investigated. Using metamaterials such as photonic crystals and photonic crystal fibers we have the possibility to channel UV radiation in the affected area of the implant surfaces

**MD.66.**

**Title** **MODEL FOR ASSESSING THE USEFULNESS OF FINANCIAL REPORTING INFORMATION AND ITS APPLICATION FOR THE PURPOSE OF ACCOUNTING HARMONIZATION**

**Authors** Irina GOLOCHALOVA

**Institution** **Moldova State University**

**Patent no.** **# 22.00208.0807.08/PD**

**Description**  
**EN**

The importance of the principle of usefulness of financial reporting information is reinforced in the context of responsible investment decisions. The implementation of this principle is possible on the basis of a model for assessing the usefulness of information, the development of which required an understanding of the theory of information as applied to the concept of financial reporting. The proposed model is based on a three-stage algorithm. In the first stage the properties of information, characterizing its semantic and pragmatic aspects, are identified. These characteristics are equal in importance and are assigned equal shares in the overall information utility. Information has the property of entropy, which reduces the real level of utility compared to the reference, to recovery of which attention is paid to such characteristics as comprehensibility and completeness. Accounting methodology distinguishes two systems: Anglo-Saxon, with the conceptual basis of IFRS, and the continental, based on the Directive. In comparison with the EU Directive, the IFRS provide for an economic approach in the preparation of financial statements, which leads to an increase in entropy. Neutralization of entropy is carried out through the application of additional characteristics of information. The proposed model provides for each of the designated accounting systems entropy coefficients and information utility boundaries, and is embodied in formulas for calculating the level of usefulness of financial reporting. The model demonstrated the implications of the combination of IFRS and the Directive in the national accounting system of Moldova without an effective conceptual platform.

**MD.67.****Title****USE EMBEDDING ALGORITHMS IN BIOLOGICAL DATA PROCESSING****Authors**

Ion GANEA

**Institution****Moldova State University****Patent no.**

Embedding has broad applications in areas such as graph visualization, link prediction, node grouping and classification. Embedding maps the entire graph from two-dimensional space to N-dimensional space and calculates how similar the nodes are.

**Description  
EN**

If we want to anticipate the efficiency of a biostimulator, we add attributes or characteristics and put them in a vector. This vector multiplied by a weight and the addition of a feature gives us a prediction of the factor we need. The vector has the same characteristics for each biostimulator and at the beginning, it is decided to order those characteristics, such as root length, stem length, root and stem biomass, etc.

Information Technology and Communication.

**MD.68.****Title****INTELLIGENT SUPPORT SYSTEM APPLIED TO SCHOOL MATHEMATICS LESSONS****Authors****Gabriela Cristina BRĂNOAEA****Institution****Moldova State University,  
Physical, Mathematical, Information and Engineering  
Sciences Doctoral School****Patent no.**

This paper presents the relevance of artificial intelligence in the teaching of mathematics by using an Intelligent Support System made in Wolfram Mathematica. This system allows the design of an unlimited number of personalized items necessary for the training of students in mathematics. Neuroscience research in collaboration with artificial intelligence can lead to deeper and faster personalized math learning, increasing the potential of every student.

**Description  
EN**

AI's potential to revolutionize the way students learn has made it an attractive option for educational institutions.

The **intelligent decision support system** is designed using the generic problem-family oriented programming methodology of e-Learning systems that implement the concepts of "custom



tasks" and "problem-solving open-response assessment items" on the computer.

The intelligent support system is divided into three parts:

**student mode** (diagnosis of the student's learning characteristics, evaluation of the current level)

**author-teacher mode** (structuring educational supports, creating methods for creating adaptive study material )

**virtual teacher mode** (design of adaptive algorithms for optimal training of personalization of the learning environment and recording of progress)

The main components of the ISS are as follows:

1) the ISS **knowledge base** consisting of:

(a) the set of families of specific tasks;

(b) the set of generic models of specific task families;

2) the ISS **database**;

3) the **composer of personalized tasks** for each student in the mathematical discipline;

4) the solver of mathematical tasks obtained at stage 3;

**The innovative part** of this approach consists in the expansion of standard e-learning platforms, through the intelligent component that facilitates **custom tasks**.

Each specific problem is automatically generated and customized each time the student accesses it.

A major benefit of the ISS is the way it works, analyzing answers and allowing teachers to see how many times students try exercises, if they succeed, if they assimilate the concepts, and if they struggle.

The initial tasks can be extended for an unlimited number of variables so that each student in a class, at each access, receives a different exercise, but with the same degree of difficulty, and the methodology used can be extended to the other learning units in the curriculum of mathematics.

In this way, remarkable practical results can be obtained thanks to the objective evaluation of each student, removing the risk of attempts to copy.

The results of the research are used in the practice of teaching mathematics at Secondary School No. 10 in Bacău.

This research was supported by the PhD project "Intelligent support system for acceleration of mathematical acquisitions in high school students".

Scientific advisor: Professor, PhD Gheorghe CĂPĂȚĂNĂ

**MD.69.****Title****MIND-BRAIN-BODY CONNECTION IN THE FIELD OF EDUCATION****Authors**

Eugenia BOGATU

**Institution****Moldova State University****Patent no.****20.80009.1606.08****Description  
EN**

Our human development is due to several factors, such as the correlation between mind, brain, body. This correlation allows us to have a complex, integrative view of a series of phenomena occurring in our body and mind. To have a permanent state of well-being, it is necessary that between the mind, brain, body, and the immediate context in which we live and act to have a natural connection. When there is a discrepancy between the elements of this correlation, it goes without saying that a cognitive discrepancy is occurring. Effective communication from this point of view aims to direct the flow of energy and information towards a complex integration of the entire human development system. Our well-being owes much to this integration. The mind-brain-body connection most directly shapes our well-being. Knowledge of the human brain is necessary for effective communication in this field. Objectively speaking, until now everything related to the knowledge of the human brain has not been considered, most of the time in education.

**MD.70.****Title****THE PLURALITY OF AN EXPLANATORY CONSTRUCTION OF THE MODERNIZATION PROCESS FOCUSED ON THE PROTECTION OF HUMAN RIGHTS****Authors**

Rodica CIOBANU

**Institution****Moldova State University****Patent no.****# 20.80009.1606.15****Description  
EN**

The research highlights the transition from conceptualizing the modernization of governance to understanding the crisis of modernization, with the aim of identifying mechanisms and tools for the effective realisation of governance centred on the protection of human rights in societies such as the Republic of Moldova.

The research identifies the biggest problems faced by

Moldovan citizens in relation to the governance: human rights violations, corruption, lack of professionalism and inefficient management of resources.

In order to address these issues and to identify governance mechanisms focused on the protection of human rights, we outline, in a synthetic formula, the linkages and interdependencies to provide the appropriate theoretical and methodological foundations. The integrated nature of the applied methodology has advanced the concept of rationalization of the form and nature of effective governance in the conditions of Moldova.

This explanatory formula identifies real prospects for defining, understanding and achieving modernization through rationalization and instrumentalization of the governance act. The research shows the rationale of the explanatory construction of the process of modernization of governance in the Republic of Moldova.

The convergence of managerial, political and legal approaches leads to the articulation of views and evidence on the priorities for a project of modernization of governance in the Republic of Moldova.

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**MD.71.**
**Title**
**REMEDIES FOR THE LEGAL CRISIS IN THE  
REPUBLIC OF MOLDOVA**
**Authors**

Rodica CIOBANU

**Institution****Moldova State University****Patent no.****# 20.80009.1606.15****Description  
EN**

The research analyses the impact of the legal crisis on the process of implementing reforms in Moldova.

The methodology adopted used quantitative and qualitative methods as well as multiple evaluation methods.

***Stage 1. Investigating the effectiveness of law***, targeting reforms initiated by the government in 2019 after the adoption of the Declaration of Captured State, hindered by pandemics, the war in Ukraine and the systemic crisis of law.

***Stage 2. Gathering citizens' opinion*** with reference to the crisis of law. Law and crisis were placed in a joint conceptual framework and law and rights were placed under the heading of crisis.

**Stage 3. Data analysis and preparation of conclusions:** it confirms the crisis of law, determines its causes, impact and mode of manifestation.

**Step 4 Testing of results and peer review.** (academia). Shows impact on citizen-authority interactions; non-effective and inapplicable legal standards.

**Step 5. Assessment of public and civil society perspectives.** Notes similar problems and need for urgent solutions.

**Step 6. Data analysis, generalisation and framing the solutions.** Conclusion: - modernisation requires consistency, institutional reform and addressing the crisis of law in its various manifestations; - solutions drafted and put forward for action.

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**MD.72.**
**Title**

**DISCOVERING THE MYSTERIES OF PI THROUGH AUGMENTED REALITY TECHNIQUES**

**Authors**

Inga TITCHIEV, Olesea CAFTANATOV, Veronica IAMANDI, Dan TALAMBUTA

**Institution**

**Moldova State University, Vladimir Andrunachievici Institute of Mathematics and Computer Science**

**Patent no.**

**# 20.80009.5007.22**

**Description  
EN**

The aim of our research are exploring the impact of augmented reality techniques in discovering the mysteries of Pi.

For these purpose the educational application of augmented reality (AR) delivered via mobile device that engages pupils with a wide range of multi-sensory learning experiences was proposed, which could potentially provide rich, contextualized learning for understanding concepts related to transcendental number Pi.

Advantages of the proposed approach consists in changing the abstract concept to the tangible one, allows pupils not only to see, but also to experience and practice, which takes the education process to a new level. This application can also serve as software assistive technologies for hearing and visually impaired children.

**MD.73.**

<b>Title</b>	<b>VISIBLE LIGHT ACTIVE NANOCRYSTALLINE TIO<sub>2</sub> / DIATOMITE HYBRID PHOTOCATALYST WITH ADVANCED CATALYTIC PROPERTIES: SYNTHESIS, CHARACTERIZATION AND APPLICATIONS FOR ENVIRONMENTAL PROTECTION</b>
<b>Authors</b>	Tatiana DATKO, Veaceslav ZELENTOV
<b>Institution</b>	<b>Moldova State University, Institute of Applied Physics</b>
<b>Patent no.</b>	<b>ANCD # 20.80009.5007.06</b>
<b>Description</b>	A new photocatalyst DTD LV, active in the visible wavelength range, which is characterized by high photocatalytic activity, on the base of nanocrystalline anatase and diatomite has been obtained in one stage synthesis.
<b>EN</b>	The synthesis was carried out under conditions of normal temperature and pressure. The nitrogen as the dopant has been applied. The advantages of a mineral support – diatomite, for anatase nanoparticles allowing it to be used in slurry-type reactors, and the modification of the anatase crystal lattice with nitrogen compounds ensuring visible light activity have been combined at the same time. The photocatalyst can be used for mineralization of hardly decomposable, low-concentration highly toxic organic compounds in aquatic environment.

**MD.74.**

<b>Title</b>	<b>TREATMENT PROCEDURE OF ACTIVATED SLUDGE FROM WASTEWATER</b>
<b>Authors</b>	Petru SPATARU, Alexandru VISNEVSCHI, Oxana SPINU
<b>Institution</b>	Tudor SPATARU, Igor POVAR
<b>Patent no.</b>	<b>Moldova State University, Institute of Chemistry</b> <b>s 2022 0101 / 2022.12.22</b>
<b>Description</b>	The purpose is transforming the parasitic flotation phenomenon of activate sludge ( <b>AS</b> ) into a useful effect of concentrating solid organic residues. Three possibilities are proposed for separating organic solids by flotation: a) Practicing specific microbiocides; b) Primary sediment ( <b>PS</b> ) + <b>AS</b> combinations; c) Aged <b>AS</b> (approx. 60 days). In the
<b>EN</b>	

case of aged **AS** the conditions are created for the decrease/disappearance of oxygen dissolved in water, the death and decomposition of aerobic microorganisms and their lysis. The implementation of our results will allow (I) reduction of treatment surfaces for organic sediments from wastewater treatment; (II) avoiding the application of flocculants; (II) energy saving (use of energy/seasonal temperature) for solids separation; (IV) separation water can be sent to a nitrogen separation stage only (in recycle).

**MD.75.****Title****REAL-TIME MONITORING AND INSTANT ALERT SMART PLATFORM****Authors**

Veaceslav SPRINCEAN, Alexei LEU, Roman BUIESTRU, Mihail CARAMAN, Vasili ANDRUH, Marian JALENCU, Marianna SAVVA, Florentin PALADI

**Institution**

**MOLDOVA STATE UNIVERSITY,**

**Faculty of Physics and Engineering**

**Patent no.**

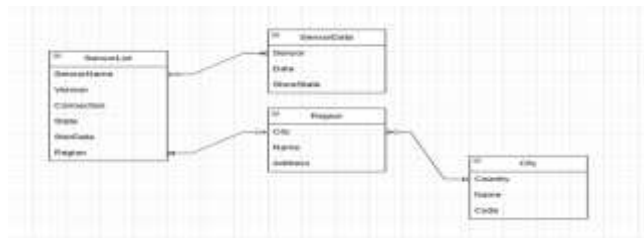
„Advanced physical technologies with UVS application in monitoring and modelling of environmental factors”, State Program, 2020-2023

**Description  
EN**

eALERT platform. The very etymology of the name eALERT is: e - environment, ALERT - alert. eALERT is primarily an LPWAN wireless network composed of intelligent IIoT end devices, hereafter "nodes", which redundantly transmit telemetry data directly to base stations (Gateway) equipped with autonomous power supplies and local storage memory which in turn transfer it to the network server. Initially, a star wireless network topology based on LoRaWAN technology is proposed, which later, with the widening of geographical areas and the significant increase in the number of nodes, will be transformed into a multi-hop one, forming "wireless mesh" networks. Telemetry data streams from the stations are transmitted in real time over the LoRaWAN network to the network server. Through the secure application server of the eALERT information platform, applications that consume data from the nodes can be accessed through the network server and displayed in the UI (User Interface) to provide the most relevant information to the beneficiaries. At the same time, beneficiaries who have their own optional information systems can bi-directionally access data from the eALERT platform via the Application Programming Interface (API). Bi-directional communication gives beneficiaries (state and/or private organisations, etc.) access to the data and information in the system. It is also possible to send alerts directly to these entities as

well as to individuals on the list of beneficiaries (Fig.). Thus, instant information to the population of Chisinau in case of natural and anthropogenic dangerous hazards is done by sending SMS messages to the list of subscribers.

The first step in this process is to obtain valid data from sources, sensors to be installed. Then the input data should be converted to json or any other convenient format, as this is the most suitable for fast processing. After preprocessing, the data is stored in nosql database. after the data is stored in a temporary database, a trigger is set to transfer the data to the data warehouse. This repository is designed for long-term storage and analytical processing of data



The diagram above shows some of the components for storing messages received from sensors in a form already convenient for analytical reports in the user interface.

The first object is a sensor list (SensorList) - it is necessary to store all sensors connected to the system, as well as their configurations and methods of connecting to them.

The second object is SensorData, which is responsible for storing all information from any sensor.

The other two components (Region, City) are needed for accurate location of installed sensors. They are also involved in generating reports for this or that location in the user interface.

**Acknowledgements:** This research was supported by the NARD&MSU research project #20.80009.7007.05

**Nicolae Testemitanu State University of Medicine and  
Pharmacy of the Republic of Moldova**

**MD.76.****Title**

**Use of bromo-2-{{2-(prop-2-en-1-ylcarbamothioyl)hydrazinylidene}methyl} phenolatocopper as a catalase production and/or activity stimulator**

**Authors**

Gulea Aurelian, Gudumac Valentin, Graur Vasilii, Țapcov Victor, Andronache Lilia, Ceban Emil, Pantea Valeriana

**Institution**

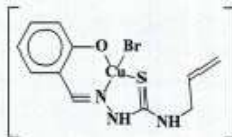
**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

*MD 4838*

**Description  
EN**

The invention relates to chemistry and medicine, namely to the use of a biologically active copper coordination compound (CCC) as a catalase production and/or activity stimulator. This CCC can be used in medicine as a drug which, by stimulating the production and/or activity of catalase in the body, can prevent and/or reduce the development of cellular and tissular lesions associated with excessive accumulation of reactive oxygen species (ROS), as well as the occurrence of neurodegenerative, renal, cardiovascular pathologies, atherosclerosis and carcinogenesis, and inflammatory processes. Summary of the invention consists in the use of bromo-2-{{2-(prop-2-en-1-ylcarbamothioyl)hydrazinylidene}methyl}phenolatocopper of the formula:



as a catalase production and/or activity stimulator.

Domains of application: Bio-organic chemistry, medicine, pharmacology, pharmacy, medicine technology

**MD.77.****Title**

**Device for normalization of intraocular pressure**

**Authors**

Bendelic Eugeniu, Alsaliem Sulaiman

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

INTERNATIONAL EXHIBITS



<b>Patent no.</b>	MD 1514
	The invention relates to medical equipment, in particular to a device for normalization of intraocular pressure, and can be used in ophthalmic microsurgery for the surgical treatment of patients with glaucoma.
	Summary of the invention consists in that the device (fig. 1) comprises a tube of a length of 3 mm, an inner diameter of 0.3 mm and an outer diameter of 0.6 mm, connected at one end to the middle of the working head, made in the form of a semicircle with a diameter of 3.0 mm and a thickness of 0, 4 mm, at the same time the tube communicates with the inside of the working head by means of a through hole, and the device is made of polyethylene.
<b>Description EN</b>	The problem solved by the present invention is the development of a device for the normalization of intraocular pressure, which would avoid the occurrence of postoperative complications.
	The advantages of the claimed device consist in the fact that the construction of the device allows the performance of the antiglaucoma intervention with the minimum damage of the ocular tissues, the prevention of the encapsulation of the filtration bubble and its reopening in case of obstruction.

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<b>MD.78.</b>	
<b>Title</b>	<b>Method for diagnosing ischemic cerebral stroke in children</b>
<b>Authors</b>	Sprincean Mariana, Hadjiu Svetlana, Călcîi Cornelia, Lupuşor Nadejda, Bozadji Veaceslav, Revenco Ninel
<b>Institution</b>	<b>„Nicolae Testemiţanu” State University of Medicine and Pharmacy of the Republic of Moldova</b>
<b>Patent no.</b>	MD 1472
	The invention relates to medicine, in particular to pediatric neurology, neonatology, pediatrics, and can be used for early diagnosis of neuropsychomotor disorders in children who have undergone ischemic cerebral stroke. Summary of the invention consists in that the patient of pediatric age is clinically and paraclinically examined, it is established the clinical cerebral structure affection picture, at the same time it is sampled 2...3 ml of venous blood, it is centrifuged, it is separated the blood serum and stored at a constant temperature of -20°C, it is determined the serum
<b>Description EN</b>	

concentration of S100B protein, in the case when the serum concentration is more than 0.272 pg/ml, the presence of ischemic cerebral stroke is diagnosed.

**Benefits:** The advantage of the invention consists in the early diagnosis of the degree and size of neuropsychomotor disorders in children with stroke for the administration of early treatment, the assessment of the degree of disability of the child and the remote prognosis.

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**MD.79.**
**Title**

**Method for diagnosing masticatory muscle dysfunctions**

**Authors**

Gheorghe Bordeniuc, Victor Lacusta, Sergiu Bâzgan, Valeriu Fala

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

MD 1608

**Description  
EN**

The invention relates to medicine (dentistry) and can be used to test a patient's pain sensitivity in the masticatory muscles. The invention's core principle: For the studied muscle (masseter, temporalis), a "pain map" (pain sensitivity to mechanical stimuli - MPS) is first obtained using gathered algometry data (pressure pain sensitivity thresholds - PPT) organized in a matrix format (9-15 cells). Based on the gathered data, the proposed formula generates two clinical indices (relative/absolute heterogeneity) that can be used to describe the degree of non-uniformity in the spatial distribution of mechanical pain sensitivity (MPS) in the examined muscle.

Advantages: The suggested parameters (relative/absolute heterogeneity) allow for a better distinction of clinical cases that, specifically in cases where former used indices in the specialty literature (entropy, standard deviation) would present difficulties in differentiating patients.

The method's practical relevance pertains to its value during the diagnostic phase as well as while assessing the efficacy of the treatment given to patients with masticatory muscle dysfunction.

<b>MD.80.</b>	
<b>Title</b>	<b>Surgical method for treating nasopharyngeal tumors in children</b>
<b>Authors</b>	<div style="border: 1px solid black; padding: 2px;">Țîbîrnă Gheorghe</div> , Railean Silvia, Ciorici Vasile, Țîbîrnă Andrei, Mereuță Ion, Lisița Natalia, Bărlădeanu Laurențiu, Porosencov Egor, Ababii Polina, Poștaru Cristina, Lupan Roman, Mânăscuță Ghenadie
<b>Institution</b>	<b>„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</b>
<b>Patent no.</b>	MD 1592
<b>Description EN</b>	<p>The invention relates to medicine, namely to maxillofacial surgery and pediatric oncology, and can be used for the surgical treatment of malignant and benign nasopharyngeal tumors in children.</p>
	<p>Summary of the invention consists in that is performed a skin incision of a length of 4.5 cm, which begins 1.5 cm below the angle of the lower jaw and continues along the anterior edge of the sternocleidomastoid muscle, the soft tissues are separated from the II and III cervical fascia, afterwards the external carotid artery is ligated above the superior thyroid artery and the lymph nodes are removed from the bifurcation region of the common carotid artery. A digital investigation of the nasopharynx and tumor region is carried out with the determination of its consistency, its spread to the lateral walls of the nasopharynx, if the nasal cavity, skull base, orbit are involved in the process. Another skin incision is performed laterally and along the right nasolabial fold, the soft tissues are separated to the canine fossa and the nasal root, then the front wall of the maxillary sinus and the lateral wall of the inferior nasal meatus are perforated with the help of an incisor, with access to the nasopharynx, the location of the tumor in the nasopharyngeal cavity is determined, afterwards the tumor is moved upward, removed from the bone and partially removed with a hemostatic clamp, hemostasis is performed using a tampon, the end of which is brought out through the inferior nasal meatus, and the wounds are sutured in layers.</p>

**MD.81.****Title**

**Method for preventing variceal hemorrhages in patients with decompensated liver cirrhosis**

**Authors**

Anghelici Gheorghe, Savin Oleg, Crudu Oleg, Pisarenco Serghei, Zugrav Tatiana, Lupu Gheorghe

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

MD 1569

**Description  
EN**

The invention relates to medicine, in particular to surgical hepatology, and can be used for the prevention of variceal hemorrhages in patients with decompensated liver cirrhosis. Summary of the invention consists in that endoscopically, two components of fibrin glue are simultaneously introduced into the lumen of the varicose vein, namely, the first component comprises a fibrinogen solution, and the second component comprises a mixture of thrombin solutions with a 10% solution of albumin, aprotinin and Ca<sup>2+</sup> chloride, with the following ratio of components, per 1 dose of fibrin glue: Fibrinogen solution (mg) 15...45, Thrombin solution (IU) 25...100, Albumin solution 10% (mL) 10...20, Aprotinin solution (KIU) 250... 1000 Ca<sup>2+</sup> chloride solution (μmol) 15...30. The advantage of this method is the secure blockage of the variceal blood circulation due to its sealing with fibrin adhesive (glue). As a result, this invention allows for an efficient hemostasis preventing any spontaneous expulsion of the fibrin clot and an effective adhesion to the vascular wall, all due to the particularities of the obtained clot – a hard consistency with a long-lasting retraction capacity and the formation of paraesophageal extraluminal collaterals –, which facilitates the prophylaxis of variceal hemorrhage.

**MD.82.****Title**

**Divices for the processing of the biological tissues**

**Authors**

Macagonova Olga, Cociug Adrian, Nacu Viorel

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

MD1504; Patent Application No. s 2022 0021 from 2022.03.30

**Description  
EN**

The work is presented by the cycle of inventions, which includes a device for separating tissues and a device for

fixing the cornea. The device for separating biological tissues consists of a triangular block with a rectangular window being joined by screwing, with a cylindrical handle with a rubber button for aspiration of separated biological tissue with a pear blade that is joined distally with the cylinder by screwing. Invention with the device for fixing the cornea relates to medical equipment. The invention consists in that the device comprises a body, consisting of two cylinders, welded coaxially at one of the ends, of which the first cylinder is, at the free end of the second cylinder is made a concavity. The device also comprises a ring, which is rigidly connected to one end of a semicircular rod, the opposite end of which is rigidly connected to the middle of another semicircular rod, the ends of which are fixed on the free edge of the second cylinder by means of screws. All elements of the devices are made of stainless steel.

**MD.83.****Title**

**Methods of treatment of chronic obstructive pulmonary disease in elderly patients**

**Authors**

**Bodrug Nicolae, Luca Ecaterina, Botezatu Adriana, Calancea Valentin, Curov Igor, Ursu Catalina**

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

Patent application No s 2022 0064 from 29.09.2022;

Patent application No. s 2022 0065 from 29.09.2022

**Description  
EN**

The cycle of inventions refers to medicine, mainly to the specialty of pneumology, and is intended for the treatment of chronic obstructive pulmonary disease complicated with a pulmonary heart disease in patients of the third age and another one associated with vulgar psoriasis disseminated in elderly patients.

The summary of the invention relates the synergism of treatment with bronchodilator, anti-inflammatory, mucolytic preparations, antibiotic therapy, vitamin therapy and ozone therapy through the systemic and topical way of administration and the use of an immunostimulatory medicine, which leads to an effective result for the treatment of chronic obstructive pulmonary disease and also for long remission of manifestations of vulgar psoriasis disseminated in third-age patients.

The problem solved by the proposed inventions is the development of a complex treatment method, which reduces the adverse effects of drug treatment, decreases the frequency of accutizations of the psoriatic process, prolongs the active period of the life time of patients, increases the quality of their life related to health and increases tolerance to physical effort.

The advantages consist of the fact that an essential reduction in the severity of chronic obstructive pulmonary disease symptoms, the absence of other exacerbations, with the improvement of the patients' physical exertion capacity and daily functionality, reduction of the size and aggressiveness of psoriatic eczema, while keeping them in remission.

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**MD.84.**
**Title**

**Procedure for obtaining materials based on silver nanoparticles with antifungal activity**

**Authors**

Burduniuc Olga, Coşeri Sergiu, Mareş Mihai, Biliuța Gabriela, Nastasa Valentin, Bostănar-Iliescu Andra-Cristina

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova;  
National Agency for Public Health**

**Patent no.**

Patent Application s 2022 0053 from 2022.08.12

**Description  
EN**

The invention relates to nanotechnologies and medicine, in particular to the process of obtaining materials based on silver nanoparticles stabilized with cellulosic derivatives with proven antifungal action against clinical yeast isolates.

**The essence of the invention** consists in the proposal of a process for obtaining materials based on silver nanoparticles with antifungal activity, which consists in mixing for two hours, a solution of cellulose derivative of concentration 1% with a solution of silver nitrate of concentration 0.01 M, using double-distilled water or dimethylsulfoxide as solvents for the preparation of the solutions, at room temperature.

**The technical result of the invention** consists in the fact that, for the first time, a simple and effective procedure is proposed for obtaining antifungal materials based on silver nanoparticles stabilized with cellulosic derivatives, which involves the use of cheap and common methods

(cellulose representing the most abundant biodegradable organic material on the planet Our). This process does not involve the use of toxic agents and external physical factors, such as temperature, pressure, etc. Silver nanoparticles based on cellulose derivatives showed a high degree of inhibition against yeast species, with minimum inhibitory concentration values between 0.0625-0.125 mM. Based on minimum fungicidal concentration (MCF) values, consistent with MIC values, all AgNO<sub>3</sub> cellulose derivatives showed in vitro antifungal activity against both *Candida albicans* and non-*albicans* *Candida* species.

The results obtained suggest that silver nanoparticles stabilized with cellulose derivatives can provide a rational support in the expansion of the arsenal of antifungal remedies in both human and veterinary medical practice.

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**MD.85.**
**Title**

**Procedure for obtaining materials based on silver nanoparticles with antibacterial activity**

**Authors**

Burduniuc Olga, Coşeri Sergiu, Mareş Mihai, Biliuța Gabriela, Nastasa Valentin, Iliescu Bogdan-Ştefan, Bostănaru-Iliescu Andra-Cristina,

**Institution**

„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova;  
National Agency for Public Health

**Patent no.**

Patent Application s 2022 0054/ 2022.08.12

**Description  
EN**

**The essence of the invention.** Process for obtaining materials based on silver nanoparticles with antibacterial activity against both acid-alcohol-resistant bacteria and Gram-positive and Gram-negative bacteria, which consists in mixing for two hours, a solution of cellulose derivative of 1% concentration with a 0.01M silver nitrate solution, using double-distilled water or dimethylsulfoxide as solvents for the preparation of the solutions, at room temperature.

**The technical result of the invention** consists in the fact that for the first time a new, simple and effective procedure is proposed to obtain nanocomposites with broad-spectrum antibacterial activity based on silver nanoparticles stabilized with cellulosic derivatives, which involves the use of methods with low production costs, usual and durable. Silver nanoparticles based on cellulose derivatives showed a "cidal" effect, with minimum inhibitory concentration (MIC)

values between 0.0312-0.125 mM. Based on minimum antibacterial concentration (MBC) values, consistent with MIC values, all cellulosic derivatives based on AgNO<sub>3</sub> showed in vitro antimicrobial activity against both acid-alcohol-fast, Gram-positive (+), and Gram-negative (-), bacteria.

Through the obtained results, silver nanoparticles stabilized with cellulosic derivatives demonstrate that they can act as a potential antibacterial agent both in human and veterinary medical practice.

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**MD.86.**
**Title**

*Screening and monitoring of non-communicable diseases in Primary Health Care through the Prophylactic Examination Checklist Forms*

**Authors**

Șalaru Virginia, Chiosa Diana, Alexa Zinaida, Muntean Maria, Anisei Angela, Zatic Tatiana, Curocichin Ghenadie

**Institution**

**„Nicolae Testemitanu” State University of Medicine and Pharmacy, Chișinău, Republic of Moldova**

**Patent no.**

-

**Description  
EN**

Series O nr 6598, from 28.05.2020; Series O nr 6599 from 04.06.2020

The main chronic non-communicable diseases operate through a group of common risk factors, that determines the onset and severity of the disease, also the treatment approaches.

The tools relate to family medicine and their purpose is to help family physicians and nurses to perform and document the procedures for the annual preventive examination of adults in Primary Health Care.

The main goal is the annual evaluation for apparently healthy people with the identification of risk factors and application of all screening procedures according to national regulation, and the quarterly follow-up of patients with hypertension and type 2 diabetes.

The Prophylactic Examination Checklist Forms form represent a well-defined and structured algorithm, which includes the requirements of national programs for the control of non-communicable diseases, that have become an annex to the standardized clinical protocols – PEN1 "Prevention of heart attack, stroke, and kidney disease



through integrated diabetes mellitus management and arterial hypertension" approved by Ministry of Health Order no. 1258 of 29.12.2022 and PEN 2 "Health education and counseling on healthy behavior", approved by Ministry of Health Order no. 1259 of 29.12.2022.

**MD.87.**

<b>Title</b>	<b>Multifocal repetitive transcranial magnetic stimulation (rTMS) protocol in the treatment of migraine patients.</b>
<b>Authors</b>	Stanislav Groppa, Pavel Leahu
<b>Institution</b>	<b>„Nicolae Testemitanu” State University of Medicine and Pharmacy of the Republic of Moldova; The Institute of Emergency Medicine</b>
<b>Patent no.</b>	Series OȘ 7359 / 28.11.2022
<b>Description EN</b>	Episodic migraine is a debilitating condition associated with vast impairments of health, daily living and life quality. Repetitive transcranial magnetic stimulation (rTMS) has been shown to help with specific symptoms, with its efficacy being probably linked to the applied rTMS protocols. We conducted an experimental, double-blind, randomized controlled study by applying an innovative multifocal rTMS paradigm. The experimental multifocal rTMS protocol included two components; first, swipe stimulation of 13 trains of 140 pulses/train, 67Hz, 60% of RMT, and 2s intertrain interval and second, spot burst stimulation of 33 trains of 15 pulses/train, 67Hz, 85% of RMT, and 8s intertrain interval. Reduction >50% from the baseline in migraine days (as primary outcome) and frequency, intensity and disability of migraine attacks (as key secondary outcomes) over a 12-week period were assessed.

**MD.88.**

<b>Title</b>	<b>Respiratory biofeedback using two-channel visualization of chest and abdominal movements with VISURESP recording system for reduction of anxiety</b>
<b>Authors</b>	Arnaut Oleg, Beșleagă Tudor, Ganenco Andrei, Grosu Oxana, Lozovanu Svetlana, Lupușor Adrian, Moldovanu Ion, Odobescu Stela, Ojog Victor, Rotaru Lilia, Tăbîrță Ina, Vovc Victor
<b>Institution</b>	<b>The Institute of Neurology and Neurosurgery „Diomid Gherman”</b>

<b>Patent no.</b>	<p><b>„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</b></p> <p>Certificat de înregistrare a obiectelor dreptului de autor și drepturilor conexe Seria O Nr. 7236 din 15.03.2022</p>
<b>Description EN</b>	<p>The study of the variations of the components of the breathing pattern under the influence of physiological or pathological factors allow the deepening of knowledge in the field of physiology of systemic interaction at the level of the whole organism as well as in the field of pathophysiology of functional, psychosomatic diseases. A disorder of the breathing pattern can be the first sign of a respiratory pathology, whether it is a mechanical, physiological or psychological dysfunction. Before diagnosing abnormal respiration, clinicians must first exclude, or treat, the organic disease, and only then breathing pattern disorder can be diagnosed. Assessments of breathing pattern, measurement of patient self-reported results, and other examination findings help to construct a complete picture of breathing pattern disorder.</p> <p>Respiratory inductance plethysmography is a method of assessment of pulmonary ventilation by recording the movements of the chest and abdominal wall. The recording of the breathing pattern in our laboratory is performed using the VISURESP recording system from RBI instruments, France. In our study, we aimed to simplify the calibration procedure by replacing the spirometer with an adjustable calibration syringe made of aluminum with a precise volume of 2 L, with the possibility of choosing the volume of injectable air from 0.5 L to 2 L, used for the calibration of devices for measuring the volume or respiratory flow (spirometer or pneumotachograph).</p>

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<b>MD.89.</b>	<p><b>Method for assessing the knowledge, attitudes and practices of healthcare workers regarding antimicrobial resistance in low- and middle-income countries in Europe</b></p> <p><b>Authors</b> Ferdohleb Alina, Ciobanu Elena, Croitoru Catalina, Oana-Simina Iaconi</p> <p><b>Institution</b> „Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</p>
<b>Title</b>	

<b>Patent no.</b>	-
<b>Description</b>	Copyright – Series O, No. 7324 from 07.10.2022 (AGEPI);
<b>EN</b>	Innovator certificate – No. 5936 from 11.08.2022 („Nicolae Testemițanu” SUMPh)
	The innovation involves the use of the elaborated questionnaire. The questionnaire is of the CAP type (knowledge, attitudes, practices), self-administered and can be used without restrictions of gender, age, geographical area, ethnicity, belonging to a religious denomination, etc. It is applicable in low and middle income countries in Europe. The questionnaire consists of 88 questions and sub-questions, grouped into four sections. For the working instrument, the Cronbach alpha coefficient was calculated, which is an indicator of the measurement precision of a test, of the internal consistency and fidelity of a psychological instrument. The value of the Cronbach alpha index varies between 0 and 1. An instrument, to be considered consistent, must reach a value as close as possible to 1, the level of 0.70 being accepted as the threshold by most researchers. In the case of the developed and tested instrument, the value of the Cronbach alpha coefficient was – 0.93. The consistency and fidelity analysis per chapter was as follows: Knowledge chapter – 0.83, Attitudes chapter – 0.71, Practices chapter – 0.95. The analysis grid is submitted for copyright registration.

**MD.90.**

<b>Title</b>	<b>Method for assessing the knowledge, skills and practices of family doctors regarding climate change in the work with patients</b>
<b>Authors</b>	Croitoru Catalina, Ciobanu Elena, Salaru Virginia, Mazur-Nicorici Lucia, Burduniuc Aurelia
<b>Institution</b>	<b>„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</b>
<b>Patent no.</b>	-
<b>Description</b>	The innovation provides the method of evaluating the level of knowledge, attitudes and practices of family doctors about the problems related to global warming, heat waves, thermal stress. For the evaluation, the questionnaire developed by the authors, validated on 53 medical workers, is used.
<b>EN</b>	The resulting information presents some of the objectives of

the research project "Estimating the stressful impact of heat waves on the health of the population" (*Nicolae Testemițanu* USMF Research Ethics Committee, No. 13 of 15.03.19). The analysis grid is registered as copyright with no. 7105 "Conducting the survey to assess the knowledge, skills and practices of doctors regarding the risks associated with heat waves in the context of global warming with the development of the local questionnaire".

The method has been **copyrighted** – Series O No. 7105 from 08.12.2021 (issued buy AGEPI) and obtained an Innovator's certificate No. 5849 from 02.06.2021 (issued by „Nicolae Testemițanu” SUMPh)

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**MD.91.**

<b>Title</b>	<b>Chronic liver and pancreatic diseases: nutritional and surgical aspect. Gastroenterology / hepatology compartment.</b>
<b>Authors</b>	Lupașco Iulianna, Dumbrava Vlada-Tatiana, Vengher Inna, Taran Natalia, Berezovscaia Elena, Ghelmici Tatiana, Chirvas Elena, Harea Gheorghe, Golovatiuc Liudmila, Banari Ion, Buza Anastasia, Lupașco Daniella
<b>Institution</b>	<b>„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</b>
<b>Patent no.</b>	State Program (2020-2023), Health strategic priority 20.80009.8007.37
<b>Description EN</b>	<p>The aim of the actual study is a nutritional status (NS) peculiarities evaluation in patients with chronic diffuse liver (CDLD) and pancreatic diseases as well as risk factors that affect the NS and the impact of NS on the evolution and prognosis of CDLD in a multidisciplinary group.</p> <p>The scopes are destined Evaluation of NS peculiarities according to the functional state of the liver and the presence of complications. Studying the particularities of food intake in patients with CDLD, assessment of dietary habits with impact on NS. Elaboration of the simple convenient food questionnaire for performing the nutritional screening. Studying the digestive factors with impact on NS in CDLD. the interrelationships between oxidative stress and NS in the studied groups. Identification and validation of genetic biomarkers involved in SN disorder in CDLD. Studying the psycho-emotional factors in relation to NS in patients with CDLD. Evaluating Comparison of NS assessment methods: anthropometric, laboratory, electrical bioimpedance with</p>

selection of the simplest for performing methods for NS screening for early detection of malnutrition in CDLD. Elaboration of the principles of NS monitoring in patients with CDLD with a theoretical basis creation regarding the nutritional correction of patients. The bioethical conditions of the doctor-patient relationships will be carried out with developing, bioethical recommendations specific for the management of CDLD patients. The above will provide the development of the new interdisciplinary concept of nutritional evaluation of patients with various hepatopancreatic pathologies.

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**MD.92.**
**Title**

**Medico-legal identification of physical domestic violence – Research project**

**Authors**

Andrei Pădure, Petru Glavan, Anatolii Bondarev, Larisa Spinei, Doina Cazacu

**Institution**

**“Nicolae Testemitanu” State University of Medicine and Pharmacy**

**Patent no.**

-

**Description  
EN**

Health system and medico-legal investigations have a crucial role in proving domestic violence. One of their tasks is to identify domestic violence victims. For this purpose, physicians and forensic doctors must be provided with instruments, including scientific-based ones.

The main aim of this research project is to improve physicians' ability to identify children and adult victims of domestic violence based on its traumatic consequences based on victim's profile and injuries' pattern. These tools will be used by medical practitioners to identify domestic violence victims especially when they do not allege such circumstances. In order to achieve this goal forensic medical reports regarding domestic violence cases disaggregated by victim's age will be analyzed.

The project will focus on the following specific objectives:

1. Assessing the extent of domestic violence at the national level based on medico-legal data;
2. Studying the social conditions of victimization in the family environment;
3. Studying the morphological traumatic pattern of non-lethal physical domestic violence based on the victims' age;

4. Providing scientific-based practical tools for identifying victims of physical domestic violence.

The expected results of the study are:

1. Identification of women and children as victims of domestic violence improved and their equal access to medical care ensured;
2. Medical and medico-legal care provided to victims of domestic violence improved and focused on their needs;

The rights to health, bodily integrity and non-discrimination of women and children as victims of domestic violence respected.

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**MD.93.**
**Title**

**Study on medical waste management in the Republic of Moldova**

**Authors**

Gutu Luminita, Croitoru Catalina, Ciobanu Elena, Sofroni Vasile, Spataru Diana, Rața Vadim, Cheptea Dumitru, Turcan Vasile, Busuioc Ecaterina

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

-

**Description  
EN**

***Project G15131 financed by the Soros Foundation Moldova***

The purpose of the study was to evaluate the process of managing medical waste in order to harmonize existing practices and reduce risks for patients and medical institution employees, the environment, and public health. As part of this project, an impartial evaluation of the normative-regulatory framework for medical waste management was carried out, official sources were analyzed, and its strengths and weaknesses were identified, as well as in the country's healthcare institutions (HCI), including the period of SARS-CoV-2 pandemic.

In the activity of healthcare institutions, certain problematic aspects in the management of medical waste were highlighted, these being determined by the increase in the amount of infectious waste by 1.26 times in 2021 compared to 2019. At the same time, the volume of cutter-stinging waste increased by 34.5%, and pharmaceutical waste by 14.2%. The lack of a person responsible for managing medical waste (7.4%), institutional management plans (in 27.16% HCI), and standard operational procedures (in 48.6% HCI) was established, but also insufficient insurance

with personal protective equipment of employees involved in the managing medical waste (in 21.6% HCI).

The results of the study revealed HCI's capabilities in managing medical waste. Possible risks from the practice of managing medical waste have been identified and the stages of waste flow in the institution have been analyzed. Finally, recommendations were developed on the harmonization of the legal framework, and waste management practices, but also for reducing the risk caused by them to patients and HCI's employees, the environment, and the population's health.

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**MD.94.**
**Title**

**Improvement of diagnosis and pharmacotherapy of the ear disorders**

**Authors**

Parii Sergiu, Ababii Ion, Rudic Valeriu, Valica Vladimir, Maniuc Mihail, Gonciar Veaceslav, Curocichin Ghenadie, Uncu Livia, Buza Anastasia, Nicolai Eugeniu

**Institution**

**„Nicolae Testemitanu” State University of Medicine and Pharmacy, Republic of Moldova**

**Patent no.**

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Summary of the research project and inventions are elaboration of new method for determination of speech intelligibility score, method for predicting development of adverse effects of hearing instruments, method for genetic diagnosis of nonsyndromic sensorineural deafness (GJB2 gene mutation), method for treatment of sensorineural hearing loss (SNHL) and elaboration of 2 combined drug preparations for treatment of otitis and SNHL. Development of the postdoc project 2016-2021 (26.14.11.2016).

**Description  
EN**

The advantage for proposed applications of the preclinical and clinical study involves measuring the effectiveness audiometric and genetic diagnosis, hearing care and drug treatment in children and adults with inflammatory and non-inflammatory diseases of external, middle and inner ear.

Has been developed a theoretical and practical basis for an interdisciplinary and systemic conceptual approach of preclinical and clinical studies on the development, pharmacological treatment of otitis media and SNHL.

The results were implemented in the practical activities of the departments and laboratories with the specifics of

pharmacology, pharmacy, human genetics and the ENT clinic of the „Nicolae Testemitanu” SUMFh (2 registration certificates, 7 acts of implementation of inventions, 5 acts of implementation of innovations).

**MD.95.****Title**

**Innovations in tactical decisions and the operative treatment of colorectal polypoidal formations**

**Authors**

Ursu Alexandr, Dolghii Andrei, Melnic Eugen, Toma Ian, Rojnovceanu Gheorghe

**Institution**

**„Nicolae Testemitanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

PhD thesis

**Description  
EN**

The present study analyzes the number and type of protrusive formations discovered globally, at the level of a sample population that refer to a hospital unit for varied symptomatology and endoscopic-morphological features of colorectal formations, especially malignant precursor lesions. Also, has highlighted the number of tumoral protrusive formations of colon found overall, in a sample of a population that is targeted at a hospital for a varied symptomatology study with patients admitted in the hospital, and not on a lot presumed healthy (without clinical symptoms), as in the case of screening. The innovation presented by these concepts is the choice of tactical decision in the treatment of polypoid formations depending on the size, histological examination and degree of dysplasia. Because that a large number of cancers arise from malignancy adenomatous polyps, their diagnosis followed by their removal by polypectomy, considerably decrease the chance of the occurrence of colorectal neoplasia. The analysis presented is part of the of the development process carried out within the doctoral research supported by the author.

**MD.96.****Title**

**Application of the predictive model for preterm birth based on pregnancy evolution data, anamnestic data and pregnancy-associated pathology**

**Authors**

Cotelea Veronica, Friptu Valentin, Surguci Mihai, Mihalcean Luminița, Corolcova Natalia

**Institution**

**„Nicolae Testemitanu” State University of Medicine and**



Patent no.	Pharmacy of the Republic of Moldova
	<p>-</p> <p>PhD thesis</p> <p>This project presents the results obtained from a predictive model which was developed for allows to determine the risk for premature birth, the model having four components that present potential pathogenetic mechanisms for triggering/determining the given pathology.</p>
Description EN	<p>The innovation presented by this concept is to perform individualization of treatment for women at high risk of premature birth as well as for the initiation of national programs with the aim of reducing the rate of premature births and as a result, improving perinatal outcomes by significantly decreasing infant mortality and morbidity (Innovator's certificate No. 5977 from 24.01.2023, „Nicolae Testemițanu” SUMPh of the Republic of Moldova).</p> <p>The analysis presented is part of the development process carried out within the doctoral research supported by author.</p>

MD.97.	<p><b><i>In vitro</i> model of biocompatibility evaluation: a new approach for testing the decellularized vascular scaffolds</b></p> <p>Malcova Tatiana, Rojnoveanu Gheorghe, Ciubotaru Anatol, Nacu Viorel</p> <p>„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova</p>
Title	
Authors	
Institution	
Patent no.	<p>-</p> <p>PhD Thesis</p>
Description EN	<p>The device relates to regenerative medicine, tissue engineering, and vascular surgery. The aim of the project was to develop a novel trusty and impeccable <i>in vitro</i> procedure to support reliable evaluation and safety assessment of decellularized (DC) vascular scaffolds. It can be used to simulate and predict biological reactions to DC vascular scaffolds before the material is placed in the living body.</p> <p>The matrix biocompatibility is assessed by GFP-labeled human umbilical vein endothelial cells (GFP-HUVECs).</p> <p>The described methodology is efficient, cost-effective, and easy-to-use in experimental practice to determine the therapeutic potential of vascular tissue-engineered small-</p>

diameter grafts by measuring the cellular response and verification the risk of *in vivo* graft's failure.

In addition, it allows to assess and to compare the effectiveness of different decellularization approaches. We thank Andrée Birgit and Hilfiker Andres (Hannover Medical School, Hannover, Germany) for their assistance, valuable discussion and helpful advice.

This project was made possible by *NanoMedTwin - Promoting smart specialization at the Technical University of Moldova by developing the field of Novel Nanomaterials for BioMedical Applications through excellence in research and twinning* (#810652), as well as *Nanoarhitecturi în bază de GaN și matrici tridimensionale din materiale biologice pentru aplicații în microfluidică și inginerie tisulară* (20.80009.5007.20).

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**MD.98.**
**Title**

**Assessment of serum vitamin K levels (vitamin K1, vitamin K2 (MK-4), vitamin K2 (MK-7)) in women with intrahepatic cholestasis of pregnancy**

**Authors**

Cemortan Maria, Ostrofet Constantin

**Institution**

**„Nicolae Testemițanu” State University of Medicine and Pharmacy of the Republic of Moldova**

**Patent no.**

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Certificate of Innovation no.5895 from 23.03.2022

Assessment of serum vitamin (vit.) K levels (vit. K1, vit. K2 (MK-4), vit. K2 (MK-7)) in women with intrahepatic cholestasis of pregnancy (ICP) allows the identification of pregnant women with low levels of vit. K.

**Description  
EN**

In ICP lipid malabsorption leads to a lack of fat-soluble vitamins, especially vit. K. Vitamin K is involved in the hemostasis mechanism, contributing to the conversion of prothrombin to thrombin. Thus, hypovitaminosis K may involve coagulopathic bleeding in women with ICP. The assessment of vitamin K levels would allow the reduction of bleeding complications, which have a significant impact on the maternal-fetal prognosis in ICP.

The serum level of the mentioned vitamins is assessed using high performance liquid chromatography (HPLC). The separation principle of HPLC is based on the distribution of

the analyte (sample) between a mobile phase (eluent) and a stationary phase (column packing material). Depending on the chemical structure of the analyte, the molecules are retarded during the transition to the stationary phase. The specific intermolecular interactions between the molecules of a sample and the packing material define their 'on-column' time. Therefore, different constituents of a sample are released at different times. Thus, separation of the sample ingredients is achieved.

The impact of the implementation is due to highlighting pregnant women with ICP and low vitamin K levels, especially those with changes in coagulogram results. Thus, through implementation, women at increased risk for the development of coagulopathic complications related to the pathogenesis of intrahepatic cholestasis of pregnancy are identified.

Project of PhD „Diagnosticul și evoluția gravidității și nașterii la femeile cu colestaza intrahepatică de sarcină”.

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**MD.99.**
**Title**

**Optimization of the sentinel surveillance system, the study of the variety of genotypes and the impact of vaccination in rotavirus infection in children**

**Authors**

Iliev Albina-Mihaela; Tatiana Alsaliem, Donos Ala; Spînu Constantin, Stela Gheorghită, Spînu Igor, Laura Trandafir State University of Medicine and Pharmacy “Nicolae Testemițanu”, Chisinau, Republic of Moldova;

**Institution**

State University of Medicine and Pharmacy „Grigore T. Popa”, Iasi, Romania

**Patent no.**

World Health Organization, Republic of Moldova

**Description  
EN**

The study reflects a deep and current material, after a scientific research in collaboration with WHO referring to a very important issue of children's public health – acute viral diarrhea caused by rotavirus. The results of the study have a major importance in clinical, paraclinical and molecular biology diagnosis, treatment, management and match the requirements of international and national guidelines, WHO and UNICEF policies. Thereby, the impact of the implementation of rotavirus vaccination in the National Immunization Program of the Republic of Moldova was

significant, because the incidence of acute diarrhea caused by rotavirus decreased by 2 times after the introduction of vaccination compared to the pre-vaccination period.

The results obtained in the framework of this study are implemented in medical practice and in the medical training, through different categories of health workers, such as pediatricians, family doctors, residents, which will contribute to improving children's health.

## “Ion Creangă” State Pedagogical University of Chisinau

<b>MD.100.</b>	
<b>Title</b>	<b>Cultivation process of crop plants</b>
<b>Authors</b>	ȘTEFÎRȚĂ Anastasia, BRÎNZA Lilia, BULHAC Ion, COROPCEANU Eduard, COVACI Olga <i>Institute for Research, Innovation and Technological Transfer of UPS „Ion Creangă”;</i>
<b>Institution</b>	<i>Institute of Chemistry of MSU; Institute of Genetics, Physiology and Plant Protection of MSU</i>
<b>Patent no.</b>	<b>1348</b>
<b>Description EN</b>	<p>The invention relates to agriculture, in particular to a process for growing plants, in particular maize and soya, and can be used to increase plant resistance to water and temperature stress and productivity. The problem that the invention solves is increasing the tolerance of plants to water and temperature stress and increasing plant productivity in fluctuating environmental conditions. The process, according to the invention, includes treating seeds before sowing and plants during vegetative growth with an aqueous solution that contains thiourea, <math>\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math>, <math>\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}</math>, potassium salicylate, <math>[\text{Co}(\text{DmgH})_2(\text{SeUrea})_2]\text{BF}_4 \cdot 2\text{H}_2\text{O}</math>, <math>[\text{Fe}_3\text{O}(\text{CH}_3\text{COO})_6(\text{H}_2\text{O})_3]\text{NO}_3 \cdot 3\text{H}_2\text{O}</math>, <math>\text{Mn}(\text{CH}_3\text{COO})_2 \cdot 4\text{H}_2\text{O}</math>, <math>[\text{Co}(\text{DmgH})_2(\text{Nia})_2]\text{BF}_4 \cdot 2\text{H}_2\text{O}</math>, <math>\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}</math>, <math>(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}</math>, <math>(\text{HOC}_6\text{H}_4\text{COO})_2\text{Cu} \cdot 4\text{H}_2\text{O}</math>, at the same time the plants treat 2 times with a consumption of 200...250 L/ha.</p> <p>The result of the invention consists in increasing plant tolerance to dehydration, cold and heat and productivity.</p>

**MD.101.****Title**

Complex preparation with antioxidant properties

**Authors**BULHAC Ion, ȘTEFÎRȚĂ Anastasia, COROPCEANU  
Eduard, BRÎNZA Lilia, COVACI Olga*Institute for Research, Innovation and Technological  
Transfer of UPS „Ion Creangă”;***Institution***Institute of Chemistry of MSU;**Institute of Genetics, Physiology and Plant Protection of  
MSU***Patent no.****4647**

The invention relates to chemical compounds with biologically active properties, and can be used in agriculture for reducing the negative impact of oxidative stress caused by reactive oxygen species, for antioxidant protection and diminishing the oxidative destruction of cellular components.

**Description  
EN**

The complex preparation, according to the invention, contains thiourea,  $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ ,  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ , potassium salicylate,  $[\text{Co}(\text{DmgH})_2(\text{SeUree})_2]\text{BF}_4 \cdot 2\text{H}_2\text{O}$ ,  $[\text{Fe}_3\text{O}(\text{CH}_3\text{COO})_6(\text{H}_2\text{O})_3]\text{NO}_3 \cdot 3\text{H}_2\text{O}$ ,  $\text{Mn}(\text{CH}_3\text{COO})_2 \cdot 4\text{H}_2\text{O}$ ,  $[\text{Co}(\text{DmgH})_2(\text{Nia})_2]\text{BF}_4 \cdot 2\text{H}_2\text{O}$ ,  $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ ,  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$ ,  $(\text{HOC}_6\text{H}_4\text{COO})_2\text{Cu} \cdot 4\text{H}_2\text{O}$ .

The result of the invention consists in the reduction of malonic dialdehyde content – the final product of peroxidic oxidation of lipids by reactive oxygen species, and in the intensification the activity of enzymatic system of antioxidant protection.

**MD.102.****Title**

**MDIR Constructor 2.0 -software for creating interactive textbooks**

**Authors**

Balmuş Nicolae, Chiriac Tatiana

**Institution**

**“Ion Creangă” State Pedagogical University of Chisinau**

**Patent no.**

O Nr 6765, from 17.12.2020 (Certificate of Copyright and Related Rights, AGEPI Moldova)

**Description  
EN**

MDIR Constructor 2.00 is a software, made in the Delphi 10.4 (FMX) programming environment, with the help of which users, based on a \*.pdf file, develop Interactive Digital Manuals of their own design for various school subjects. The software contains original navigation options and has built-in tools for creating and including in the pages and fields of the manual various learning and assessment activities (audio/video sequences, images, documents, animations, interactive simulations, virtual laboratory works, tests (10 types), crossword puzzles (3 types), phrase and word dictations, reading patterns, randomized problems, custom assessment topic generators). The main novelty of version 2.00 is the automatic generation of two versions of the interactive digital textbook: the teacher version (contains all the digital resources designed by the teacher for the management of school discipline); the student version (contains only the resources authorized by the teacher).

## Academy of Economic Studies of Moldova

**MD.103.**
**Title**
**Policies development on the labor market in order to increase employment**
**Authors**

Bircă Alic, Vaculovschi Dorin, Sainsus Valeriu, Abramihin Cezara, Barbăneagră Oxana, Verejan Oleg, Matveiciuc Igor, Șarai Natalia

**Institution**
**Academy of Economic Studies of Moldova**
**Patent no.**

20.80009. 1606.09

**Description  
EN**

The project researches the labor market in the Republic of Moldova in order to develop policies to increase the level of employment. In this context, several activities were proposed for the research team: the assessment of the overall situation of the labor market; quantitative and qualitative analysis of labor market indicators and their comparison with those of the European Union; highlighting the discrepancies in employment policies applied in the European Union and the Republic of Moldova; researching the impact of international migration and the aging of the population on the evolution of the labor market; analysis of the level of general and professional skills on the labor market in the context of changing work paradigms; developing active policies and their impact on employment growth, evaluating employment growth opportunities through the lens of work flexicurity. The research results were reflected in 62 scientific papers published in: the proceedings of international scientific conferences, scientific journals indexed in International Databases and in a monograph.



**MD.104.**

<b>Title</b>	<p><b>Integrated approach to the financial dimension of economic, social and cultural rights in the Republic of Moldova (Research Project. Project nr. 20.80009.0807.35)</b></p>
<b>Authors</b>	<p><i>Angela SECRIERU, Ion PÂRȚACHI, Nadejda BOTNARI, Angela BOGUȘ, Ana NEDELCU, Liudmila ROȘCA-SADURSCHI, Liliana CECLU, Irina ȘCHIOPU, Natalia MOCANU, Lilia DRAGOMIR, Eduard ȚUGUI, Ana NASTASIU, Simion MIJA, Iulian SECRIERU, Svetlana RUSU</i></p>
<b>Institution</b>	<p><b>Academy of Economic Studies of Moldova</b></p> <p>The project solves the following research task: development and application of a methodological framework for the assessment and monitoring of economic, social and cultural rights (ESCR) in the Republic of Moldova in accordance with the recommendations of specialized international institutions, so that the mechanisms for improving the efficiency of public spending and ESCR budgeting developed within the project, ensured stricter observance and protection of these rights.</p> <p>The project substantiates the hypothesis that the effectiveness of public spending through the prism of human rights and their budgeting is one of the strongest mechanisms for protecting ESCR.</p> <p>The research carried out within the project led to the following results with an emphasis on application:</p>
<b>Description</b>	<ul style="list-style-type: none"> <li>- modeling the dependence between the Gross Domestic Product and public expenditures related to the social and cultural field;</li> <li>- organization and conduct of the Survey "The teaching process in the Republic of Moldova under the impact of the COVID-19 pandemic". The survey was carried out nationally through online interaction between April 13 and June 2, 2021. 2,782 respondents (teaching staff) participated in the survey;</li> <li>- development of the design methodology of indicators for measuring the level of respect for ESCR;</li> </ul> <p>the development of the methodology for the rationalization of local public finances in the conditions of a considerably large number of small-sized territorial administrative units in the Republic of Moldova, which determines the inefficient use of public financial funds with a critical impact on the range and cost of local public services and finally on ESCR.</p>

**MD.105.****Title**

**Scientific Project "Configuration the innovative business in the context of regional competitors**

**Authors**

Pisaniuc Maia, Chistruga Boris, Popa Marina, Jitaru Dorina, Gaugas Tatiana, Jomir Eudochia, Călugăreanu Irina, Gribincea Alexandru, Dascaluic Daniela, Ulinici Adrian

**Institution**

**Academy of Economic Studies of Moldova  
(Research Project Nr. 20.80009.0807.42)**

The main aim of the project is to identify the directions and structure of local innovative business in the context of regional competition.

The overall objectives of the project are:

- Analysis of trends in innovative business at European level of: models, forms, application tools;

- Determine the potential of the Republic of Moldova in the development of innovative business models;

- Determination of the country's innovation directions in the conditions of regional competition, determination of the absorption capacity of innovative production;

- Determining the correlation between demand and supply of human capital involved in innovation activity;

- Following the implementation of the given project,

- We analyzed the possibility of using BIG Data and artificial intelligence in different business areas, mainly financial;

- We determined the impact of technology on the labour market, with reference to structure, required skills;

- We quantified the impact of the use of advanced technologies on domestic business, on the field of training of specialists;

- We have identified the factors that can boost or stop the assimilation of technologies and innovations as a whole;

- We determined the capacity of absorption of innovations in the Republic of Moldova;

- We analyzed innovation through a holistic, multidimensional approach, namely economic, psychological, social aspects.

- We deduced the point of singularity, for various fields, first of all for the financial sector, because it is the field that uses advanced technologies in serving customers;

- We examined the regulatory framework in the PPP field to

**Description  
EN**

drive innovation activity and identified the factors that halt this process;

- We analysed the possibility of amending the Republic of Moldova's legislation on PPP in order to minimise the risks for economic agents involved in innovation infrastructure projects;

- We proposed for the first time the use of PPP contract engineering according to the imperative requirements of the Moldovan legislation, which will contribute to the efficiency of contract management. Result confirmed by Certificate of registration of copyright objects Series 0 No.6806 of 01.02.2021;

- We have proposed and registered at AGEPI the Methodology for analysis of Public Private Partnerships (PPP) in investment projects, based on a system of indicators.

Research results presented in 7 international conferences, round tables, disseminated in 25 publications at European level, in recognized journals, in policies, strategies, regulations at republican level, as well as in plans of educational offers, to develop a new generation of creative specialists, able to fit in the innovation-based economy.

The research team is made up of 11 researchers, with experience in the field, from various economic specialisations.

The research will result in partnerships between SMEs and ASEM, collaborations with various research centres in Europe. [www.ase.cccbi.md](http://www.ase.cccbi.md)

## National Agency for Public Health, Republic of Moldova

### MD.106.

#### Title

**A method for testing blood donors for markers of viral hepatitis B**

#### Authors

Spînu Constantin, Cebotari Svetlana, Sajin Octavian, Isac Maria, Spînu Igor, Suveică Luminița, Ciobanu Igor

#### Institution

National Agency for Public Health

#### Patent no.

**Short-term Patent MD 1166Z 2018.02.28**

#### Description EN

invention pertains to the medical field and can be utilized to prevent viral hepatitis B infection resulting from blood transfusions from individuals with acute or chronic viral hepatitis B. The current method has drawbacks as it cannot detect all cases of occult viral hepatitis B, which increases the risk of transmitting the virus through blood transfusion. The proposed solution aims to significantly reduce this risk by excluding the possibility of transmission of hepatitis from donors with occult hepatitis B. The method involves sequentially determining the presence of HBsAg, anti-HBcor sum, anti-HBcor IgM, and anti-HBs in the blood. Additionally, a hepatitis virus DNA test is performed on blood samples with anti-HBs titer  $> 100\mu\text{ml}$ . If the test is positive, markers of viral hepatitis B in the donor's blood are determined. The outcome is a new testing algorithm for viral hepatitis B markers, including HBV DNA, which eliminates the transfusion of blood products from individuals with a positive anti-HBs marker  $> 100\mu\text{ml}$  with traces of viral hepatitis B virus DNA, characteristic of occult hepatitis B.

### MD.107.

#### Title

**Digitalization of epidemiological surveillance of COVID-19 infection**

#### Authors

Spînu Constantin, Sajin Octavian, Dascalov Alexandru

#### Institution

National Agency for Public Health

**Scientific work series SO Nr. 6908, 17.11.2021**

#### Description EN

The development and implementation of a digitized system for epidemiological surveillance of SARS-CoV-2 virus infection in the Republic of Moldova are critical for several reasons. Firstly, this digitized system allows for the collection of real-time information on COVID-19 morbidity in the country, including the identification of risk factors such as age, gender, living environment, and geography. This information is invaluable in designing effective

prevention measures and predicting future outbreaks. Secondly, the digitized system facilitates the rapid detection of outbreaks and enables a timely response. As a result, the system can support the government's decision-making process and ensure that preventative measures are effective and up-to-date. Finally, the digitization of the epidemiological surveillance system in the Republic of Moldova allows for the development of mathematical models that can predict the pandemic's future evolution. These models are essential in planning the allocation of resources and developing effective strategies to control the spread of COVID-19.

**MD.108.****Title**

**A method for detecting viral hepatitis B markers in donated blood**

**Authors**

Spînu Constantin, Sajin Octavian, Isac Maria, Spînu Igor, Cebotari Svetlana, Iziumov Nina, Ciobanu Igor

**Institution**

National Agency for Public Health

**Short-term Patent MD 975Z 2016.07.31**

**Description  
EN**

The present invention is in the field of medicine and aims to protect public health by preventing the transmission of viral hepatitis B through blood transfusions in cases of occult viral hepatitis B. The current method for detection and exclusion of occult hepatitis is insufficient, leading to potential transmission of the virus through blood transfusions. Studies have shown that in endemic countries, around 1% of individuals with absence of HBsAg and presence of anti-HBcor sum, irrespective of anti-HBs concentration, may have occult viral hepatitis B and can be infectious. The objective of the invention is to improve the effectiveness of donated blood triage to prevent the transmission of viral hepatitis B, especially from people with occult or reactivating hepatitis B. This is achieved by developing an original algorithm for testing donated blood for viral hepatitis B markers, which reduces the risk of transmitting the virus through blood transfusions.

**MD.109.****Title**

**A technique for detecting the presence of the anti-SARS-CoV-2 IgG marker in blood serum**

**Authors**

Spînu Constantin, Cebotari Svetlana, Isac Maria, Sajin Octavian, Spînu Igor, Iziumov Nina

**Institution**

National Agency for Public Health

**Short-term Patent MD 1524Z 2021.12.31**

**Description  
EN**

A method for identifying the presence of anti-SARS-CoV-2 IgG markers in blood serum has been developed to improve laboratory diagnosis of COVID-19. Currently, two methods are used: viral detection through the RT-PCR method, and detection of specific

IgM and IgG antibodies through immunoassay analysis. However, some blood samples collected from patients, including primary blood donors with a clinical diagnosis of COVID-19, demonstrate equivocal results, which makes interpretation difficult. To address this problem, the proposed technology involves processing blood samples with a special substance that removes non-specific inhibitors, resulting in increased sensitivity and specificity of the test. This eliminates the need for repeated investigations of patients after 2 weeks, which saves time and resources.

**MD.110.****Title**

**Methods of prevention and management of household chemical accidents**

**Authors**

Iurie Pinzaru, Kristina Stinca, Vladimir Bernic, Grigore Friptuleac, Tatiana Tonu

**Institution**

**National Agency for Public Health, Republic of Moldova**

**Patent no.**

**Registration certificate no. 7344 of 2022.11.10**

**Description  
EN**

This invention relates to human medicine. The original methods focused on a complex and interdisciplinary approach to the prevention and management of household chemical accidents, were proposed. Advantages: it allows parents and children, teachers, doctors to be informed and involved in the prevention of household chemical hazards/accidents and the provision of first aid in the case of accidents that have already occurred as a result of the incorrect use of chemicals. The methods are used as support for ensuring a safe habitual environment for the population. The methods of prevention and management of household chemical accidents have allowed the reduction by about 40% of the cases of acute chemicals poisoning. This methods are particularly important, intended for used in practice of public health specialists involved in the supervision and management of chemicals and monitoring and research of acute chemical poisonings, of doctors, parents, childrens and the general population, in prevention of household chemical accidents.

**MD.111.****Title**

**Estimating the health status of the population from the localities along the Prut river in relation to the quality of drinking water**

**Authors**

Miron Inga

**Institution**

National Agency for Public Health

<b>Patent no.</b>	<i>Series O No. 7339 of 07.10.2022</i>
<b>Description</b> EN	<p>The innovation and scientific originality emerges from the complex approach of investigations in a new direction of research, which studies the population health in relation to the environment. For the first time in the Republic of Moldova, the complex impact of drinking water quality from different sources on the population health was highlighted and specific preventive measures were reasoned. The scientific problem solved consists in highlighting the health status particularities of the population from riparian localities of Prut River that uses for drinking purposes water from different sources and of different quality. It was found that drinking water from the aqueduct fed from the Prut River is more favorable for the population health. The obtained results allowed the elaboration of intersectoral measures, scientifically argued, aimed at ensuring the safety of drinking water and the prevention of waterborne diseases. They will form the basis of the public health service practical activity. The results were the basis for the improvement of some legislative acts that regulate the management of drinking water quality, and serve as a support for consolidating and coordinating the intersectoral activities in the field of ensuring the security of drinking water and the prevention of water-related diseases. They were used to draw up three sanitary regulations on water and health issues.</p>

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<b>MD.112.</b>	
<b>Title</b>	<b>CONTROL OF HEALTH RISK ASSOCIATED WITH OCCUPATIONAL EXPOSURE TO IONISING RADIATION</b>
<b>Authors</b>	Coretchi Liuba, Bogdan Marina
<b>Institution</b>	National Agency for Public Health
<b>Patent no.</b>	<i>PhD Project</i>
<b>Description</b> EN	<p><b>The purpose</b> of the study is to assess the health status of those professionally exposed to IR, with the development of measures to control the radiation risk for health at workplaces.</p> <p><b>Research objectives:</b></p> <ol style="list-style-type: none"> <li>1. Determining the level of staff irradiation in rooms where ionizing radiation sources are used in the field of medical investigations, in scientific laboratories, in the industrial and agricultural sectors.</li> <li>2. Analysis of the structure of morbidity, including oncological diseases, and detection of the diseases that prevail among the personnel involved in</li> </ol>

the activities with RI.

3. Analysis of individual effective doses in the subjects included in the dynamic study for the period 2023-2026.

4. Elaboration of measures to control the risk to which personnel are exposed (elaboration of appropriate radiation protection measures) with proposals for the elaboration of a Register of personnel professionally exposed to IR jointly with ANRANR specialists.

**Scientific research methodology.** In order to carry out the study in question, it is proposed to carry out measurements of the level of staff irradiation at the workplaces of medical personnel exposed to the risk of ionizing radiation, including in radiological diagnosis and ionizing radiation therapy offices, and to compare the values obtained with those admissible according to the law in force. At the same time, the clinical and paraclinical parameters from the medical files of the employees will be studied in order to analyze the state of health.

#### **Study material**

To collect the study material, the method of analyzing the information from the medical records of category A specialists, involved in radiological practices, registered in the AMT Diagnostic Consultative Center, Professional Pathology Center in the municipality of Chisinau will be used. The investigated persons - professionally exposed to ionizing radiation from the medical field - work within the IMSP Oncological Institute in the Medical Imaging, Computed Tomography and Ultrasound Service, Radiogynecology, Radiotherapy, etc. sections. The health status of the specialists will be assessed according to the results of the medical examinations. The results of investigations of clinical/paraclinical indicators in dynamics will be analyzed.

#### **Study methods:**

- Hygienic (hygienic characterization of the working conditions of the professional exposed to IR).
- Epidemiological (analysis of the structure of general and oncological morbidity).
- Statistics.

A cohort, analytical, descriptive, comparative study will be carried out, in which hygienic, epidemiological and statistical study methods will be applied based on the STATISTICA 10, Epiinfo, Excel and SPSS computer programs.

#### **The scientific novelty of the research**

The risk of exposure to IR on health will be determined, radioprotection measures will be developed to control the risk of exposure to IR, and proposals will be recommended for the development of the Register of occupationally exposed to IR. The hygienic criteria for evaluation and classification of working conditions in the activities of using ionizing radiation sources will be substantiated.

#### **Expected results**

- Monitoring of the annual average individual effective doses of those professionally exposed to ionizing radiation during the period y.y. 2023-



2027.

- Detecting and analyzing cases of over-irradiation of professionally exposed personnel exceeding the maximum allowed dose (20 mSv/year) according to the "Fundamental Norms of Radioprotection. Hygienic Requirements and Rules" (NFRP-2000).
- Determination of the radiation dose rate in the air from the offices equipped with radiological devices.
- The level of interaction between the incidence/prevalence of oncological diseases, in relation to exposure to ionizing radiation at work, will be established.
- The hygienic criteria for evaluation and classification of working conditions in the activities of using sources of ionizing radiation will be substantiated".
- In collaboration with the specialists from practice and from ANRANR, the Register of Professional Exposures to RI will be developed.

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**MD.113.**
**Title**

**Quantification of health risk associated with radon exposure.**

**Authors**

Ababii Aurelia, Coretchi Liuba

**Institution**

**National Agency for Public Health.**

**Patent no.**

PhD Project

**Description****EN**

One of the important sources of exposure of the population to radiation is radon ( $^{222}\text{Rn}$ ). Being a radioactive noble gas, produced in the natural decay series of uranium and thorium, it contributes about 70% to the exposure to natural radiation of the population and by 50% to the total exposure to ionizing radiation. Inhalation exposure to  $^{222}\text{Rn}$  isotopes and their short-lived offspring is a major risk factor for the incidence of bronchopulmonary cancer. Due to the storage capacity in the indoor air of homes, radon concentrations can increase to very high values. The research aims at using the modern methodology for quantifying the natural and technogenic radiostressogenic factor by radonometry, spectrometry, dosimetry, the health risk will be established, associated with the action of ionizing radiation, caused by radon. The aim of the research is to estimate the health risk associated with radon exposure and to develop measures to control the influence of radiostressogenic factor in the onset of oncological diseases, in the context of EURATOM / 59/2013. Based on the multiple quantification of radon concentrations in the main components of the environment and indoor air of the dwellings, the doses of population

exposure to radon will be calculated. Geographical areas with an increased risk of radon exposure will be elucidated. National population radiation protection regulations will be updated. The synergism between radon concentration and smoking in the onset of bronchopulmonary cancer will be highlighted. Effective Strategies to Reduce the Negative Impact of Radon on Health will be developed. The obtained database will be useful in mapping radionuclides and oncological diseases on the territory of the Republic of Moldova, in order to develop decisions and measures aimed at preventing lung cancer and other cancers.

**MD.114.****Title****IMMUNE STATUS ASSESSMENT PROCESS****Authors**

COREȚCHI Liuba, CAPATINA Angela, ABABII Aurelia, GÎNCU Mariana

**Institution**

National Agency for Public Health  
2667 C2 MD A 61 B 5/145

**Description  
EN**

The invention relates to the field of medicine, in particular to processes for the evaluation of the immune status under the conditions of stressogenic factors, including increased ionizing radiation conditions. There is provided a process for the individual assessment of the immune status in patients exposed to stress factor associated with ionizing radiations, according to the correlation of sum of the populations of T-lymphocytes, including correlation of TCD4+ (T-helper lymphocytes) and TCD8+ (T-suppressor lymphocytes) populations to the TCD3+ (pan T-lymphocytes) x 100, investigated by using of immunofluorescent immunotherapy or the biphenotypic method. The technical result consist in increasing of individual assessment of immune status in patients exposed to radiostresogen factor with detection of the correlation between expression of tension index of immune response and manifestation of clinical pathologies. The procedure can be used in the evaluation of the immune state of the occupationally exposed to ionizing radiation, but also of the population exposed to ionizing radiation as a result of nuclear accidents.

MD.115.

Title

**RISK COMMUNICATION OF THE RADON EXPOSURE**

Authors

Corețchi, L., Overcenco, A., Șargu, V., Gîncu, M., Ababii, A., Șalaru, I., Bahnarel, I

Institution

**National Agency for Public Health****of the Ministry of Health of the Republic of Moldova**

Certificate of registration Serial OȘ no. 7498 of 27.02.2023 issued by State Agency for Intellectual Property of the Republic of Moldova

Description  
EN

Radon ( $^{222}\text{Rn}$ ) as a colorless, odorless and tasteless radioactive gas is ubiquitous, and can be detected in soil, rocks, groundwater, etc. Long-term radon exposure is the leading cause of bronchopulmonary cancer among non-smokers and dramatically increases the chances of bronchopulmonary cancer among smokers. It is easier for public health authorities to encourage radon testing and remediation when people are convinced that their health is at increased risk. Management of the risk of radon exposure should include broader prevention actions at the population level, which could be scaled up to maximize benefits. Communicating the risk of radon exposure and the needs for radon remediation in homes and public buildings is an important moment in preventing and reducing the population's exposure to ionizing radiation, including radon, which will lead to the implementation of the public health strategy. The developed **Risk communication of the radon exposure** guide refers to radon exposure risk communication campaigns, target audience identification; risk communication messages and channels for the general public, professionals, etc.; the activities of institutions participating in the radon risk communication campaign; monitoring and risk assessment of radon exposure. This work is intended for specialists from territorial Public Health Centers, medical workers, teachers from primary, secondary and high school education institutions, LPAs, decision makers, non-governmental organizations, the general public and can be used as support in organizing and carrying out actions of communicating the risk of radon exposure and preventing the appearance of bronchopulmonary cancer related to natural ionizing radiation.

## Labromed Laborator S.R.L. Moldova

**MD.116.****Title*****AIR DEZINFECTION DEVICE*****Authors**

Micu Alexandru

**Institution*****Labromed Laborator S.R.L.*****Patent no.*****PATENT FOR INVENTION MD 1650 Y 20221130***

**MEDICAL DEVICE FOR AIR DISINFECTION SDMA UVAC NON-OZONE.** Made in Republic of Moldova. Ultraviolet Air Cleaner, cod GMDN 65418

**Description  
EN**

- Preventing the spread of infectious diseases through airborne transmission in enclosed spaces by physical methods.
- Continuous disinfecting air with high microbial load and reducing the risk of contamination of medical staff, the prevention and combating of nosocomial infections transmitted by aerosols in the closed spaces of medical facilities in order to protect medical and auxiliary personnel, as well as patients against pathogens: viruses, bacteria, fungi, etc., including the infection with the Coronavirus.
- UV-C radiation -253.7nm, destroys the cellular DNA and ARN, damage that prevents the activity of the germs and their ability to reproduce.
- Air disinfection in closed spaces of public institutions, including schools, kindergartens, medical facilities, nursing homes, industrial plants, the food industry, and also in locker rooms, shops, warehouses, waiting rooms, crowded places, etc.
- **Long duration of activity** – guarantee of 9000 hours of operation: UV-C germicidal lamps operate for a long time at ideal parameters for disinfection, the germicidal tube operating within nominal parameters. Microbial cells cannot develop resistance to this technology.
- Flexibility – easy maintenance, continuous operation, exclusion of the human factor. Disinfection becomes effective and works continuously from the moment the medical device is connected to the power source.

The process is environmentally friendly – UV-C ensures residue-free disinfection; here are no secondary physical or chemical products, that require specialized storage or handling.

## Junior Achievement Moldova

<b>MD.117.</b>	
<b>Title</b>	<b>Emlaniashop</b>
<b>Authors</b>	Emilia Cojocaru, Mentor Silvia Scorțescu
<b>Institution</b>	<b>Universul, JA Moldova</b>
<b>Description</b> EN	Emlaniashop a rain hat that aims to treat head problems, also the hat is water resistant. It is intended for all ages. The hat is intended for all people, but especially for those with headaches and rheumatic problems and heart problems. There are people who often go to the doctor to take prescriptions, being acute in the headache department. This hat really treat hat and its original and unique one.
<b>MD.118.</b>	
<b>Title</b>	<b>Felispanda- Project 2</b>
<b>Authors</b>	Buca Felicia, Mentor Silvia Scortescu
<b>Institution</b>	<b>Universul, JA Moldova</b>
<b>Description</b> EN	Felispanda- Project 2 I work on a coat for a cat, dove, horse, rabbit, the project continues with magneto-therapy that will treat birds and animals for migraines, locomotor pain. Animals are saved and protected from the actions of nature. The universe acts on them and considerably affects their living environment. I love animals and birds very much, as we have a collection of pet breeds at home including domestic birds.
<b>MD.119.</b>	
<b>Title</b>	<b>BIFNY</b>
<b>Authors</b>	Lungu Alexandra, Mentor Silvia Scorțescu
<b>Institution</b>	<b>Universul, JA Moldova</b>
<b>Description</b> EN	BIFNY-is a fridge bag that contains medical magnets in which you can keep products throughout the trip, or for going to the villa, camping or the beach. It is made of fluffy and ecological cloth. The purpose of the project is to heal the hands that hold weight and the back of the person who carries the heavy bag, including the food is always safe and fresh.
<b>MD.120.</b>	
<b>Title</b>	<b>APUN-Project 2</b>
<b>Authors</b>	Griziuc Renata, Mentor Silvia Scortescu
<b>Institution</b>	<b>Universul, JA Moldova</b>
<b>Description</b> EN	APUN-Project 2 I product sleeping glasses and purse-case for sunglasses with medicinal magnets that treat and help to treat the human body, head. Also I product water bottle cover that treats and keeps fresh water. They are maded of ecological cloth intended for girls and boys with APUN character design. The product is original and accessible to everyone.

## New Zealand

by

*Toronto International Society of Innovation & Advanced Skills (TISIAS)*

### NZ.1.

**Title**

**AccuMM – Accurate to the MilliMetre**

**Authors**

Jonathan P. Olds, Winston K.G. Seah and Ramesh Rayudu

**Institution**

**Victoria University of Wellington**

**Description**
**EN**

Knowing where and when a landslide will occur is currently more of an art than a science. We use low-cost solar-/battery-powered wireless GPS-based sensors, together with our specialized, cloudbased algorithm to calculate the location of each sensor, relative to a fixed-based station. Costing less than 5% of existing solutions, yet providing sub-centimetre accuracy, our system can be deployed insitu for long-term continuous landslide movement monitoring. This enables more points on a landslide to be monitored continuously without the need for site visits nor intervention for five years or more, giving geotechnical engineers data to help them in landslide risk assessment.

7. Buildings and Materials

## North Macedonia

### MK.1.

#### Title

**FinSim (continuation project)**

#### Authors

Vlatko Stojkoski, Ana Mladenova

#### Institution

**Yahya Kemal College**

#### Description EN

The purpose of FINSIM is to provide users with a complete understanding of personal finance and money management. The platform is designed to be easy to use and interactive, providing a fun and engaging way to learn about financial concepts and apply them in practical scenarios.

One of the most interesting findings of FINSIM is the importance of setting financial goals. By setting realistic goals, users can focus their financial efforts and work towards achieving their objectives. The platform allows users to create and track financial goals, providing a clear road map for their financial journey.

Another surprising finding is the impact of small changes on long-term financial outcomes. By simulating different financial scenarios, users can see how small changes in their financial behavior can have a significant impact on their long-term financial outcomes. This feature can be especially useful for users who are looking to develop better money management skills or to reduce debt.

Overall, FINSIM is a valuable resource for anyone looking to improve their financial literacy and make smarter financial decisions. The platform offers a variety of features and resources to help users achieve their financial goals, from creating a budget to setting financial objectives. By providing an interactive and engaging experience, FINSIM makes learning about personal finance accessible and enjoyable for users of all levels.

**MK.2.****Title****Cleaning waters from heavy metals with natural vinegars****Authors**

Yasemin Akbiyik, Marko Pejov

**Institution****Yahya Kemal College-Skopje****Description**

Elimination of heavy metal pollutants from ground and waste waters is a serious problem in modern societies. Finding an effective solution of this problem, preferably based on natural resources is of fundamental importance in contemporary environmental technology.

In this project we have examined the potential of different vinegars prepared by natural fermentation processes from different regions in Turkey to contribute to removal of heavy metals from natural ground waters and waste waters. To achieve this aim, we have prepared series of water samples containing different concentrations of several heavy metals present in cationic form (Cu, Mn, Pb and Zn), simulating water samples polluted to a different extent. We have monitored the effect of adding different volumes of the investigated vinegars to the prepared samples. Upon suitable pretreatment and incubation of the samples for at least 24 hours, the concentrations of Cu, Mn, Pb and Zn have been determined. For this purpose, the inductively coupled plasma optical emission spectrometry (ICP-OES) technique (also known as ICP – atomic emission spectrometry) has been used.

On the basis of the obtained concentration values in the initially prepared samples as well as for the samples treated with different vinegars, we have derived series of conclusions concerning their potential for heavy metal elimination.

We have related the cleaning potential of vinegars to the evidence described in the literature for stimulating effect of vinegars on the growth of naturally occurring bacteria. These bacteria, further on alter the chemical state of heavy metals, converting them into non-bioavailable forms.



**MK.3.****Title****SOLAR-POWERED ENERGY EFFICIENT  
OXYHYDROGEN GENERATOR****Authors**

Dea Despatovska-Nina Lameva

**Institution****Yahya Kemal College Skopje****Description EN**

With this project we wanted to see if we could build an energy efficient hydrogen generator. We have done an extensive research about this topic. There are many examples of HHO Generators that use electricity for the principal of electrolysis to produce hydrogen gas that can be used as a fuel. We wanted to use alternative source of energy that comes from natural elements that are available in large quantities such as wind water Sun Etc. One of the widely available Alternative Energy source is water. So we combined solar energy and hydrogen generator to achieve more reliable and energy-efficient alternative. The method that we used to make a simple hydrogen generator we used specific materials and resources to construct such a generator. By conducting two experiments simultaneously we managed to generate different results in reference to the amount and the source of electricity that was used. A diagram of the experiment as well as results and charts are shown in this project. Appropriate interpretation of the results was made. In conclusion we have two sets of results as expected. It's more economical that means with the same amount of fuel we can make 30% more distance than usual.

-  
1. Environment – Pollution Control

# Philippines

by

*Toronto International Society of Innovation & Advanced Skills (TISIAS)*

## PH.1.

### Title

**Mesotemp**

Ma. Chat Donna V. Ofilas

### Authors

Joy Ann Miranda

Iman Hadi Vincheh

### Institution

**Ramon Magsaysay High School**

### Description EN

Mesotemp is a device that functions to massage a certain part of the body that uses the flux of the heat energy instead of the mechanical movement. The system uses two heat flow generators that can be adjusted based on the pain area or users need and then four modes of massaging can be used to target that specific area to alleviate the muscle pains and cramps people are experiencing, without the use of motion by the person himself or another. The four modes of the buttons refer to the intensity of heat the patches will release. The user can choose which button they would like by pressing it to decide which heat intensity they prefer. This device can effectively relax muscle tissue, which may lead to decreased nerve compression, increased joint space and range of motion. It's convenient and has various benefits including reducing pain, muscle soreness and tension and improving circulation, energy, and alertness.

4. Medicine – Health Care – Cosmetics

## Poland

Represented by **Eurobusiness-Haller**

### PL.1.

**Title** **Method of producing feldspar-quartz meal from gneiss mining waste**  
**Authors** Jerzy Jonkisz, Marcin Kana, Andrzej Pomorski  
**Institution** "Poltegor-Institut" Instytut Górnictwa Odkrywkowego (Institute of Opencast Mining)  
**Patent no.** Patent application No. P.441013

**Description** The subject of the invention is a method of producing feldspar raw material in the form of feldspar-quartz meal from gneiss mining waste, from which, after processing, it is possible to obtain construction aggregates (ballast, key aggregate and continuous graining mixtures) as well as decorative aggregates (stone bark, gabion stone, etc.). An important product of the technological process is also the extraction of rock gneiss as an ingredient for soil improver. The invention is distinguished by the fact that the feldspar-quartz meal obtained from gneiss waste materials meets the following quality criteria: content of  $K_2O + Na_2O$  min. 6.5%;  $K_2O/Na_2O$  value  $> 1$ ;  $Fe_2O_3$  content  $\leq 0.5\%$ , and the rock component of the soil improver: containing a minimum of 4.0% potassium oxide ( $K_2O$ ); and free of above-normal toxic metal content.

**PL.2.****Title****SEA RESCUE STATION LIFE STAND****Authors**

Piotr Sulecki

**Institution**

-

**Patent no.**

Patent Application No. P 438630

**Description**

A marine life-saving station enables a safe and effective rescue operation with rescue equipment by people in the vicinity of a drowning person

During the rescue operation, life stand is designed to inform all people within a radius of several thousand square meters about the rescue operation being carried out so that as many people as possible take part in it.

Safely carried out rescue operation even by people that are not qualified or cannot swim. Immediate notification of people in the vicinity of emergency services. Three people can carry out the action simultaneously.

Life Stand is sound and light system integrated with the lifebuoy informing about the threat to the life of a person in the water. It's equipped with a lifebuoy with a thirty-meter rope and rescue buoys. After removing the lifebuoy from a stand the alarm signals heard from several thousand square meters will start. The sound signals will go on for 90 seconds and light signals will last 40 minutes. Life stand has installed gms module that will automatically alert emergency services providing them with location of the stand. There is also a beach entry sign in case of emergency services are called by people on the beach.

Life stand is equipped with an independent battery power supply with solar charging and led lighting which illuminates the stand at night.

Combination of light and sound alarm with GPS location, description of the place with no. beach entrances, stand lighting at night, own solar power supply, equipped with three life-saving appliances, 2 buoys and a lifebuoy with a rope.

First six life stands appeared in Poland in the municipality of Jastarnia in 2021, another seven in 2022 in the Stegna municipality.

See youtube movie about the invention:  
<https://www.youtube.com/watch?v=M8ul8q6aBzQ>

## Poland

Represented by

*Association of Polish Inventors and Rationalizers*

*Stowarzyszenie Polskich Wynalazców i Racjonalizatorów. SPWIR*

### PL.3.

#### Title

**Method of radiation sterilization of biological dressings and package for transport and radiation sterilization of biological dressings**

#### Authors

Zbigniew Zimek, Hanna Lewandowska - Siwkiewicz, Anna Korzeniowska-Sobczuk

#### Institution

**Institute of Nuclear Chemistry and Technology**

#### Patent

P. 439658

#### Description

Biological dressings using Acellular Dermal Matrices (ADM) play an important role in the treatment of full-thickness skin injuries in both acute and chronic wounds. They are considered a safe alternative to autologous skin grafts in the therapeutic treatment of extensive wounds. An important factor in terms of patient safety is the cleanliness of the dressing, i.e. the absence of any bacteria or viruses on its surface. This ensures that no undesirable factors can enter the patient's body which could impair the function of the dressing and endanger patient's health. It is therefore necessary to develop hermetic packaging and sterilisation methods that do not affect the functional properties of the dressing. A method for radiation sterilization of a biological dressing according to the invention provides that a biological dressing of human or animal origin is placed in a transport package having an outer protective layer of cardboard and a two-part inner thermal insulating layer of polystyrene where one part constitutes a lid and the other a base, Then the dressing placed in such a tight package is sterilized using an electron beam of the energy of 9.5 MeV. Within the scope of the invention, the parameters of the packaging intended for transport and sterilisation of the dressing were developed. The dose distribution in the sterilisation device containing the allograft was calculated ) using the Monte Carlo method, and then the appropriateness of the dose was tested using alanine dosimetry after irradiation at dry ice temperature . It was found that a sterilisation dose of 35 kGy is achieved in a mass corresponding to the cell-free skin matrix at an exposure (surface) dose of 25 kGy, which means an increase in the sterilisation process rate by almost 1/3, which in a similar relation reduces the cost of the sterilisation process. The maximum number of allografts that can be placed in the sterilisation device without compromising.

**PL.4.**

<b>Title</b>	<b>A platform for rail-road transport, in particular wood and metal logs</b>
<b>Authors</b>	Wiesław Krasoń, Piotr Kędzierski, Michał Stankiewicz, Grzegorz Sławiński, Jarosław Kiepora
<b>Institution</b>	Military University of Technology
<b>Patent</b>	P.434261, EP21461538.7,

**Description**

The object of research is a cheap, easy-to-build basic module and multi-platform sets, obtained by combining basic modules with dimensions corresponding to typical railway containers: 10' (with a length of up to 3m), 20' and 30' (length of up to 9m). Such structures can be used to support the intermodal rail-road transport of wooden and metal logs including pipes, products transported on pallets and loose materials. A single platform-container module supporting the transport of logs has the dimensions of a 10' (length of up to 3m) railway container. Such a platform has a modular structure. It can be assembled in various configurations depending on the intended use. The complete module – a single platform consists of a steel frame, a rotating end carriage placed vertically at one end of the frame or two end carriages at both ends and a set of removable stanchions with ties surrounding the load. Single set of connected two basic platform modules is the equivalent of a 20' container. Such a set consists of: two frames connected with bolt joints, two rotating end carriages placed vertically at both ends of the frame set and two sets of stanchions with ties for the load. The multiplatform set with the log load can be reloaded many times. Four different types of loading and unloading techniques most often used in the transport of logs can be used for this purpose, They concern reloading from trucks, road tractors to various types of railway wagons and vice versa without the need to empty the set of platforms. Additionally, a single platform module can be equipped with removable metal or composite side walls and a roller shutter folding roof. Such a structure will enable the protection of loads, such as e.g. steel in coils or paper, against precipitation.

**Poland**

Represented by  
**IBS Global**

**PL.5.****Title**

**Lyophilisate of collagen and glycosaminoglycans  
isolated from fish skin**

**Authors**

Beata Kaczmarek-Szczepańska, Paweł Antosik,  
Katarzyna Burlikowska, Justyna Kozłowska, Iwona  
Otrocka-Domagala, Lidia Zasada

**Institution**

**Nicolaus Copernicus University in Torun**

**Patent no.**

The lyophilisate which is a mixture of compounds from the group of glycosaminoglycans and collagen was obtained by processing fish skins that are wasted in the food industry. Bioactive compounds present in the product can find biomedical applications in the production of dressing materials or implants. The product is biocompatible and can be used to cover metallic implants and produce hydrogels/dressings for wounds or in tissue engineering to produce scaffolds for cells or as a component of cosmetics. Lyophilisate is in powder form stable at room temperature, and easy to store and transport.

**Description**

PL.6.

Title

**An innovative method using an evolutionary technique to design single-channel dies used in the extrusion process of crystallized CO<sub>2</sub> to reduce the consumption of electricity and raw materials**

Authors

Dominik Wojtkowiak, Krzysztof Wałęsa, Jan Górecki, Aleksandra Biszczanik, Mateusz Kukla

Institution

Poznan University of Technology

Patent

**W.131208, W.131209**

Description

The method developed supports the design of single-channel dies for extruding crushed materials in reciprocating pelletisation. The innovation of the solution comes from the use of a genetic algorithm, categorised as an artificial intelligence algorithm. This allows the comparison of simulation test results obtained for selected values of the geometrical parameters of the die channel. On that basis, the algorithm, using a probabilistic selection rule, changes the value of the individual geometric parameters in order to achieve the set objective function. The decision-making parameters used in the indicated method are the reduction in the limit value of the force required to carry out the extrusion process while maintaining the product density value within a fixed value range.

Demonstration tests gave credibility to the effects of the developed design method, where the Cold Jet PE80 granulator managed to reduce electricity consumption by 17% and raw material consumption by 5%. The shape of the die channels and their geometric parameters have been filed with the Patent Office of the Republic of Poland (applications Nos. W.131208 and W.131209). In order to develop a numerical model of the material, tests were carried out to determine a mathematical function describing the change in the value of the mechanical parameters as a function of its density. This was made possible by the development of four test rigs, which were covered by patent applications P.442070, P.442071, P.437840 and P.437839.

The end result was the design of the single-channel dies, which are adapted for installation in the PE80 pelletiser by Cold Jet. Three types of dies were developed for 3 ranges of final pellet density. Converging convex and concave-convex dies were used for the demonstration studies. The results of the study proved that the use of the proposed new die design method reduces electricity consumption by 17% and raw material consumption by 5%. On the basis of which, utility model application Nos. W.131208 and W.131209 were prepared.

In the case of the other dies, they allow pellet production in the range of 1,300-1,500 kg/m<sup>3</sup>. Dry ice pellets are only offered on the market for densities of around 1,550 kg/m<sup>3</sup>. Therefore, a proposal is made to produce pellets with different values of it can be considered a product innovation.



## Poland + Ukraine (collaboration)

### PL.7.

<b>Title</b>	<b>Problems of Plants Revitalization in the East of Ukraine after the war</b>
<b>Authors</b>	Yulia IVASHKO, Denys MYKHAILOVSKYI, Valerii TOVBYCH, Justyna KOBULARCZYK, Dominika KUŚNIERZ-KRUPA, Andrii DMYTRENKO, Yuliia KHARABORSKA
<b>Institution</b>	1 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine. 2 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland. 3 National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, Poltava, 36011, Ukraine.
<b>Description</b>	The research is devoted to the actual problem of reconstruction and repurposing of war-ravaged industrial territories in the East of Ukraine. Given that these are industrial areas, the revitalization experience of recent years was analyzed using the example of the multifunctional complex "Fabryka Norblina" in Warsaw. The authors of the article investigated the situation with the destruction of objects in the combat zone and during the years 2018 – 2022 investigated the construction process of the "Fabryka Norblina". On the basis of the conducted research, proposals were formulated regarding possible options for using the industrial territories in the East of Ukraine in the process of post-war reconstruction.

### PL.8.

<b>Title</b>	<b>Reproduction and restoration of iconostases of Ukrainian churches</b>
<b>Authors</b>	Mykola ORLENKO, Ivan BUZIN, Yulia IVASHKO, Andrii DMYTRENKO, Dominika KUŚNIERZ-KRUPA, Denys MYKHAILOVSKYI, Serhii BELINSKYI, Anastasiia URAKINA
<b>Institution</b>	1 "Ukrrestavratsiia" corporation, Kyiv, Ukraine. 2 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037,

<b>Description</b>	Ukraine. 3 National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, Poltava, 36011, Ukraine. 4 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland. 5 Knights of the Winter Campaign 28th separate mechanized brigade Armed Forces of Ukraine.
	The research is devoted to the problem of reproduction and restoration of wooden iconostases in churches of Ukraine. The experience of the "Ukrrestavratsiia" corporation in the reproduction of unique wooden iconostases of the Baroque era in the St. Michael's Golden-Domed Cathedral and in the Dormition Cathedral of the Kyiv-Pechersk Lavra was analyzed. The purpose of the study was to analyze how the existing domestic and foreign experience can be used in the post-war reconstruction of Orthodox churches of Ukraine. The scientific novelty of the research lies in the fact that the recommendations are formed on the basis of the author's photo-fixation of objects and practical experience of restoration and reproduction of iconostases of outstanding monuments
<b>PL.9.</b>	
<b>Title</b>	<b>Research for banksy mural 'Judoki' in Borodyanka</b>
<b>Authors</b>	Oleksandr MOLODID, Oleksandr KOVALCHUK, Yulia IVASHKO, Dominika KUŚNIERZ-KRUPA, Pavol TISLIAR, Andrii DMYTRENKO, Łukasz BEDNARZ
<b>Institution</b>	1 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine. 2 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland. 3 Masaryk University, Arna Nováka 1, 602 00 Brno, Czech Republic and University of Ss Cyril and Methodius, Nám. J. Herdu 2, 917 01 Trnava, Slovakia. 4 National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, Poltava, 36011, Ukraine. 5 Wrocław University of Science and Technology, 27

**Description** Wybrzeże Wyspiańskiego Street, 50-370, Wrocław, Poland. The research concerns the issue of researching one of Banksy's murals, which was created in the city of Borodyanka, Ukraine. This mural, like the artist's other works, carries a deeper message. This time it is a message related to the war in Ukraine. At the same time, the authors note that the mural is a work of art and an important 'witness' for the local community to the tragic events in Borodyanka. In the current situation, where as a result of the war, the building substance is destroyed to a greater or lesser extent, it is important to consider how to protect, preserve, and restore works of street art, especially works as valuable as the Banksy mural under analysis.

**PL.10.**

**Title** Specificity of the construction of historical temples of Shaanxi Province as the basis of their preservation and restoration

**Authors** Yang DING, Yulia IVASHKO, Justyna KOBYLARCZYK, Michał KRUPA, Aneta PAWŁOWSKA  
1 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine.

**Institution** 2 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland.  
3 University of Lodz, Institute of Art History, 65 Narutowicza Street, 90-131, Lodz, Poland.

**Description** The Shaanxi province and its capital, the city of Xi'an, are areas of concentration of traditional Chinese architecture outstanding monuments. The study of the peculiarities of the genesis and compositional construction of objects of various functional purposes as a framework for restoration and monument protection activities is relevant. Using the example of the author's drawings of the temples of the Shaanxi province, the departure from the dominant pagodas of Buddhism borrowed from India in the early periods towards the temples of the local religions of Taoism and Confucianism, whose architecture is subordinated to the local environment, in the late Ming and Qing periods is argued. The commonality of temples with secular buildings – residential pavilions and small architectural forms – pavilions, which is a national and regional feature, has been

proven. The gradual simplification of the types of local temples, the decrease in the number of varieties and the eclecticism of forms indicate compliance with the general process of style formation - emergence, flowering, gradual decline due to eclecticism.

**PL.11.**

<b>Title</b>	<b>Problems of Expositions and Protection of Banksy's Murals in Ukraine</b>
<b>Authors</b>	Aneta PAWŁOWSKA, Agnieszka GRALIŃSKA-TOBOREK, Piotr GRYGLEWSKI, Oleg SLEPTSOV, Oleksandr IVASHKO, Oleksandr MOLODID, Marek POCZAŃTKO
<b>Institution</b>	1 University of Lodz, Instytut Historii Sztuki, 65 Narutowicza Street, 90-131 Lodz, Poland. 2 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine. 3 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland.
<b>Description</b>	The research work examines the artistic value, legal and conservation aspects of Banksy's murals created during the war in Ukraine. Currently, there are conflicting opinions both on the artistic value of street art and on how to preserve works of this type as works of art. As Banksy's works have become commercially important, there is a need to assess them in Ukraine, regarding legal aspects and the possibility of displaying them. The authors analyzed the problems of using these murals from the point of view of the law and structural possibilities, since the murals are made on dilapidated buildings.

**PL.12.**

<b>Title</b>	<b>In-fill development architecture, as element of post second war reconstruction of city of Poznan. Case study of Joseph Stübben's extension plan of the city from years 1902-1918</b>
<b>Authors</b>	Adam NADOLNY, Yulia IVASHKO, Katarzyna ŚLUCHOCKA, Ioan Gabriel SANDU, Przemysław BIGAJ
<b>Institution</b>	1 Poznan University of Technology Faculty of Architecture, Jacka Rychlewskiego 2, 60-965 Poznan, Poland,

	2 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine
	3 Gheorghe Asachi Technical University of Iași, Faculty of Materials Science and Engineering, Blvd. Mangeron, No. 41, 700050, Iasi, Romania
	4 Romanian Inventors Forum, Str. Sf. P. Movila 3, 700089, Iasi, Romania
	5Cracow University of Technology, Faculty of Architecture, 24 Warszawska Street, 31-155, Cracow, Poland
<b>Description</b>	The concept of the post-war reconstruction of many Eastern European cities, shaped as a result of the actions of German town planners at the turn of the 19th and 20th centuries, in many cases consisted of negation, non-continuation or abandonment of previously set development directions. The subject of studies in this text will be the city of Poznań, which continued to develop in the post-war period on the basis of spatial arrangement created as a result of actions of Joseph Stübben in the years 1902-1918. The post-war reconstruction of the city after 1945 preserved its main urban layout created during the modernization period with the participation of a German town planner. The structure of the city preserved in this way consisted mainly of multi-family residential buildings. Urban planning and architectural activities as part of the reconstruction of the city after 1945 were aimed at continuing this concept. A critical analysis of these activities is planned in the following text.

**PL.13.**

<b>Title</b>	<b>Problems of supplementing the formed historic development with new objects (on the example of Poznań)</b>
<b>Authors</b>	Karolina SOBCZYŃSKA, Adam NADOLNY, Katarzyna SŁUCHOCKA, Jakub KACZMAREK, Vladyslav SMILKA, Oleksandr IVASHKO
<b>Institution</b>	1 Poznan University of Technology Faculty of Architecture, Jacka Rychlewskiego 2, 60-965 Poznan, Poland, 2 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine
<b>Description</b>	The authors emphasize the importance of analysing the

composition of historical buildings' elevations existing in the vicinity of the designed object. Capturing the main compositional structures and guidelines of the facades of historical objects is difficult and hence the authors show different ways to achieve this, emphasizing different ways of observing the object and graphically recording the layout of the composition and later using these effects in the design stage. The aim is to acquire and improve the ability to fit the designed object into the historic context.

**PL.14.**

<b>Title</b>	<b>Condition Survey and Recommendations Regarding the Repair of the Facades of the Historical Building in the Besarabskyi Quarter in Kyiv</b>
<b>Authors</b>	Oleksandr MOLODID, Olena MOLODID, Ivan MUSIIAKA, Sergii BENDERSKYI, Olena KOZAKOVA, Andrii DMYTRENKO, Przemysław BIGAJ
<b>Institution</b>	1 Kyiv National University of Construction and Architecture, 31 Povitroflotskyi Avenue, Kyiv, 03037, Ukraine 2 National University "Yuri Kondratyuk Poltava Polytechnic", 24 Pershotravnevyi Avenue, Poltava, 36011, Ukraine 3 Cracow University of Technology, 24 Warszawska Street, 31-155, Cracow, Poland
<b>Description</b>	The research describes the work carried out during 2021 – 2022 on the condition survey of building facades in the so-called historical Bessarabian quarter in Kyiv. The purpose of the survey is to identify defects and damage that were acquired during the operation of the facades and can reduce their durability. The following methods were used: visual – when determining the technical condition of structures based on external features; analytical – when assessing the technical condition of the surveyed object, instrumental – when studying the physical and mechanical indicators of structures. Based on the received survey data, recommendations were formulated regarding the facade restoration technology. It is recommended to focus specifically on the method of dismantling the existing decorative layers of the facade and replacing them with new ones. This approach will maximally extend the service life of the facade of the historic building.

**PL.15.**

<b>Title</b>	<b>"Friendly city" - the main challenges of making architectural heritage accessible to visually impaired people and other users.</b>
<b>Authors</b>	Aneta Pawłowska, Piotr Milczarski, Krzysztof Krejtz, Izabela Krejtz, Anna Wendorff, Daria Rutkowska-Siuda, Artur Hłobaż, Anna Śniegula, Andrew T. Duchowski, Adam Drozdowski, Magdalena Milerowska, Norbert Borowski, Katarzyna Wisiecka
<b>Institution</b>	University of Lodz Narutowicza 68, 90-136 Łódź Poland/ SWPS University Chodakowska 19/31, 03-815 Warszawa, Poland
<b>Description</b>	The project will support the independent movement of visually impaired people in the space of the center of Lodz using public transportation. Its implementation will give the effect of social inclusion and have a positive impact on the quality of life of visually impaired people. Following the principles of universal design, the system will be used by all people via free apps for smartphones and smartwatches for IOS and Android operating systems. The goal will be achieved by installing a wireless network of electronic tags (Bluetooth Low Energy) at city bus stops. The small, virtually maintenance-free battery-powered markers will communicate with smartphones and smartwatches of blind and visually impaired people visually impaired using a developed app. The signal emitted from the markers will enable visually impaired people to find stops. Users of the application via smartphones and smartwatches will receive a voice message regarding local information (e.g. distance, direction) and objects. A special description (so-called audio-description) will be given to the historical buildings in the area. In order for the descriptions to be accurate, they will be preceded by oculographic surveys of Lodz's spaces among sighted people. Tourists and seasonal workers will be able to use the project, as the interface and substantive content of the application will also be created in different languages. All stages of the project will be evaluated by people with the visually impaired. The assumption of the project will be the possibility of its wide implementation both in the entire Lodz agglomeration and other cities.

## Poland

*Represented by Association for the Promotion of Polish Science,  
Technology and Innovation*

### PL.16.

<b>Title</b>	<b>Armour panels with perforated plates made of nanostructured bainitic steel</b>
<b>Authors</b>	Bogdan Garbarz, Jarosław Marcisz
<b>Institution</b>	Sieć Badawcza Łukasiewicz - Górnośląski Instytut Technologiczny
<b>Patent</b>	PL multiple
<b>Description</b>	Nanostructured bainitic steel (nanobainitic steel) is a new structural material with the static tensile strength in the range of 2.0–2.2 GPa and good toughness. One of the applications of nanobainitic steel plates are armour systems. ŁUKASIEWICZ-GIT develops a technology for producing ULTRA-PAN armour panels made of nanobainitic steel (tensile strength min. 2.0 GPa, total elongation A min. 12%). The optimised perforation plate array of the panel combined with the innovative material cause destabilisation of the projectile trajectory during impacting on the armour, significantly decreasing the penetration efficiency, while reducing the surface mass of the armour shield by at least 30%. Industrial technology production of the nanobainite steel perforated plates was developed, including melting and casting into ingot moulds, preparation of the rolling mill charge, hot rolling, post-rolling plate processing and final heat treatment and finally perforation method.

### PL.17.

<b>Title</b>	<b>Methodology of evaluating the service life of 800HT alloy with austenitic matrix</b>
<b>Authors</b>	Hanna Purzyńska
<b>Institution</b>	Łukasiewicz Research Network – Upper Silesian Institute of Technology
<b>Description</b>	Approval of the material of the pressure part of power units for further operation requires a special procedure. An important element of this procedure is the assessment of the condition of the material and its suitability for further use. In particular, this procedure requires conducting periodic diagnostic tests and each time assessing the condition and degree of exhaustion of the material of these elements. The results of material tests are the basis for estimating the time of further safe operation. After exceeding the calculated operating time, it is only possible to assess the condition individually and forecast further safe operation for the given parameters of further operation. Studies of the microstructure of the Inconel 800HT alloy after long-term exposure to high temperature and stress made it possible



to analyze the dynamics of its changes. Scanning and transmission electron microscopy and X-ray analysis of the phase composition of the deposits were used to analyze changes in the microstructure of the material after long-term exploitation. The degradation of the material, caused by the advanced precipitation process of carbides and intermetallic phases, caused the loss of service life by reducing the mechanical properties, including the creep strength. The developed methodology for assessing changes in the microstructure of the new-generation Inco0nel 800HT alloy with an austenitic matrix is an original scientific study that is used by numerous scientific and industrial institutions to predict the time of safe operation of pressure elements of power and petrochemical equipment.

**PL.18.****Title**

**Multi-phase steel for the production of premium rails characterized by high wear and fatigue resistance**

**Authors**

Krzysztof Radwański, Roman Kuziak

**Institution**

Sieć Badawcza Łukasiewicz - Górnośląski Instytut Technologiczny

**Patent**

PL P.417742

**Description**

The present invention relates to carbide-free multi-phase steel, composed essentially of TRIP assisted bainite. Multi-phase steel according to the invention is preferably used for the production of flanged Vignole rails of enhanced durability in service, and specifically, of enhanced resistance to wear and contact-fatigue defects initiation and growth, compared to the air cooled rails of pearlitic steels after hot rolling. The desired properties of the rails are achieved during cooling in still air after rolling without the necessity of performing isothermal treatment – so called bainitization. Retained austenite is in the amount greater than 12% by volume fraction. This feature of rails is achieved by properly alloying of medium carbon steel and adding Ti in the amount giving rise to the precipitation strengthening of bainitic ferrite by TiC nano-particles. Moreover, the main chemical steel composition includes 0.28%C, 1.1%Si, 2.5%(Mn+Cr). The mechanical properties of rails made of this steel are as follows:  $R_{p0.2} > 700$  MPa,  $R_m > 1200$  MPa,  $A_{10} > 20\%$ , 400-450HB.

**PL.19.****Title**

**Innovative methodology for determining service life of creep-resistant steels and alloys**

**Authors**

Adam Zieliński, Hanna Purzyńska, Janusz Dobrzański, Marek Sroka

**Institution**

Łukasiewicz Research Network – Upper Silesian Institute of

	Technology
	Creep tests are the most objective method of predicting the service life of steels and alloys intended for operation in temperature and stress conditions. They make it possible to determine the creep time resistance under the required operating conditions. The creep strength is determined based on the results of long-term fracture tests, with or without elongation measurement during the test. These tests are carried out for design purposes and materials after long-term use to determine their operating parameters in creep conditions. Due to the highly time-consuming and thus cost-intensive nature, various ways of characterizing the creep resistance can be used in practice. One is shortened creep tests, e.g. with elongation or rupture measurement, and their extrapolation to a specific temperature or service life.
<b>Description</b>	<p>Creep tests with elongation measurement make it possible to determine the creep rate in a steady state, i.e. in the second creep period. It is an important parameter showing the resistance to creep of the tested material. With increasing temperature and ageing time, service life is lost. This is manifested by an increase in the creep rate in its second period. The obtained results correlate with the results of microstructure studies.</p> <p>The innovative methodology for determining the service life consists in linking the results of material creep tests in the initial state with the results of material creep tests after ageing at a minimum of two temperature levels, i.e. at the temperature of expected long-term operation and at a higher temperature, the level of which accelerates changes in the microstructure without changing the significant way of the nature of the phenomenon.</p>

<b>PL.20.</b>	
<b>Title</b>	<b>IndustrialCap: Wearable System for Industry Workers: Enhancing the Sense of Proximity</b>
<b>Authors</b>	Julia Dominiak, Anna Walczak, Marcel Bednarczyk, Natalia Bartłomiejczyk, Rafał Bartosiak, Adam Rylski, Amelia Sałek, Krzysztof Grudzień, Zdzisława Rowińska, Andrzej Romanowski, Zbigniew Chaniecki
<b>Institution</b>	<b>Lodz University of Technology, Institute of Applied Computer Science</b>
<b>Description</b>	IndustryCap is an automatic system for industry workers built in a form of a cap/helmet, that enables alerting about objects appearing too close to the user. System senses proximity in six directions through ultrasonic sensors placed around the head's circumference. When the object closer than two meters from the wearer is detected, thermal camera measures the

temperature of the objects. Based on the measurement, the system determines whether the detected object is a person. Three types of feedback about the detected obstacle and its relative position are implemented: LED warning light, haptic warning by vibration motors and audible warning. System innovation is focused within integration of multiple modality basic sensors in one device that senses not only obstacles, but also detects real people both in steady and moving settings. The other huge advantage is no CCD/video image processing in the system, that reduces privacy concerns and at the same time leverages social acceptance of the system. The device can be easily integrated into protective helmet used in industry environments. The invention allows for maintaining safe distance from other industry workers and machines with which direct contact can cause life-threatening situations. Moreover, IndustryCap can warn the user about hot surfaces which in industrial environments can be a sign of malfunction.

**PL.21.****Title**

**Supporting Remote Cooperation with Augmented Reality in Industrial Environment**

**Authors**

Mateusz Ałaszewski, Piotr Owczarek, Bartosz Moczowski, Jędrzej Pietrzak, Anna Walczak, Julia Dominiak, Natalia Walczak, Krzysztof Grudzień, Zbigniew Chaniecki

**Institution**

**Lodz University of Technology, Institute of Applied Computer Science**

**Description**

We present an innovative way of communication between industrial workers during routine tasks. Both newcomers and experienced employees need support and guidance when performing particularly important activities. However, it is not always possible to ensure their on-site presence in the workspace. To guarantee safety of employers and efficiency of production processes, it is crucial to minimize the chance of human error. Considering the well-being and effectiveness of industrial workers, we developed and tested a system for remote two-way communication which enables the engineer "on site" to collaborate with the "remote" expert in real time. The "on-site" engineer receives hints on the augmented reality head-up display (HUD) in the form of holographic markers, which the "remote" expert places considering the order and location of activities necessary to correctly operate the devices (valve, switchboard, mimic board, etc.). Moreover, the system based on wireless audio-video communication via HMD does not reduce the manual capabilities of the engineer.

**PL.22.**

<b>Title</b>	<b>TomoTable: System for Tracking and Classification of Everyday Objects for Remote Collaboration in Industrial Environments</b>
<b>Authors</b>	Krzysztof Adamkiewicz, Jędrzej Pietrzak, Bartosz Moczowski, Amelia Sałek, Anna Walczak, Julia Dominiak, Adam Rylski, Krzysztof Grudzień, Zbigniew Chaniecki, Andrzej Romanowski
<b>Institution</b>	<b>Lodz University of Technology, Institute of Applied Computer Science</b>
<b>Description</b>	System TomoTable enables recognition and tracking objects on a flat surface based on projected capacitance measurements. The system has a form of a grid of electrodes placed under the sensing sensitive area. The electrodes are connected to the electronics responsible for performing measurements and signal processing. Capacitance is measured between a selected column and row of the matrix. Changes in the capacitance depend mostly on the properties of the material in the place where the row and the column cross. The device reads the capacitance between all rows and columns and uses the obtained measurements to construct an image of the material located right on the sensing surface. This image is used to determine the shape of the object footprint, its position, orientation, and, with the use of machine learning algorithm, system can also classify the object. This information can be used to construct augmented reality systems that integrate with tangible objects. The advantage of this system is a lack of external components like cameras. The system also does not require the surface to be soft or transparent. The system can be effectively used in industrial environments – ex. it can recognise tools placed on the smart surface and highlight the one that is needed. Highlighting the appropriate tool decreases the possibility of error, especially if the user is an inexperienced industry worker.

**PL.23.**

<b>Title</b>	<b>TextureTouch: Robotic Arm for Remote Textures Sensing</b>
<b>Authors</b>	Natalia Krzyżaniak, Natalia Walczak, Weronika Majewska, Anna Walczak, Julia Dominiak, Aleksandra Wysokińska, Magdalena Wróbel-Lachowska, Krzysztof Grudzień, Zbigniew Chaniecki, Andrzej Romanowski
<b>Institution</b>	<b>Lodz University of Technology, Institute of Applied Computer Science</b>
<b>Description</b>	TextureTouch is a system that allows remote touching of fabrics using a manipulator and providing feedback in the form of specific vibrations. The developed solution may be used for on-line shopping, product quality assessment by textile wholesalers, as well as for scientific and educational research

on haptic perception. The supplied invention allows for a quasi-direct interplay with the chosen fabric material, imitating the user motion and moving it to the operation of the robot. The device includes two elements – an artificial robotic arm and glove with elbow bands, which is responsible for capturing the user's movements and transmitting sensory stimuli of the touched fabric. The smart glove maps and mimics the movement using robotic arm's of the hand and forearm using a set of sensors. The manipulator was developed using current flexible 3D printing technology, thanks to which it accurately and naturally reproduces the operator's movements. The contact is simulated with the aid of using a vibration stimulus withinside the glove - while the robot arm touches the material, these data may be mapped at the user's hand withinside the shape of a particular vibration. Glove and robotic arm, after a quick setup, connect to each other using a wireless Wi-Fi network. A dedicated application server is responsible for the exchange of data on arm movement and received touch signals. The prototyping process was based on interviews and tests with users.

**PL.24.****Title**

**Innovative composition of biomass fuels additives to reduce toxic exhaust components**

**Authors**

Grażyna Żak, Michał Wojtasik, Jarosław Markowski, Robert Wojtowicz, Mateusz Rataj, Tadeusz Kwilosz, Stefan Ptak

**Institution  
Patent**

**Oil and Gas Institute-National Research Institute, Poland**  
P.4405650; 04.03.2022

**Description**

The amount of emissions and the type of emitted flue gas components from heating plants using biomass depend on the composition of the fuel, the combustion process used and the method of exhaust gas cleaning, in the case of individual customers: on the composition of the fuel and the type of furnace used. The emission of toxic exhaust components in both of the above cases can also be reduced by using substances added to the fuel at production process.

The subject of the present invention is a technology for the production of an innovative composition of additives reducing emission to the atmosphere of toxic exhaust components emitted in the combustion process of sawdust from coniferous wood subjected to a granulation process. The innovative composition includes kaolin and iron oxide dosed in the optimal amount and proportions.

**PL.25.****Title**

**How to select the direction of the fluid flow in the double geothermal wells**

**Authors**

Sławomir Falkowicz, Andrzej Urbaniec, Renata Cicha-Szot, Marcin Majkrzak, Łukasz Kłyż

**Institution**

**Oil and Gas Institute-National Research Institute, Poland**

**Patent**

P.442533; 14.10.2022

**Description**

Usually the double geothermal wells are used for production of the hot geothermal fluids. The hot reservoir water outflows through the production well and is transferred to the heat exchanger where it is cooled and injected back into the reservoir through the injection well. After some time the water temperature at the well-head is gradually decreasing which is caused by lower reservoir temperature. The invention allows us to indicate the most advantageous direction of fluid flow which improves the effectiveness of the geothermal system.

The injection well is chosen by considering the homogeneity of rocks around the perforation zone ). The trajectory of the gas/water ratio and derivative of the gas/water ratio vs. time are used for that purpose. The water coning around the well is the most advisable the production well.

**PL.26.****Title**

**Composition of ultra-tight slurry**

**Authors**

Marcin Kremieniewski, Marcin Rzepka, Miłosz Kędzierski Ewa Kałna

**Institution**

**Oil and Gas Institute-National Research Institute, Poland**

**Patent**

P.435702; 16.10.2020

**Description**

Due to the existing requirements set for slurries for sealing of boreholes, it is indispensable to ensure the appropriate pumpability of the slurry. However, it is also important to obtain a barrier impermeable to liquids along with a high compression strength of the forming cement sheath. Components in appropriate proportions were used to design the innovative composition of the ultra-tight slurry, and its cement matrix has been additionally sealed with a solution of hydrophilic nanosilicate.

Due to this, it perfectly fills the intergranular space, which allows for the elimination of the possibility of gas media microflow. The innovative ultra-tight slurry may be used in areas of increased risk of gas migration occurrence, where the obtaining of an ultra-tight structure of the forming cement sheath is required.

**Portugal**

## Inventarium Science

**PT.1.****Title****SYSTEM FOR SAVING GAS AND  
ELECTRICITY IN BOILERS AND HEAT  
ACCUMULATORS VIA REMOTE CONTROL****Authors**

HELDER DA SILVA

**Institution**

-

**Patent no.**

-

Generally, when you have a shower, after lathering up, you need to rinse off. However, even though the water in the pipes is already hot, you are still using hot water and cannot switch off the heat source in order to save gas or electricity.

**Description**

In order to save on the gas or electricity used in the heating equipment, this invention has an emitter or switch located near the equipment and a receiver that allows you to turn off the heating equipment in order to use the hot water that is already in the pipes. In the case of electric heat accumulators, when the order is given, the solenoid valve at the hot water outlet is closed and the cold water valve is opened, thus allowing the water that is already hot to be pushed out without passing through the heat accumulator.

Class no.

2. energy

## Saudi Arabia

*By Highly Innovative Unique Foundation,*

<b>SA.1.</b>	
<b>Title</b>	<b>Effect of Optical Notation as Teaching Method</b>
<b>Authors</b>	Awatif Mohsen Alotaibi
<b>Institution</b>	Highly Innovative Unique Foundation, (Jeddah, Saudi Arabia)
<b>Patent no.</b>	High School 167, Riyadh, Kingdom of Saudi Arabia
<b>Description</b>	- "Optical notation" is an art that converts words into quickly understandable illustrations using paper and a pen. It is also known as drawing notation. With development, visual notation has become a science called "sketch notes", and it is characterized by its ease and abundance of features. It facilitates the arrival of information to the student, facilitates study, and changes learning methods. Traditional, in which the visual entrance is based on visual imagery, figurative and un figurative.



**SA.2.****Title** **Vitamin D Tracker****Authors**

Dr. Awatef Salem Balobaid, Dr. Sahira Banu Ahmed and Dr. Shermin Shamsudheen

**Institution**

Highly Innovative Unique Foundation,  
Jazan University, Kingdom of Saudi Arabia

**Patent no.**

-

**Description**

An emerging silent problem that spreads wide is the deficiency of Vitamin D. The quantity of absorption of UV rays and in turn, the production of Vitamin D depends on location, UVI, season, age, gender, clothing, and exposure to sunlight. A prototype is developed to predict the amount of UV that could be beneficial from sunlight. This data is used by nine different machine learning algorithms like Decision tree, Random Forest Classifier, K-Nearest Neighbour, Support Vector Machine, XGBoost Classifier, Perceptron Classifier, Multi-Layer Perceptron, AdaBoost Classifier, and Gradient Boost Classifier to study the severity of deficiency in Vitamin D production or absorption. Four different levels of severity were maintained Sufficiency, Insufficiency, Deficiency, and Severe. Alert messages were created by the protocol as SMS notifications or as WhatsApp messages. On the classification of severity levels, the Random Forest model performs the best whereas Adaboost has a very low performance.

Identifying the level of Vitamin D was carried out only by blood tests in existing methods. But in this paper, we have proposed a system that detects the value through the wristband sensor which helps to measure the UV exposure in the body. After the analysis when the value exceeds the threshold then alert notifications are sent to the mobile stating their level. This system helps each individual to monitor and take care of their health in a better manner. The future directions could be the consideration of data collected in various seasons to look out for the implementation results and their follow-up in Arab countries.

**SA.3.**

<b>Title</b>	<b>Malath Disaster Relief: Medical Disaster Response Unit</b>
<b>Authors</b>	Dr. Miram Ali, Eng. Haifa Al-Bargi and Eng. Sawsan Al-Bargi
<b>Institution</b>	Highly Innovative Unique Foundation Architecture Department, Faculty of Engineering and Information Technology, Onaizah Colleges, Saudi Arabia.
<b>Description</b>	Malath is an emergency care unit that provides emergency care services for disaster relief; in specific disaster sites such as earthquakes, wars, pandemic etc. This invention was inspired by the recent earthquakes that hit Syria and Turkey flattening cities in the region. The idea is to streamline healthcare service provision via the Malath unit inspired by the triage system to administer emergent care to disaster victims quickly and efficiently. The unit is equipped with communication services; Satellite communication to provide GPS location and real time connection to local relief authorities; civil defense, national guard, police and hospitals. The unit is flexible as it expandable/compactable, and easy to assemble and disassemble to adapt to the different conditions of disaster sites, making it easy to transport to disaster sites.

## Sudan

### SD.1.

**Title**

**Samar Abdalla**

**Authors**

The Shields

**Institution**
**Patent no.**

5 patents pending US approval

EMF and Radiation protection gadgets.

This invention is created using 100% copper fabric, the material is embedded into clothes through a sewing process.

**Description**

Using 100% copper fabric sheets, they are cut into desired lengths and later applied to two sections. One is all clothing, examples are ear muffs which can be placed on the ears, and block radiation from reaching your head. We also have created pocket sizes on shirts to stop radiation exposure to the breast areas. Lastly, we embedded the sheets on pant pockets to prevent exposure of waves to the reproductive areas of the front and back.

Then we have gadgets. We created phone and laptop casings to help prevent the radioactive waves emitted from devices.

Our products were designed and tested using an EMF reader and the emotions have completely dropped in harvesting Radiation.

# Taiwan

Represented by WIIPA

## TW.1.

### Title

**A Novel Biodegradable Straw Prepared From Peel And Hydroxyapatite**

### Authors

TING YUNG CHIANG, CHEN HUI LI, TU XIN HUI, HE YU HAN, WU PEI LING

### Institution

Far East University

### Patent no.

I726553

### Description

This product is a novel manufacturing method of biodegradable straws. Traditional plastic straws cause serious pollution to the environment. This product not only does not pollute the environment, but also reduces the amount of waste. The raw materials of this product straw are PLA (Polylactic Acid), peel and hydroxyapatite extracted from fish scales. Peel and fish scales are both wastes. Adding them to the decomposable straw makes a great contribution to waste reuse and reduction, and is also the goals of circular economy.

## TW.2.

### Title

**A Pneumatic Push Drilling Machine for Evaluating the Strength of In-situ Concrete**

### Authors

Yu-Feng Lin, Chu-Yun Wang

### Institution

**Chienkuo Technology University**

### Patent no.

I458974

### Description

The strength of concrete is a fundamental requirement for the safety of building structures. The current quality control method is to make cylindrical specimens for compression testing to verify its strength. However, if there is a dispute over the quality, it is necessary to take core samples from the structure and conduct testing in a laboratory to confirm the strength of the concrete, which can cause significant damage to the structure.

The principle of the testing machine in this invention is to use a fixed air pressure as the propelling force. Therefore, under a fixed drilling force and rotational speed, the machine drills into the concrete to a fixed depth. The required drilling time is inversely proportional to the strength of the concrete. According to the results of the test,

this method not only avoids excessive damage to the structure but also allows for an immediate assessment of the strength of the concrete on-site.

**TW.3.****Title**

**An Expandable Modular Internet of Things (IoT)-Based Temperature Control Power Extender**

**Authors**

Huan-Mei Chu, Ching-Yun Hsu, Ling-Yao Wei, Chin-Yi Huang, Bing-Kai Liao, Hong-Cheng Kao,

**Institution**

Cheng Shiu University

**Patent no.**

M619907

**Description**

Today, the world's electricity consumption is growing rapidly, and therefore energy demand is also increasing. In the past few decades, various measures have been taken to improve equipment and system design to increase production and transmission efficiency and reduce power consumption. This article proposes a novel Internet of Things (IoT)-based temperature control power extender with two working modes of cooling and heating to solve power shortage. The power is turned on or off accurately and timely through the temperature sensing element, thereby avoiding unnecessary power consumption to achieve the purpose of energy-saving. This work can directly power on or off the power extender through the Internet. It can also use a 2.4G Wi-Fi wireless transmission to transmit real-time temperature information, switch status and master-slave mode, etc. Related data can be controlled, collected, and uploaded to the cloud. Each proposed power extender's temperature setting in a large-scale field can be set uniformly, and no staffing is wasted to set the temperature separately. Taking a general industrial electric fan as an example, if it is changed to this temperature control extension cable to drive, and assuming that the industrial electric fan is activated for 900 seconds per hour, its power-saving rate is 74.75%.

**TW.4.****Title**

**Auxiliary Support Structure for Hand Tools**

**Authors**

Lin Yu-Ting, Yang Zong-Wen, Chiu Yu-Wen, Chen Shu-Chun, Chen Jia-Yi

**Institution**

Cheng Shiu University Department of Tourism and Recreation

**Patent no.** Cheng Shiu University Department of Catering Management M557101

**Description** This product combines the functions of a "Dustpan", "Bucket" and "bin" to provide consumers with a convenient sweeping tool, reducing the need for consumers to purchase different types of sweeping tools and reducing the amount of space in the home.

**TW.5.**

**Title** **Bag with holding liquid containers and temperature-controlled functions**

**Authors** Tsai Jo-Peng, Yang Shun-Lung, Peng Yi-Ci, Chang Yu-Han, Ji Bo-Xun

**Institution** **Far East University**

**Patent no.** **I707808**

**Description** This invention is a multifunctional bag capable of holding liquid container for solving the problems in life, especially the daily needs of taking out or delivering meals in the current epidemic situation. In addition to providing the convenience of food fixing and carrying, it can also be transformed into a device for carrying liquids that are often needed for childcare or family outings.

**TW.6.**

**Title** **Beginner Racket**

**Authors** KUAN HSIEN-HSIANG

**Institution** SCI-EXCELLENCE Co. Ltd

**Patent no.**

**Description** Our work is to use the principle of electrical conductivity to place the wire in the center of the racket and split the two wires, wrap the ball with aluminum foil to make it conductive, and connect the electrified wire to the buzzer to know that it hits the center.

**TW.7.**

**Title** **Billiard machine with fast ball collection function**

**Authors** Kun-Mao Chen, Cheng-Hung Tsai, Shih Yi Ming, Chen Wei Ren, Chin-Sung Chen

**Institution** **Cheng Shiu University**

**Patent no.** **I762343**

**Description** The effect of this creation is that this creation has the functions of picking up, collecting and serving the ball at the

same time, and can provide the functions of storing the ball and practicing receiving and serving the ball. Moreover, the mechanism of picking up, collecting and serving the ball is simple in structure, easy to design, and can reduce production cost. This creation has a special baffle design, which can avoid the problem that the ball cannot be swept into the delivery area due to the bounce of the ball due to the sweeping collision of the ball collection module or the ball sweeping module when picking up the ball. This creation has the functions of direction detection obstacle, obstacle detection and fast moving speed. This creation has a fast ball-collecting speed, can perform the action of fast serving, and trains the player's reaction action. Compared with the prior art, this creation has a large storage space for balls, and can be used as a storage box for billiards, which is convenient for a large number of ball training. In addition to the mechanism of picking up, collecting and serving the ball, this creation also has the function of disinfection lamp and ozone sterilization, which can prevent the billiard ball from being contaminated with viruses and bacteria after it falls to the ground, and the user will be infected with germs after holding the ball. In the process before and after the creation enters the serving module, a limiter and a guide plate are set, which can limit one ball to enter the serving module at a time and can surely send the ball to the high-speed slewing device for serving operation.

**TW.8.****Title****Dustpan Bucket****Authors**

CHOU HSIU-JUNG, LI YI-XUE, CHU TING-YING, WANG HONG-LIN, HUANG JIA-HONG

**Institution****Cheng Shiu University****Patent****M632227****Description**

This product combines the functions of a "Dustpan", "Bucket" and "bin" to provide consumers with a convenient sweeping tool, reducing the need for consumers to purchase different types of sweeping tools and reducing the amount of space in the home.

**TW.9.**

<b>Title</b>	<b>Electric Dustproof Power Cabinet</b>
<b>Authors</b>	Chien Wei, Kang Tsai-Hua, Liao Shu-Han, Lin Je-Home, Chen Yung-Hsun
<b>Institution</b>	<b>Lunghwa University of Science and Technology HungKuo Delin University of Technology Tamkang University Chenshern Co., Ltd.</b>
<b>Patent</b>	<b>M631435</b>
<b>Description</b>	This creation system provides an electric dust-proof power cabinet. By setting the observation port, the internal conditions of the cabinet can be better observed, which is convenient for the staff. By setting the handle and the lock hole, the cabinet door can be better controlled and protected. Function, by setting the shock absorber, it can better protect the hair dryer and increase the stability of the hair dryer. By setting the support rod and the bottom plate, the cabinet can be supported and fixed, and the stability of the cabinet can be enhanced.

**TW.10.**

<b>Title</b>	<b>Environmental Quality Monitoring System</b>
<b>Authors</b>	WEI-KUEI CHEN, YONG-XIANG LAN, JUN-HONG WANG, SI-WEI LI, QI-XIANG XU
<b>Institution</b>	<b>Chien Hsin University of Science and Technology</b>
<b>Patent no.</b>	<b>M635716</b>
<b>Description</b>	<p>Typical air quality systems have the following four drawbacks:</p> <ol style="list-style-type: none"> <li>1. Non-real-time information: Taking the Taiwan Environmental Protection Agency system as an example, it is usually the average value of the past one hour, not the actual air quality value at that time.</li> <li>2. Poor accuracy: Take the Taiwan Environmental Protection Agency's system as an example, it is usually the average value of a large area, rather than the actual air quality of the location where the user is inquiring.</li> <li>3. Too much time-consuming: The user must execute the query action by himself.</li> <li>4. Failure to notify and issue warnings in time: In case of fire, dust explosion and other special conditions, it is impossible to notify or issue warning messages in time.</li> </ol>



The solution proposed in this creation can completely solve the above four shortcomings. The information provided by our device has the important advantage of "community active notification". All users in the same group only need one person to perform the setting action, and everyone in the same group can simultaneously receive the information sent by the system. Send out the real-time air quality status of a specific location. Users can choose the groups they need to actively join without performing setting actions, which not only has high practicability but also high convenience for users. Using this creation can instantly understand the environmental quality of the surrounding area. The real-time PM2.5, PM10 concentration, temperature and humidity can be displayed on the screen, and the green, blue and red lights represent the current air pollution level.

Most importantly, most of the users can obtain the service of our proposed creation almost without paying any additional cost.

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**TW.11.**
**Title****Foldable Paper Cups for Drinks****Authors****YU SHU-FEI, LIN SONG-YIH, HUANG KUAN-CHANG, CHEN YI-QUAN****Institution****Far East University****Patent no.****M632746****Description**

We innovatively combine green design with the TRIZ design method to provide a paper cup structure with its own lid and prevent the liquid in the cup from spilling. By eliminating plastic cup lids, plastic sealing film, and other devices, the effect of reducing plastic and improving the problem of garbage recycling is achieved to achieve the purpose of environmental protection. There are two covers connected to the top of the paper cup designed by the creative invention, and there is a fold line between the cover and the cup body. Therefore, after using the cup to hold drinks, the cover can be folded inward along the fold line. It can prevent the drink in the cup from spilling when walking around. Through the combination of the cover sheet and the folding line, this creation replaces the plastic lid and plastic sealing film of the beverage cup to achieve the purpose of reducing plastic. The benefits are as follows: 1. Improves the shortcomings of

ordinary paper cups without lids, thereby improving the practicability of paper cups. 2. Plastic reduction design that is easier to recycle. 3. Reduce waste of resources.

**TW.12.****Title****Good Pal****Authors**

LIN CHYUN CHAU, FAN YU CHING, WU YING RU

**Institution****SHU-TE UNIVERSITY****Patent****M636849****Description**

There are many different outdoor exercises. People can contact the nature to improve their health. However, in the process of exercise, whether it is a park or a basketball court, many people will have no place to keep their belongings. People feel anxious and uneasy. Thus, the design is aimed to solve the problems and provides outdoor anti-theft keeping for the users.

The innovation, Good Pal, is an outdoor anti-theft keeping system. There is a station platform with individual anti-theft cabinets. Users can interact to the platform and acquire rental service through digital payment card. The cabinets is portable for the user to temporarily carry. The adjustable mechanism can help the user to extend the keeping volume for their stuffs. There is a lock chain design on the cabinet for the users to properly fasten the cabinet on some object beside user's exercise site. The users can use their digital payment cards to lock or unlock the cabinet.

**TW.13.****Title****HANDS-FREE SPEAKER KEYBOARD****Authors**

CHE JEN HSIEH, HSIEH JUI-LING, HONG YU XIANG, LIN XIAO JUN, TSAI CHENG LIN

**Institution****Cheng Shiu University****Patent****M634440****Description**

A hands-free speaker keyboard, comprising: a keyboard body, with a keyboard area and a mobile phone placement area, the keyboard area has a plurality of keys, and the mobile phone placement area has a slot; a charging module, with a charging port located on the slot, charging The electrical port is connected to one of the charging holes of the mobile phone on the slot to charge the mobile phone; a control module is located in

the keyboard body, and the control module is electrically connected between the charging module and a power source. Between, to control whether to supply power to the charging module; a sound amplification module, set on the keyboard body and receive the first sound signal of the mobile phone through the control module, so as to play the sound; and a radio group, set on the keyboard. The main body receives the second sound signal from the outside, and transmits the second sound signal to the mobile phone through the control module, so as to make a call.

**TW.14.**

**Title** **Industrial pipeline inspection and maintenance robot**  
**Fa-Shian Chang**

**Authors** TAI-YUAN CHANG, CHUAN-TSE HSIANG, WEN-BIN LAI, GUAN-QUN LU

**Institution** **Cheng Shiu University**  
**CTCI Corporation**

**Patent no.** -

**Description**

The purpose of the present invention is to provide a pipeline internal cleaning robot with a modular design that allows for quick replacement of modules. The robot includes a carrier body and a detection and cleaning module. The carrier body can be a tracked or wheeled vehicle for movement inside horizontal pipelines, or a spiral-powered or worm-type vehicle for movement inside vertical pipelines. The platform has a multi-functional module integration design that can be used for unknown environmental observation, gas detection, removal and cleaning of weld slag and debris inside pipelines, and the entire module communicates via wired remote control. This invention can be used in various factories or natural gas transmission pipelines for pipeline internal weld slag cleaning, measurement, and debris removal, thereby improving the efficiency of pipeline inspections and shortening inspection and cleaning times. Additionally, the modular design of this invention fully utilizes the advantages of multifunctionality, reduces construction costs, complexity of subsequent repairs and maintenance, and has a competitive advantage in the international market.

**TW.15.****Title**

**Integration of internal thread inspection of misaligned and defective fastener based on AI deep learning and OpenCV techniques with a 6-axis robotic arm**

**Authors**

Huang-Kuang Kung, Pang-Chieh Lin, Yu-Li Chen, Cai-Zhi Lin, Wei-Ming Kuo

**Institution**

**Cheng Shiu University**

**Patent no.**

**M634518**

**Description**

An optical platform with the integration with a 6-axis robotic arm is developed to the inspection of internal fastener to determine the existence of misaligned hole and/or screw defects. This machine vision system integrates a robotic arm with 6-axis degrees of freedom that can access all directions of the inspected machine part. It can resolve the difficult inspection problem of an irregular part with internal thread hole.

This is a typical irregular machined part with many inner thread holes that have to be inspected.

**TW.16.****Title**

**Intersection Early Warning System**

**Authors**

CHEN CHIEH-TING, HO YU-CHENG

**Institution**

Kornell Academy

**Patent no.**

M639006

**Description**

This system is designed to be installed at intersections: When a vehicle run over it, an electromagnetic component inside will induce a current that light up the crosswalk to warn both the drivers and pedestrians.

**TW.17.****Title**

**IMAGE COPARISON SYSTEM FOR CAR**

**Authors**

Che Jen Hsieh, Lee Chun Hsuing, Hsieh Jui-Ling, Hong Chen Fong, Li Cheng-En

**Institution**

**Cheng Shiu University**

**Patent no.**

I787888

**Description**

One purpose of the present invention is to provide a driving image comparison system to solve the problem that it is difficult to provide the license plate numbers of surrounding vehicles and the lack of driving only relying on the driving recorder. The system includes an image

capture module, an image capturing module disposed on the vehicle for capturing the vehicle images while the vehicle travels along the highway with multiple highway monitors, and the multiple highway images of the highway monitors are stored in the cloud database in real time; a global positioning system module disposed on the vehicle for providing multiple vehicle travel positions of the vehicle while the vehicle travels along the highway, wherein those travel positions constitute a driving path; a processing module connecting the image capturing module, the GPS module and the cloud database, and the processing module obtains those highway images corresponding to the vehicle travel positions in the cloud database according to the vehicle travel positions of the vehicle; and a storage module disposed on the vehicle for storing the vehicle images and those highway images corresponding to those vehicle travel positions.

**TW.18.****Title****Maze toy with pivoting wall****Authors**

Chen Yu-Gang, Hsieh Min-Ling, Qiu Tan-Li, Chang Kuo-Hsien

**Institution****Far East University****Patent no.****I788261****Description**

This technology includes a base plate and multiple rotating wall elements. Each element can be rotated and positioned, so that all elements can be adjusted to a maze toy with self-setup paths. Through the rotation and positioning of individual wall units, the user can adjust the various game paths by himself, and design the maze moves from the simplest to the more complicated, which can increase the challenge and interest of this toy. This work can be used as a teaching material for school children to train the reflexes and concentration of "hands, eyes and heart"; it can also be used as a toy and assistive device for the seniors to train their hand-eye coordination, which can prevent and reduce the risk of Alzheimer's disease.

**TW.19.****Title****Modular Multifunctional Tracked Vehicle****Authors**

Fa-Shian Chang, Shu Xuan Chang, Guan-Qun Lu, Shang-You Xie, Jing-Zhe Yan

**Institution****Cheng Shiu University****Patent no.****Li Chih Senior High School****Description**

The present invention is a modular assembly tracked multifunctional robot that can be quickly disassembled into small volumes for separate storage and recombination, suitable for various unexpected situations. The vehicle is designed with a long-track walking mechanism that can easily overcome off-road terrain and climb over long-distance obstacles, suitable for inclined and uneven task environments. The chassis has a multi-functional module combination design, which can be used for unknown environment observation, gas detection, hazardous material removal, rescue, and firefighting functions.

The entire module communication is maintained with both wired and wireless, automatic and remote control. It can be applied to nuclear pollution and chemical areas for reconnaissance, measurement, and elimination work. Operators can control the machine through the warm zone in cold areas and then proceed to work in the hot zone to reduce secondary injuries and accidents caused by personnel entering the area, and effectively improve the efficiency of related reconnaissance work, shorten the exploration and dangerous situation handling time, and quickly and effectively handle related issues, ensuring the safety of people's lives and property. In addition, the present invention adopts a modular design, fully utilizing the advantages of one machine with multiple functions, reducing the construction cost and complexity of subsequent repair and maintenance, and having a competitive advantage in the international market.

**TW.20.****Title****MOVABLE DITCH SLUDGE REMOVAL DEVICE****Authors**

Wen-Liang Chen, Jian-Ru Chen, Bing-Qian Wu

**Institution****SHU-TE UNIVERSITY****Patent no.****M635482****Description**

After every rainy day, the drainage ditch is often blocked. If it is not cleared immediately, it is easy to breed a large number of mosquitoes. Based on the concept of prevention and control of breeding source and benefiting the public, this creation has developed a movable ditch sludge removal device. The device can be operated remotely through the mobile device APP to enter the ditch for dredging, and the device has the functions of image camera lens, lighting, etc. The environment image in the ditch can be transmitted to remote control modules such as mobile phones or tablets to provide users with correct control of the mobile position. The device is equipped with shovel body and sediment storage box, which can effectively improve the removal efficiency of sediment. This can effectively reduce the accumulation and blocking of waste in the ditch, and reduce the occurrence of pest breeding sources and water accumulation opportunities. Significantly improve the quality of people's home life and environmental protection, so as to prevent the occurrence of epidemics and improve the well-being of human life.

Class no.

**TW.21.****Title****Multifunctional clothes drying rack****Authors**

FU SHAO-YU, LI TAO-RAN, TAI PEI-SHAN, TAI PEI-LING

**Institution**

Kornell Academy

**Patent no.****M639413****Description**

This work improves the wardrobe rack to have the effects of dustproof, rainproof, sterilization, and quick drying. Even if it rains outside, you can also dry clothes indoors. When used with a hair dryer, the clothes can be dried quickly. The wardrobe is equipped with ultraviolet light, which can achieve sterilization effect.

**TW.22.**

**Title** Navigation stick for the visually impaired  
**Authors** Rui-Lin Lin, Jia-Hui Huang, Yi-Cour Nian, Shi-Ting Wu  
**Institution** Chienkuo Technology University Department of Visual Communication Design

**Patent****Description**

It is not easy for visually impaired people to cross the street. If a white cane is equipped with GPS and a receiver, turning on the mobile phone's Bluetooth and connecting it to the earphone can launch its navigate function. The device can also identify the signal of traffic lights, and the user can listen to its instructions without being disturbed by other sounds. It is also equipped with luminous support at night, making it safer for the visually impaired to walk.

**TW.23.**

**Title** Power Transformer  
**Authors** Chien Wei, Kang Tsai-Hua, Liao Shu-Han, Lin Je-Home, Chen Yung-Hsun  
**Institution** Lunghwa University of Science and Technology  
 HungKuo Delin University of Technology  
 Tamkang University  
 Chenshern Co., Ltd.

**Patent** M635833

**Description**

This creation department provides a power transformer, which solves the problem that when the existing power transformer is in use, because the power transformer is used for a long time, high temperature will be generated inside, which will affect the aging of the internal coil, resulting in poor heat dissipation effect of the existing power transformer during use. It is convenient for users to use and improves the practicability of power transformers.

**TW.24.**

**Title** Skin-Spring Plant Extract Anti-aging Skin Care Product  
**Authors** Lee Wen-Sheng, Wang Tien-Ti, Yet Mei-Gang  
**Institution** GUAN XIN Biomedical Co., Ltd.  
 B&V Biopharma Co., Ltd.

**Patent no.** I377949

**Description**

「Skin-Spring」 Anti-aging Product is composed of precious and rare essences of Aquilaria agallocha and a



variety of natural plant extracts through the patented technology of the Academia Sinica. Passed the fair report of safety and skin sensitivity testing by the German dermatologist association dermatest, and South Korea's Ellead laboratory. Commissioned Taiwan Functional Cosmetics Development and Evaluation Research Center to complete human trials of safety and functionality. Demonstrated statistical difference in wrinkle improvement within 14 days, Up to 43% improvement, the overall skin texture of the face is improved by 135%.

**TW.25.**

**Title** Skirt Cane

**Authors** LIN CHYUN CHAU, TSAI XIN YI, JIANG YI HAO

**Institution** SHU-TE UNIVERSITY

**Patent no.** M635468

**Description**

As the people grow old, the knee joints gradually degenerate. The elders feel difficult to stand up. Though existing canes could help the elderly, they are mostly for walking and standing. Some assistances such as helping lift from seats, and walking alerts are still not enough. The innovation, Skirt Cane, is proposed to solve above problems. The extendable handle provides firm hold for the users when they intend to stand up from seats. There are edges of the 10-30 degree slop on the bottom. The approach could help the people smoothly standing up. The big bottom also provides better support for standing. The LED device is built-in the lower skirt-shaped part to offer lighting. There is a torch in the front end the handle for illumination. The Skirt Cane can provide a superior experience and quality for the seniors to enjoy their life.

**TW.26.**

**Title** Smart Energy Saving Lamp

**Authors** Chun-Te Lee, Hsieh Jui-Ling, Bing-Kai Liao, Hong-Cheng Kao, Ling-Yao Wei, Chin-Yi.Huang

**Institution** Cheng Shiu University

**Patent no.** M602650

**Description**

In general, the sensor lamps in the corridors, stairwells, or toilets of buildings will change from completely dark to full brightness when someone passes by. It will make the human eyes feel very uncomfortable, and when the sensor lamp is

completely dark, the whole corridor and stairwell will be dark, making women and children feel insecure at night. If the lighting is changed to be sensor-less, there is a serious problem of wasted energy. To solve this dilemma, we developed a new type of “LED sensor lamp with low-light mode” that changes the original “full dark mode” to “low-light mode”. As such, when someone approaches the sensor lamp, their eyes will not be uncomfortable with the momentary illumination. Furthermore, when no one passes by, the sensor lamp will stay in low-light mode, so that people returning home at night no longer have to go through dark corridors, thereby achieving safety, aesthetics, and energy-saving purposes. This new sensor lamp’s power consumption in low-light mode is only 1/10 of the high-light mode, but its brightness can be up to half of the high-light mode, making it very suitable for parking lots, corridors, stairways, or toilets of buildings. It only requires the replacement of the lamp but not the original lamp socket, yet the basic brightness can be maintained. Take the general 15W T8 LED lamp (sensor-less) as an example: if it is replaced by this new type of sensor lamp, and the place where it is installed is rarely passed by people, the power saving rate will be as high as 90%. Assuming that there are 12 passers-by per hour, the saving rate is still 81%.

**TW.27.****Title** Standing Cane Tip**Authors** SUNG JIA-YU**Institution** National CHU-PEI Senior High School, Hsinchu, Taiwan**Patent no.** M639286**Description**

This is a structure that allows the cane to stand, with the cane tip and three support frames. When people walk with a cane, the support frames and the cane tip can be closed to reduce the size and the area. When not using the cane, it can stand by opening the cane support frames to increase the base of support area and support strength. This creation can be adopted to different forms of canes, and is easy to operate. Besides, as the design makes the cane tolerance for all canes. The advantages are simple and intuitive use, flexibility in use, low cost/ cheap, and space saving.

**TW.28.**

**Title**                    **The fuel engine enhance device with mix combined function.**

**Authors**                Hsieh Chen-Hui, Wang Jung Sheng, Lu Yi-Yu, Liu Wei-Cheng, Chen Fan-Lin

**Institution**           **Far East University**

**Patent no.**             **M615824**

**Description**

Brown's gas is produced with the most advanced water and the air. This new technology produces ready-to-use Oxyhydrogen without storing hydrogen. Brown's gas is an important element to form the fuel-hydrogen hybrid engine system. It can be installed on automobiles or fuel engines to immediately produce high-purity hydrogen. It promotes the full combustion of fuels such as gasoline and diesel to increase power as well as to reduce fuel consumption and exhaust emissions. This system effectively removes carbon deposits in the engine, and prolongs the life of engine.

- Promoting full combustion of gasoline and diesel, and reducing fuel consumption by 15%~50%
- Reducing discharge gas by more than 80%
- Increasing power by more than 10%
- Removing carbon deposits and prolong engine life for more than 30%.

**TW.29.**

**Title**                    **The high heat dissipation of thermal interface material recycled by waste In ion solution**

**Authors**                Wang Jenn Shing, Huang Zhe-Wen, Yang Yong-Ren, Wang Xun-Ping, Hui-Li Chen

**Institution**           **Far East University**

**Patent no.**             **I748686**

**Description**

The high-power electronics generation is coming, today's electronic products pursue high performance, thermal design is increasingly important, more excellent thermal interface materials are needed. The high heat dissipation of thermal interface material the heat transfer coefficient is more than 10 times that of traditional thermal paste, Due to more thinner heat dissipation paste, the heat transfer effect will be greatly improved, enables electronic components to maintain safe operating temperatures in high-power environments. In order to meet environmental requirements, the high heat dissipation of the alloy thermal interface material is high-

purity indium obtained from recycled metals, which enables the high heat dissipation of the thermal interface material."

**TW.30.**

**Title** UVC-Sprayer device

**Authors** Lin Chyun Chau, Tsai Xin Yi, Jiang Yi Hao

**Institution** Shu-Te University Graduate School & Department of Product Design

**Patent no.** M637923

**Description** UVC-Sprayer allows to visibly display virus through UVC illumination to help users in a thorough alcohol spraying for disinfection. The intuitive design of a single key in the flashlight for operation can reduce the waste of alcohol and avoid accidents caused by excessive alcohol during the period of daily repeated disinfection.

**TW.31.**

**Title** WALL DEVICE CAPABLE OF REPLACING OBJECT

**Authors** Wen-Liang Chen, Hsin-Yu Chuang

**Institution** SHU-TE UNIVERSITY

**Patent no.** M636849

**Description** During the construction of traditional advertising billboards, in addition to facing the problem of strong winds at high places, installing the billboards on the installation frame on the wall is also complicated and troublesome work. The invention provides a wall device capable of replacing objects, which is suitable for setting the wall surface, so as to provide selection and set the color of the wall surface. With the threaded structure between the locking body and the combined structure, the locking body can be tightly fixed on the base and easily separated from the base, and the color of the locking body can be selected to define the color of the wall. Features of the work: (1) Reduced construction difficulty: The lock can be quickly installed without other tools, effectively reducing the difficulty of setting, not only can customize the wall color, but also speed up the installation of the display body. (2) The display body can be stabilized on the wall: it has the advantage of stabilizing the display body on the wall, and the color of the locking solid and the color of the display body area can make the pattern of the display body more complete. (3) Evenly provide lighting light: the lighting structure can illuminate the display body, and the light irradiated on the display body is more uniform by using the light blocking part and the reflective surface.

# Thailand

By ATIP

## TH.1.

### Title

**Terry Dalah Floral Dose Serum in Cream Extra Sensitive**

### Authors

Chuti nun Noppagard, Ubon Rerk-am

### Institution

**Terry Perfect Company Limited / Thailand Institute of Scientific and Technological Research (TISTR)**

### Patent no.

2103001748

TERRY DALAH Floral Serum in cream formulation represent *Etilingera elatior* flower extract as active ingredient. This exhibited strong anti-oxidant anti-collagenase, anti-elastase activity, tyrosinase, including melanin synthesis and anti-tyrosinase on melanoma cell, also stimulating collagen type I synthesis effect on human dermal fibroblasts. More over it showed strong anti-inflammatory effect results from inhibited NO production in RAW146.7. The formulation process was used water in oil/oil in water (W/O/W) emulsion technique that could enhance active compounds penetrating through the skin which had small droplet size average 424.9 nm.

### Description

In addition, DALAH serum had potential effective to inhibited *P.acnes* DMST 14916, *S. epidemidis* ATCC 12228 and *S.aureus* ATCC 6538 causing of acne and inflammation

of skin face. Whereas, the safety evaluation conducted on tolerance and sensitization that was evaluated by dermatologist on  $20 \pm 2$  subjects volunteer, 15-45 years old. The result revealed that the tested TERRY DALAH Floral Serum in cream was well no functional signs of tightening, tingling, burning or itching and not induce any sign of comedone after 4 weeks of usage. From user information, after use TERRY DALAH Floral Serum in cream for 1 weeks later, the skin face had look younger, bright, hygroscopic skin and reduce acne.

### Class no.

Medicine

<b>TH.2.</b>	
<b>Title</b>	<b><i>Cajanus cajan</i> (L.) Millsp. peptide extraction process as active ingredient in micellar Helios face serum and liquid soap</b>
<b>Authors</b>	Supanat Sakayawong, Ubon Rerk-am
<b>Institution</b>	<b>Supersayo co, ltd. / Thailand Institute of Scientific and Technological Research (TISTR)</b>
<b>Patent no.</b>	IP 1601000598
<b>Description</b>	<p>The peptide (molecular 5-10 kDa) and phenolic compound extracts of <i>Cajanus cajan</i> (L.) Millsp used as active ingredient in micellar Helios face serum and Helios liquid soap. The extracts had represented strong anti-oxidant, anti-collagenase, anti-elastase activity, also relative to melanin synthesis and stimulating collagen type I synthesis.</p> <p>In addition, the extracts represented strong inhibition pro-inflammatory cytokine that are correlation to the anti-inflammatory properties. The cosmetic products development used <i>C. cajan</i> extract as active ingredient in combination of emulsifier between high HLB and low HLB value that leading to small droplet size (242 nm.) in micellar form distribute in water phase. The efficacy of Helios Face Serum had high effective to reduced wrinkles on crow's feet, melasma, eye sage and lifted up eyelid for more than 90 %.</p>
<b>Class no.</b>	4. Medicine - Health Care - Cosmetics
<b>TH.3.</b>	
<b>Title</b>	<b>DNA canvas: Mobile Application for DNA testing report and hyper-personalized health store for the goal of disease prevention and healthy lifestyle modification</b>
<b>Authors</b>	Jarika Makkoch, Ph.D. , Jeerameh Klomsingh
<b>Institution</b>	<b>Genfosis Co.,Ltd.</b>
<b>Patent no.</b>	Copyright No.394426/396397-402/395933-38 and 465356
<b>Description</b>	<p>Predictive DNA test is the key success factor in precision health &amp; wellness in order to change the healthcare paradigm from a conventional treating to a preventive way. Genfosis launched its operations by offering DNA testing services to hospitals using SNPs array and whole exome sequencing techniques with the race-specific interpretation algorithm. In 2023, Genfosis developed DNA guidebook</p>

application in mobile phone platforms called DNAcanvas providing intelligent, user-friendly, and efficient wellness recommendation solutions. The distinguished feature in application is that it offers more than at-home DNA testing by matching DNA-best suited product lists in hyper-personalized health store, e.g., food menus in partnered restaurants, food supplements, ingredients in supermarket and skincare brands from existing brands in Thailand.

The purpose of application is to provide individualized health recommendations and support for disease prevention by using the genetic information obtained from DNA testing and healthy lifestyle alteration. The following six steps are the summary showing the applications procedures:

- DNA collection
- DNA analysis, to classify disease's risk into Normal, Intermediate, and High.
- Health Recommendation
- Offer DNA-based, best-matched products
- Progress tracking
- Integration with healthcare

In summary, this mobile application utilizes genetic information to provide personalized and to curate health products as a proactive support for disease prevention. The goal is to empowering people to take charge of their health and lower their risk of developing chronic diseases on a daily basis.

**Class no.**

4. Medicine - Health Care - Cosmetics

TH.4.	
<b>Title</b>	<b>Black Rice Pearls Powder for Molecular Gastronomy Recipes</b>
<b>Authors</b>	Pratsanee Kongwong, Orathai Bunthawong, Nabavee Borijindakul, Waraporn Wannasri, Suraphon Chaiwongsar Kanyanat Sirithanya, Theerayut Toojinda
<b>Institution</b>	<b>Rajamangala University of Technology Lanna Lampang</b>
<b>Patent no.</b>	Patent application No. 2303000792
<b>Description</b>	Black Rice Pearls Powder is a pre-mixed powder created for molecular gastronomy recipes, especially “spherification techniques”, which is a modern cuisine technique that involves creating semi-solid spheres with thin membranes

out of liquids. The product makes a use of a native Thai black rice (Koa Kum Na Sri Nuan) by extracting all the good elements from the rice grain, including anthocyanins, gamma oryzanol, protein, vitamin B1, vitamin B2 and vitamin E, and transforming them into a powder form. The derived powder is mixed with sodium alginate, a rich source of dietary fiber. The calcium chloride is also included to act as a gelling agent.

The Black Rice Pearls Powder is rich with health benefits such as 1) anthocyanins, an excellent antioxidants 2) gamma-oryzanol, well known for lowering blood cholesterol and increasing muscle growth and sport performance 3) vitamin B1 and B2, help the body metabolize fats and protein 4) vitamin E, maintain healthy skin and eyes, and boost the boy's natural defense against illness and infection and 5) dietary fiber, reducing cholesterol and glucose uptake, and reducing cardiovascular and gastrointestinal diseases. This low-carb and low-gluten provides a more exciting and convenient preparation method for professional modern chefs or home cooks to generate any healthy molecular gastronomy dish with a burst-in-the-mouth effect, enhancing for flavor, texture and health benefits.

**Class no.** 3. Agriculture and Food Industry

#### TH.5.

##### Title

**Healthy and Eco-Friendly Cricket Burger**

Watcharee Thepyothin, Patarporn Prapan, Srisuda Lapeng,

##### Authors

Supree Maetoo, Suraphon Chaiwongsar, Kanyanat Sirithanya, Theerayut Toojinda

##### Institution

**Rajamangala University of Technology Lanna Lampang**  
Patent application No. 2303000794

##### Description

Healthy and Eco-Friendly Cricket Burger is a frozen Thai style burger that you can easily cook in a microwave. It was designed for extreme health and environmental impacts. The buns are blue sticky rice buns, which are pre-cooked Thai brown glutinous rice coated with butterfly pea flower extracts. This special bun is gluten-free and has a low



glycemic index due to the brown rice effect, causing a lower and gentler change in blood sugar. The butterfly pea flower extract is a powerhouse of antioxidants. It contains significant amounts of the catechin EGCG - epigallocatechin gallate, as well as a host of anti-inflammatory and immune-boosting components such as flavonoids, tannins and polyphenols. For the patty, the cricket powder is used to replace conventional meat such as beef, pork or chicken. The cricket powder contains a higher protein ratio than those meats and provides the body with amino acids, essential vitamins such as B12 or B6 and minerals like iron, magnesium and calcium. It was more eco-friendly to produce cricket meat than beef or pork,

as it did not require so much land, water and food, and generated far less greenhouse gases and other wastes. The problem of the exoskeleton, the hard tissue covering the body, which sometimes non-preferred for the customer, is mitigated by choosing the right age of the cricket to avoid the accumulation of the exoskeleton. Therefore, eating this burger is not only good for your body but also making a better world.

**Class no.** 3 Agriculture and Food Industry

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**TH.6.**

<b>Title</b>	<b>Green Rice Flour</b>
<b>Authors</b>	Sirinat Natisri, Jirawan muangnak, Nipaporn Mesa, Phathana Hemathurins, Suraphon Chaiwongsar, Kanyanat Sirithanya ,Theerayut Toojinda
<b>Institution</b>	<b>Rajamangala University of Technology Lanna Lampang</b>
<b>Patent</b>	Patent application No. 2303000793
<b>Description</b>	Green Rice Flour is a flour made from a fragrant and young flattened glutinous rice, called Khao-Mao. Khoa-Moa is normally consumed as an indigenous dessert in several Southeast Asian countries. Khao-Moa is harvested at dough stage (15-21 days after flowering) which the endosperm continues to expand, the milky liquids inside begin to solidify and most good nutrients are at the highest level, such as gamma-oryzanol, gamma-aminobutyric acid, phenolic compounds, chlorophyll, beta-carotene, tocopherol well as high antioxidant activities. The color of seed coat

develops rapidly, resulting in a vivid beautiful green color (Chlorophyll) portrayed the essence of its immaturity. This flour is made from the whole young grain with the traditional methods from the northeastern part of Thailand, which involve a partial parboiling process, thus high nutritional compounds are moved from embryo and brown layer to the endosperm and thus high nutritional rice flour with an authentic Thai taste and texture is expected. Unique and good attributes of this product are green color, earthy and green odor with a little bit sweet taste. It is a low-fat alternative to whole grain flour It is suitable for various applications including gluten-free baking and cooking. Though it is made from the glutinous rice varieties, it is not firm and sticky when cooked, a result of its lower proportion of waxy starch molecules. This flour means more than just a tasty product from rice but it fills with sense of accomplishment with the pride and joy from the rice farmers.

<b>TH.7.</b>	
<b>Title</b>	<b>Lanna Natural Straw</b>
<b>Authors</b>	Suraphon Chaiwongsar, Hathaichanok Pattaampan Kriangsak Luechai, Manoch Kumpanalaisatit, Kanyanat Sirithanya
<b>Institution Patent</b>	<b>Rajamangala University of Technology Lanna Lampang</b> Patent application No. 2103003442
<b>Description</b>	Wheat was introduced into Thailand as an alternative crop after the rice season in the highland area to generate income and to mitigate the drug crop problem for the highland community. After the cultivation, wheat straw was left over without being used because of its low digestibility and utilization by animals. To make a use of those wheat straws, various innovative processes had been developed to transform the straws into the applicable straws, called “Lanna Natural Straw”. Firstly, agricultural practices for wheat cultivation techniques with different applications of plant micronutrients such as zinc, boron and silica had been developed to increase productivity and stem strength. Secondly, the micro-nano bubble water supplied with ozone and a UV drying chamber was used to clean straws and

eliminate pathogenic microorganisms. As a result, “Lanna Natural Straw” is stronger, cleaner and safer than other wheat straws. The cleaned

Lanna Natural Straw could be used to replace plastic materials. It can be prepared into appropriate sizes and used as natural drinking straws. These innovative natural drinking straws could be used in both hot and cold beverages without interfering with the taste or smell. The shape and form of them are not altered during usage. Lanna Natural Straw with a smaller diameter could be used for making cotton bud stems, creating eco-friendly products. Lanna Natural Straw can generate more income for the farmers, while helping the world reduce plastic waste and greenhouse gas during the manufacturing process.

**Class no.**      Agriculture

**TH.8.****Title****Hybrid Corona Air Purifier****Authors****Siseerot Ketkaew****Institution****Faculty of Engineering, Ramkhamhaeng University****Description**

This research offers a hybrid corona air purifier consisting of 3 parts : Part 1, corona electric field cell with corona discharge process for trapping small dust get rid of bad smell removes ammonia and carbon dioxide by using the technique of adjusting the switching frequency to control high voltage. Part 2, a set of pre-filter and HEPA high-efficiency air filter and part 3, a set of electric charge generator for eliminating microorganisms in the air. Part 1 is a high-voltage switching power supply circuit by adopting the flyback converter principle, it consists of a high-frequency pulse generator using IC No. TL494 for adjusting high-voltage of 1.36 kV, 2.58 kV and 3.24 kV under the switching frequency of 7 kHz, 14 kHz and 21 kHz, respectively, and the IC is used as a ground isolator and amplification for Power MOSFET No. IRFP460 that controls the operation of the flyback transformer, to produce high voltage For supplying electric power to the corona electric field cell set. The test results in part 1, when measuring ozone gas, it was found that at a high voltage of 1.36 kV, ozone gas could be produced at 0.005 ppm, at a high voltage of 2.58 kV, it could produce ozone gas. 0.009 ppm and at a high voltage of 3.24 kV, it can produce 0.015 ppm of ozone gas by testing with a room with an area of 300 square meters in 60 minutes. Ozone gas 0.015 ppm will result in ammonia and carbon dioxide emissions being reduced. Part 2 : HEPA high-efficiency air filters can trap PM1.0 and PM2.5 dust particles with the same dust trapping efficiency. 97.23 percent measured from a standard dust meter and part 3, an electric charge generator used for eliminating microorganisms in the air, the result is that it can reduce the number of microorganisms in the air as well. Which this air purifier has passed the standard of electromagnetic compatibility (EMC Testing), combined power consumption analysis test and the leakage current analysis test is completed, at the testing room of the Electrical and Electronic Products Testing Center (NSTDA), so this research has been funded for research and innovation from the National Research Council of Thailand (NRCT) for the fiscal year 2022 and can be used to develop a Thai innovation account and extend it into commercial innovation in the future.

<b>TH.9.</b>	
<b>Title</b>	<b>The application of broken glass to the invention of Thai ancient glass (Kriab mirror) for increase the value of International mosaic arts</b>
<b>Authors</b>	Ratchapon Tajaya
<b>Institution</b>	<b>Department of Art History Silpakorn University, Thailand</b>
	N/A
<b>Description</b>	<p>Thai ancient glass (Kriab mirror) is an invention that emerged from the concept by Restoration of knowledge of Thai arts and culture in the past together with the application of scientific knowledge in another dimension. Using waste glass as a component to produce an innovative thing. with environmental protection concept. “Turn waste into art” This material is useful in restoring and preserving Thai art and extending creativity and increasing the value of works of art in the ASEAN region. It is also a beautiful material of choice for “Mosaic art” in cultures around the world.</p>
<b>Class no.</b>	14. Other
<b>TH.10.</b>	
<b>Title</b>	<b>2 in 1 Blossom Antistress &amp; Muscle Relaxing Spray</b>
<b>Authors</b>	Pabhada Asawakarn, Punama Chulamokha Suchato, Chayanis Jaroendisayarat
<b>Institution</b>	<b>Chulalongkorn University Demonstration Secondary School</b>
<b>Description</b>	<p>At the present time, many people are experiencing health problems using computers or looking down at mobile phones for long periods. Such activities may cause muscle soreness, muscle stiffness, stress, and office syndrome symptoms. One way of relieving muscle pain is to use massage products but most massage oils, creams, and sprays on the market have a pungent odor which might be annoying to those nearby. As an alternative, the new, attractive sweet-smelling product “2 in 1 Blossom Antistress &amp; Muscle Relaxing Spray” addresses this issue perfectly. The main ingredients of this spray formula are natural flower extract, wintergreen oil, and menthol. The better smell of the flower extract helps users to relax and reduce stress. The methyl salicylate from wintergreen oil and menthol reduces muscle stiffness and feels cool when exposed to the skin. In addition, methyl salicylate is used as a topical analgesic for</p>

the relief of mild joint pain, muscle pain from stiffness or strain, arthritis, bruising, or back pain. This product initially gives users a cool sensation on the skin before slowly warming up. Users who have tried the “2 in 1 Blossom Antistress & Muscle Relaxing Spray” really like it. It is not sticky and has a sweet attractive flower extract smell, helping to relieve muscle pain, reduce stress, and promote relaxation.

**Class no.** 4. Health Care

#### TH.11.

**Title** **Smart RTNCN Intravenous fluid Sliding Alarm Device**  
**Authors** Orrawan Khongtor, Tulaporn Chaiyatam, Panisara Phaosiha, Piyanut Khamuan, Jiraphinya Tapchareon, Jinpitcha Sathiyamas Mamom  
**Institution** **Royal Thai Navy College of Nursing**  
 N/A  
**Description** Peripheral intravenous fluid administration is a way to maintain fluid and electrolyte balance in the patient's body. But in patients with agitation may often cause problems with the slippage of the intravenous fluid set. This causes patients to lose blood, receive fluids that do not meet the treatment plan, and receive needles to reload the fluids, causing pain, wasting resources and increasing the workload for nurses. The inventor therefore developed an innovation to help reduce the incidence of intravenous infusion device slippage and prevent potential hazards from intravenous fluid slippage. This device has a feature that can sound an alarm when the line starts to slip. Utilizing a MOSFET, a transistor that regulates voltage to control on-off current. The transistor will quickly sound an alarm to the nurse if it notices that the IV line has faded and there is blood or fluid leaking from the patient. And also this device can automatics clamp the intravenous fluid set suddenly.

**Class no.**

#### TH.12.

**Title** **M-Shield ION Brick**  
**Authors** JIRANAT CHAIYOSBURANA  
**Institution** **NIST INTERNATIONAL SCHOOL OF THAILAND**  
**Description** M-Shield ION (a building block) is a revolutionary

solution for the construction industry; it is made from bio-calcium carbonate derived from mussel shell waste, in which the bricks/blocks are carbon neutral and also have the ability to reduce toxic gas levels. They provide a unique value proposition as a green building solution and are perfect for construction companies, architects and builders who are looking for sustainable building materials. Since traditional bricks are unable to absorb noxious global warming causing compounds such as nitrogen oxides and have a high carbon footprint, our brick not only minimizes a typical brick's carbon footprint but also has the potential to convert noxious compounds into non harmful compounds. Although our products cost more compared to traditional bricks, the environmental benefits of our blocks are the key differentiator of our brick from other bricks in the current market.

**Class no.**

**TH.13.**

**Title**

**Authors**

**Institution**

**Description**

**Class no.**

**NANO-L**

**SETSIRI CHAIYOSBURANA**

**NIST INTERNATIONAL SCHOOL OF THAILAND**

NANO-L is a anti-pathogen coating with silver nanoparticles that is effective in killing pathogens while being produced through an environmentally safe process. In our production of silver nanoparticles, we utilize a biological process through upcycling sugar cane leaves, usually burned by farmers which releases PM 2.5 into the atmosphere. By reusing wasted sugar cane leaves, we reduce PM 2.5 emissions, alleviating global warming. Our bioprocess is also produced without a special environment and with fewer dangers to workers which reduce the cost of the coating by 15%, making it accessible to all people and industries.

1. Environment – Pollution Control

## Turkey

### TR.1.

#### Title

**Smart clothes with Ai**

#### Authors

Amir Hossein Emdadi,

#### Institution

**Turkish inventors and innovators association**

#### Patent

### Description

Intelligentization with artificial intelligence, communication in the used clothes. This smart textile communication system includes several parts, such as the communication between components inside a smart textile is established by optical fibers or conductive threads.

Smart clothes, the sensors in the clothes are completely hidden, they track the movement, skin temperature, and heart rate, and it is connected to the Internet and can be tracked and charged.

The smart dress is designed to express the patient's condition in the form of a regular t-shirt. It is able to check the patient's heart and breathing with the help of a sensor and easily transmits the disease information to the doctor and family. Patients such as brain dead who need special care, this suit with artificial intelligence transmits patient requests and data to a tablet with Windows artificial intelligence software.

This smart inductive clothing has the ability to reduce symptoms of depression and have an active effect on some body systems and the cognitive skills and performance of the development and growth of the body's anti-microbial and anti-viral activities.

Lowers serotonin to help control anxiety

Lower blood pressure

It helps to improve breathing, depression and stress, headaches

This smart clothing can prevent heart and brain attacks by the fiber sensor in the clothes, and it can announce half an hour before any new illness

Class no.



**TR.2.****Title****Exir plus herbal tablet****Authors**

Dr. Abolfazl Moradi

**Institution****Technofest institute of technology (TITU)**

This medicine was formulated and made according to the needs of the society during the covid19 epidemic, and plants effective in raising the body's immune system and effective in strengthening blood circulation and strengthening the lungs have been used. This drug is used without any chemicals or drugs as a drug that boosts the body's immune system.

Detailed description of the invention:

This drug is produced by processing many medicinal plants effective on the body's immune system and is in the form of tablets. This medicine can be used daily to strengthen the body's immunity in a small amount, which keeps the body's immunity high and the body gains relative immunity from diseases. This drug can be used in the early and severe stages of the disease in a high dose with a maximum of 7-8 tablets in one day, and gradually the dose of the drug decreases in the following days. The consumption of this pill with the program that was much more experienced in the treatment of covid19 is as follows: 1 pill every 3 hours on the first day, 1 pill every 4 hours on the second and third days, 1 pill every 6 hours on the 4th to 7th day, 1 pill every 6 hours on the 8th to 12th day. 1 piece every 8 hours and 1 piece every 12 hours for 14 days. This medicine is not prohibited for daily use in the cold season of the year, and since it causes an increase in metabolic temperature, it is recommended for healthy people every other day in the hot season of the year.

**Description**

With a low dose, it is not contraindicated during breastfeeding, but it is contraindicated during pregnancy.

The plants used can be called fennel, lavender, thyme, saffron, cinnamon, ginger, cardamom.

Key innovative features: small volume of the drug, easy to carry, non-perishability like syrup and suspensions, without coating for better digestion, without capsules for faster digestion, the fast effect of this drug is effective due to innovative processing and the use of herbal plants. It can be important in the control and treatment of lung diseases.

Business and production sustainability potential:

Due to the effect on the immune system of the body, this drug has a wide range of treatment and due to the use of medicinal plants available and can be produced, it will not have any restrictions in production, even in very high amounts, it will not suffer from lack or lack of raw materials. .

**TR.3.****Title**

**The device for detecting the amount of rebar inside the concrete by waves.**

**Authors**

Dr. Ehsan Mirzaeifard, Dr. Alireza Hasibi Taheri, Prof.Dr. Mehrdad Fojlaley

**Institution**

**Turkish inventors and innovators association**

**Description**

In the construction of concrete bridges and buildings, the amount of iron in the concrete should be at the standard level to have basic resistance.

Unfortunately, building contractors use low rebars to reduce construction costs.

And since concrete cannot be broken after pouring, there is no device to detect it.

Our device consists of two transmitters and receivers, the first one sends a signal and the second one receives a signal.

The amount of iron is given to the artificial intelligence system of the device according to the concrete diameter.

A change in the amount of iron inside the concrete is detected by the device.

The device is portable.

The device works with batteries.

Suitable for engineers to supervise the construction

## Ukraine

### UA.1.

#### Title

**Processing of tires by cryo-vibration method**

#### Authors

Andrii Mavrin

#### Institution

National Center “Junior Academy of Sciences of Ukraine”  
under the auspices of UNESCO

#### Patent

150568

#### Description

Cryo-vibrating method is needed to solve the problem of tire recycling, because only 50% of 7-10 million tons of annually used tires are disposed. Because current methods are often expensive, spoil and lose the materials with useful properties from which the tire is made or emit toxic gases therefore are harmful to the environment. But the worst option is burning another 20% of tires because at the same moment we poison nature and lose materials that could be reused.

Therefore, the search for the best method, which can be cryo-vibrating, is still ongoing. Proposed method is faster, cheaper and more environmentally friendly than others. It consists in cooling the tires first to  $-80 - -100^{\circ}\text{C}$  in liquid nitrogen in to increase the fragility of the rubber for easier destruction. Cooling to a lower temperature does not make sense because the fragility will not almost change, but the cost of liquid nitrogen will only increase. After that, the tire must be vibrated at the resonant frequency of the rubber, which depends on chemical composition and type of rubber and is in the range of 6-8 kHz.

The result of vibration is an increase in the amplitude of oscillations of rubber, its energy increases too, so rubber breaks down into rubber crumbs the size of sugar granules and separates from steel cord. The obtained materials after recycling can be reused in industry: remelting of the steel cord, the use of rubber crumb as a component of new tires, paving slabs and road surface.

Environment – Pollution Control

<b>UA.2.</b>	
<b>Title</b>	<b>Cooling of solar cells using heat pipes</b>
<b>Authors</b>	Anna Butenko
<b>Institution</b>	National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO
<b>Patent</b>	—
<b>Description</b>	<p>Unfortunately, solar panels, which are becoming more and more widespread among the population of our planet, have a lot of disadvantages, the main of which is a significant reduction in output power when they are heated. Therefore, my teacher and I decided to offer a system or device that would reduce the temperature effect on solar cells. We have studied solar cells theoretically and experimentally and after that we came up with a device model based on heat pipes. In the work, we offer a construction in which heat pipes of a special structure and solar cells are installed in a certain way.</p> <p>Energy and sustainable development</p>
<b>UA.3.</b>	
<b>Title</b>	<b>Smart Traffic Light</b>
<b>Authors</b>	Bohdan Hlavatskiy
<b>Institution</b>	National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO
<b>Patent</b>	-
<b>Description</b>	<p>The smart traffic light not only gives commands for the traffic sequence, but also monitors their execution. In the event that the smart traffic light detects a violation of traffic rules, all other road users will be immediately warned about it through the most reliable and efficient information channel - all road users will be a red light is turned on so that they stop immediately and cannot get into the zone of a serious accident. This invention is easily combined with the system of usual traffic lights, and is unpretentious in use. It will allow all road users to receive more information about the state of affairs on the road. A smart traffic light is a reliable way to inform about a violator on the road: it is always in the field of view of all drivers.</p> <p>Actually, the uniqueness of my work lies in the fact that I try to create a security system that will not start working when an emergency situation has already arisen</p>

and, as they say, "something must be done" to at least somehow minimize the consequences. My system of smart traffic lights is designed to prevent an emergency situation from occurring at all.

10)Information Technology and Communication

#### UA.4.

##### Title

**The development of a microprocessor system to monitor the confined-space state based on computer networks and Internet protocols to prevent emergencies**

##### Authors

Iliia Riabko

##### Institution

National Center "Junior Academy of Sciences of Ukraine" under the auspices of UNESCO

##### Patent

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##### Description

The research project is dedicated to the system of monitoring and maintaining the microclimate of the car interior during parking. It seeks to offer a device that is easy to use and cheap to manufacture for monitoring the thermal and gas conditions indoors. It also underpins the parameters affecting the monitoring system. I have explored the main causes of emergency situations during car parking, and considered the ways to avoid them.

I have created a working microclimate monitoring system, and developed a website for collecting and processing information.

The research separately underpins the choice of parameters affecting the operation of the monitoring system and proves the expediency of its location in the car interior.

The schematic diagrams of the electronic boards of the device were created, and special programs were written for processing the received data.

The obtained system was evaluated and its effectiveness, advantages and disadvantages were considered.

Key words: microclimate monitoring system, microprocessor, thermal shock, selection of parameters of electronic devices.

Safety, protection and rescue of people

#### UA.5.

##### Title

**Synthesis of imidazo[2,1-b][1,3]thiazines and determination of their anti-inflammatory activity**

##### Authors

Irenyk Mariana

<b>Institution</b>	National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO
<b>Patent</b>	-
<b>Description</b>	<p>Due to the fact that imidazothiazines exhibit a wide range of biological activity, namely: antituberculosis, antiviral and others, the idea arose to synthesize compounds based on them. Therefore, we synthesized the compounds and from the results of determining their anti-inflammatory activity, we learned that one of the derivatives had an index of inhibition of the inflammatory process close to the well-known drug "Diclofenac sodium" and, moreover, they are all non-toxic. Anti-inflammatory activity was studied in vivo using swelling of the hind paw of white rats. These compounds are promising for further study of their biological activities.</p> <p><b>Practical significance of the work:</b> For the first time, the obtained compounds show a high level of anti-inflammatory action, considering their non-toxicity. Compounds with satisfactory drug-like and pharmacological properties were identified as promising targets for further structure optimization and in-depth studies.</p> <p><b>Future prospects:</b> to continue the study of anti-inflammatory activity for compounds of the imidazole type, while changing the structure of substituted pyridine substituents.</p>

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<b>UA.6.</b>	
<b>Title</b>	<b>Cardiovascular diseases development and risk groups determination among Kyiv working population with the help of the software system</b>
<b>Authors</b>	Anastasiia Kurulenko
<b>Institution</b>	National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO
<b>Patent</b>	-
<b>Description</b>	<p>Today cardiovascular diseases are one of the leading causes of death worldwide and in middle-income countries the diseases are often detected late and people die at a young age from heart attacks in the most productive years of their lives.</p> <p><b>The problem:</b> people rarely undergo a planned examination and consult a family doctor when certain symptoms appear. This can greatly complicate the treatment of the disease,</p>

because during this time it will progress.

A program was developed, the test questions of which include 10 main risk factors for the development of cardiovascular diseases, according to the World Health Organization (WHO) recommendations.

The interviewed person had to indicate which of these factors are present in his life at the moment. With the help of the software system using technologies such as python, PyQt5, Qt Designer, matplotlib, people of working age were divided into three groups: low, medium and high risk of developing CVD

**Practical significance:** the software system makes it possible to identify people at risk of developing cardiovascular diseases during a survey even at the workplace and to refer them to a family doctor in order to prescribe appropriate treatment to prevent complications, as well as to promote people's motivation towards a healthy lifestyle.

**Future prospects:** The developed program is conducive to additions and corrections, therefore, in the future, it can be configured in such a way that it would allow family doctors to use it in their practice.

Medicine - Health Care - Cosmetics

<b>UA.7.</b>	
<b>Title</b>	<b>Creation and research of ecological materials as an alternative to synthetic polymers</b>
<b>Authors</b>	Mariia Hodovanets
<b>Institution</b>	National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO
<b>Patent</b>	-
<b>Description</b>	Nowadays, more plastic ends up in landfills than is recycled. Disposable packaging makes up approximately 40% of all plastic waste. These facts require taking measures such as eco-friendly alternatives to reduce pollution. My invention aims to resolve this problem and another one: organic waste. As Ukraine is one of the top agricultural producers, we have a sheer amount of crop residues that farmers usually burn and increase air pollution. Thus, I decided to use agricultural waste in producing biodegradable materials as an alternative to synthetic polymers. The first samples contain bean husks, straw, pumpkin and

sunflower seed shells with the addition of wastepaper as an adhesive component. To enhance the waterproof quality, I suggest covering the material with a biodegradable layer of film. In practice, it can be used in the production of eco-friendly packaging, egg holders, cup holders, paper bags, boxes, disposable tableware, and pots for seedlings.

The second samples contain corn waste and starch that have been processed into thin layers with hot pressure. This material is more stable, its structure resembles plastic, and it is more resistant to water than the first samples. It can be implemented in the production of disposable tableware and containers.

Both of the methods show that waste can serve as a source for producing eco-friendly goods.

Environment - Pollution Control

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**UA.8.**
**Title**

**Improvement of the Technology of Obtaining Porous Aluminum**

**Authors**

Mutskiy Mikhailo

**Institution**

National Center "Junior Academy of Sciences of Ukraine" under the auspices of UNESCO

**Patent**

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**Description**

Nowadays, porous aluminum is finding more and more applications. But at the moment, there is no efficient enough way to produce porous aluminum. That is why I decided to find this method.

The purpose of my work is to investigate the technology of producing porous aluminum by combining the casting and powder methods using salt crystals as a powdering agent and using a vacuum pump when pouring aluminum melt, followed by the study of the main mechanical properties of the resulting samples.

Five samples of porous aluminum were cast from the melt of aluminum and sodium chloride as a powder. The optimal technological conditions for their production were selected. The technological parameters (structure, mechanical behavior under compression, porosity, density, and Young's modulus) of the obtained porous aluminum samples were studied in order to determine the dependence of the strength of the porous aluminum sample on the total porosity.

It is shown that the size of the filler does not affect the total



porosity of the samples and is 60-65 %. This suggests that this method is not suitable for imparting porosity outside these limits, but it also shows that we can easily change the pore size without hesitation that the percentage of porosity will be changed. It was found that the pore size is smaller than the size of the original filler particles, which is due to the partial destruction of the filler during the impregnation process. This may be useful information regarding the production of porous aluminum by this method.

Buildings and Materials

**UA.9.**

**Title**

**USING A QUADCOPTER & SUSPENSION OF IT FOR DELIVERING ANY CARGO NEEDED**

**Authors**

Nikita Naumov

**Institution**

National Center "Junior Academy of Sciences of Ukraine" under the auspices of UNESCO

**Patent**

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**Description**

**The relevance of the study:** in the world there have been a lot of problems for the previous years: rapid spread of the disease, and it's not only COVID-19, deployment of wars between different countries, natural disasters. In such cases, people sometimes do not have a number of necessary things, which must be delivered as soon as possible. There are a lot of situations, when there is need to deliver some necessary cargo in the shortest terms. That's why we decided to deal with the topic of fast deliveries of necessary things with the help of quadcopters.

**Purpose of the study:** to develop a suspension to ordinary quadcopter models which are usually not equipped with such things for keeping some objects in order to load necessary cargo into the box and transport it with this drone.

**To achieve the purpose, the following tasks were set:**

- to consider the present needs of the transportation of things;
- to create and do research of the device for transporting the things you need immediately by a quadcopter;
- to conduct test flights together with the system created;
- to calculate the cost of the project.

**Object of the research:** Transportation of the necessary cargo with the help of a quadcopter.

**Subject of the research:** The model of keeping and

unloading of cargo.  
Aviation, car industry and transportation

**UA.10.****Title**

**Methods and tools of user experience evaluation research**

**Authors**

Olha Volianyuk

**Institution**

National Center "Junior Academy of Sciences of Ukraine" under the auspices of UNESCO

**Patent**

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**Description**

The term "user experience" may be relatively new, but it has become a key concept in web research. Today, evaluating user experience is essential for effective product sales and ensuring customer satisfaction. This task has become even more urgent during the pandemic, as digitalization has increased the connection between humans and computers. For example, in Ukraine, social media usage increased from 19 to 26 million users during the first year of quarantine. Therefore, it is vital to accurately assess and improve web services to meet modern client needs.

Although methods and tools exist to evaluate user experience, they are only sometimes perfect or accurate. As a result, there is a need to develop better approaches to assess user experience. The project "Methods and Tools for User Experience Evaluation Research" aimed to comprehensively evaluate web service user experience. This goal was achieved by addressing the following main problems:

1. Researching existing methods and tools for assessing user experience and identifying their strengths and weaknesses.
2. Developing an improved method for evaluating web service user experience using a system of fuzzy logical inference.
3. Implementing the proposed method as an information system to assess user experience.
4. Conducting practical testing of the created information system.

The result of this research was an improved method for evaluating web service user experience that uses a comprehensive analysis of the characteristics that affect user experience and applies a fuzzy logic inference system.

Information Technology and Communication

**UA.11.****Title**

**THE STUDY OF THE RAINBOW FEATURES  
(Theory and computer model)**

**Authors**

Orynychuk Yelyzaveta

**Institution**

National Center “Junior Academy of Sciences of Ukraine”  
under the auspices of UNESCO

**Patent**

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**Description**

**The purpose of the work** is to investigate the main characteristics of the primary and higher orders of the rainbow. On the basis of theoretical research, create a computer model of rainbows of different orders. To achieve this goal, it is necessary to perform the following tasks:

Calculate the angular position, width, and order of colors in higher-order rainbows, as well as determine their polarization properties. To clarify the reason for the absence of a zero-order rainbow, which should be formed due to the refraction of the sun's rays through raindrops without internal reflection.

**The object** of research is a rainbow, a natural optical phenomenon which we can expect on the sky after the rain.

**Practical significance:** to visual display the process of formation of rainbows of various orders, a computer program was created on the basis of the obtained analytical formulas, which demonstrates the passage of rays through a drop of water, with full compliance with the laws of refraction and reflection. With the help of a computer model, it is possible to determine the critical angles for rays of different wavelengths with a given number of reflections inside the drop. This allows you to establish the position of higher-order rainbows relative to the direction of the Sun, calculate their width, and learn about the order of the colors in them.

**Future prospects:** these computer programs can be used in the educational process.

**UA.12.****Title**

**Modeling of different degrees of renal ischemia using intraoperative visualization methods**

**Authors**

Roman Rodynskyi

**Institution**

National Center “Junior Academy of Sciences of Ukraine”  
under the auspices of UNESCO

**Patent**

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One of the conditions for the success of both open and laparoscopic renal surgery is the temporary cessation of blood perfusion by the vascular system of the organ. However, bleeding and further restoration of blood supply to the kidney create conditions for activation of ischemic and reperfusion mechanisms of damage to the preserved renal tissue, realization of which can lead to structural and/or functional disorders of nephrons. The objectives of this research work were to identify and analyse the differences between different methods of renal vascular clamping and to investigate, using in practice, fairly new methods of renal circulatory research, such as, for example, ICG technology. This work was the first step towards creating the most effective method of clamping the renal vessels, that is, one that is most gentle on renal function, which will improve and prolong patient life by preventing postoperative complications and many other adverse effects of renal ischaemia. To date, we have accomplished all of the goals set at the beginning of this work. Through experiments on laboratory rats, we have identified and analysed the differences in renal circulatory changes resulting from constriction of various renal vessels. Our interim study proved that the choice of a particular renal vasoconstriction technique also determines renal status after reperfusion. Based on the data obtained in our work, it is possible to determine, by a more detailed study, which method of renal blood flow arrest will be the most organ-preserving and, therefore, the most effective.

Medicine – Health Care - Cosmetics

**Description****UA.13.****Title**

**The automated system of the vaccinated people's controlled access based on Covid-certificates**

**Authors**

Oryshchak Taras

**Institution**

National Center "Junior Academy of Sciences of Ukraine" under the auspices of UNESCO

**Patent**

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**Description**

One of the current threats is the coronavirus-19 pandemic. The commonly accepted two ways to overcome the threat are vaccination of the population and compliance with strict quarantine restrictions. Among the tools created to return the

world to normal life is control of access to public places for vaccinated persons. For this, it is necessary to organize a check of the availability and originality of the certificate and its validity in the person who demonstrates it. This verification requires human and economic resources, which is not profitable for business. These considerations justify the relevance of my work.

So I set a goal to develop an automated system for controlling access to public places based on the validation of Covid certificates and verification of the validity of this certificate of the person displaying it. And my next aim was to create a system of controlled access to buildings based on electronic passes in the form of QR codes.

During the domain analysis phase, a similar program called Safe Border was discovered. This program is used by government services. The disadvantage of Safe Border is the inability to check the face and work without a person.

Based on the analysis of the subject area, the requirements for my system were formulated. The certificate is scanned first. After reading it, the data is processed, namely reading the photo, initials, certificate number, expiration date, and other data for verification of forgery. After that, the face of the person is scanned, the photo is turned into a matrix, and then the main contour is selected and compared with the contour of the photo of the face read from the certificate. After processing the photo and all other data, access is allowed or denied.

In addition, I created a system of controlled access to places with a limited number of people based on electronic passes in the form of QR codes.

To summarize, a program of controlled access for vaccinated persons has been developed, which provides:

- Reading certificate codes and ensuring forgery testing;
- Verification of the certificate belonging to the person who demonstrates it;

In the future, the program can be used to verify not only Covid certificates but also different types of documents. Additionally, I want to make the system more secure and universal, suitable for use by different groups of people.

Safety, protection and rescue of people

UA.14.

Title

**THE MACHINE LEARNING MODELS FOR PREDICTION SUPERCONDUCTING PROPERTIES OF MATERIALS**

Authors

Anastasiia Veretilnyk

Institution

National Center “Junior Academy of Sciences of Ukraine”  
under the auspices of UNESCO

Patent

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During the war in Ukraine, people faced the problem of electricity. To solve it, it is necessary to use superconductors to transmit energy without unnecessary losses. Nowadays, no one knows the solution to high-temperature superconductivity, which could accelerate scientific progress.

**The relevance** of the study of high temperature superconductors is in ability to perform technological breakthroughs in many fields, particularly in energy, electronics, and quantum computers in connection with their unique properties.

Description

**Scientific novelty of the obtained results.** For the first time, prediction accuracy exceeding 90% was obtained by machine methods. Known from scientific literature, similar studies showed accuracy within 30–88%. This accuracy of the model makes it possible to predict the critical temperature for the first time and properties of the compound without much error. This will allow you to open new materials faster that will later be used for a number of scientific tasks.

**Practical significance of the obtained results.** Thanks to this the research managed to obtain a set of machine learning models, which allow determining the influence of various physical properties of compounds on temperature of the superconducting transition with the possibility of predicting this characteristic based on the chemical composition and crystal structure of the compound. This approach makes it possible to significantly increase speed for the search of superconducting materials properties.

Information Technology and Communication

**UA.15.****Title**

**Microclimate monitoring in classrooms of educational institutions using modern digital devices**

**Authors**

Vladyslav Yevlan

**Institution**

National Center “Junior Academy of Sciences of Ukraine” under the auspices of UNESCO

**Patent**

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**Description**

In my project, I substantiated the importance of maintaining microclimate norms in educational premises, as well as the possible consequences of their violations. Using the Einstein Tablet+2 Digital Lab, I monitored such microclimate parameters as temperature, relative humidity, and illumination in the classrooms of my school. In addition, I measured the change in CO<sub>2</sub> level and relative humidity during lessons. After comparing the results with sanitary standards, I experimentally ensured that the microclimate of my school is unideal, which might mean that some part of other schools more or less has the same problem.

Thus, I concluded that educational institutions need means to improve microclimatic conditions. Furthermore, taking into account that all the studied parameters depend on many external factors, it seems appropriate to conduct continuous monitoring of these parameters.

Therefore, I decided to create a system that can receive the values of the microclimate parameters (temperature, humidity, CO<sub>2</sub> level and illumination) in real-time during the working day in each room of a building and automatically normalize them using unique devices. I called it “The system of centralized control and automatic improvement of microclimate”, abbreviated as SCCAIM. Moreover, it will be able to filter dust, bacteria, and generally PM<sub>2.5</sub> particles, which are very hazardous to health. In addition, the panel of sensors transmits received data via Wi-Fi to the main computer. There the data is saved and processed.

Besides, I described existing, but more expensive and less convenient, methods for adjusting microclimate parameters.

Medicine – Health care – Cosmetics

**UA.16.****Title****Hydraulic drive with hydraulic lock****Authors**

Leonid KOZLOV, Oleh PIONTKEVYCH

**Institution****Vinnitsia National Technical University****Patent**

Patents of Ukraine No. 107185/2016

**Description**

Hydraulic drive with hydraulic lock (Patent No. 107185) includes an adjustable pump, a sectional hydraulic distributor, a hydraulic lock and a hydraulic cylinder. The hydraulic lock includes a main and a solenoid valves. The main valve works functions of a counterbalance valve with an externally control. The solenoid valve provides unloading of the main valve to reduce energy consumption for its control. Through the use of our construction valves: self-sealing of the hydraulic cylinder chambers, stabilization of the movement speed of the piston the hydraulic cylinder, and reduced non-productive losses in the hydraulic drive are provided. The hydraulic drives with the hydraulic locks are used in mobile machines that carry out cargo transportation and loading and unloading operations. Thus, during the cargo transportation, a fall of the working bodies is equal leakages across the hydraulic lock (example to 0.3 ml/min at the pressure from the load of 10 MPa and the temperature of 328.15 K due to self-sealing). Due to our hydraulic lock, cargo loading and unloading operations take place with stabilization of the flow of the working fluid up to 8%. This makes it easier for the operator to work behind the equipment and reduces fuel consumption during work. The design of the hydraulic drive for the backhoe loader "BOREX 2206" manufactured by the Company "SYSTEM-BOREX", Borodyanka (Ukraine) has been improved, made it possible to reduce energy consumption by 35% when realization the same operations compared with the basic equipment.

The developed hydraulic drive with the hydraulic lock is intended for use in mobile machines. Such mobile machines are equipped with different working bodies and can perform multi-mode operations efficiently. Mobile machines with such the hydraulic drives with the hydraulic locks are designed for use in construction, transport, forestry, agro-industrial complex and utility.



**UA.17.****Title****Adaptive hydraulic system****Authors**

Leonid KOZLOV, Yurii BURIENNIKOV, Volodymyr PYLIAVETS, Sergii KOTIK

**Institution****Vinnitsia National Technical University****Patent**

Patents of Ukraine No. 144036/2020

**Description**

The adaptive hydraulic system includes an adjustable pump with an automatic regulator, a directional valve, a hydraulic motor and a hydraulic cylinder, a pressure sensor system and a controller. Each section of the directional valve contains, a slide, electrically controlled adjustable throttle, balanced and brake valves. The adaptive hydraulic system ensures simultaneous operation of the hydraulic motor and hydraulic cylinder. With the help of the controller, the relationship between the frequency of rotation of the hydraulic motor shaft and the speed of movement of the hydraulic cylinder rod is established. The adaptive hydraulic system is used in mobile machines equipped with variable working bodies. Thus, when performing a soil drilling operation, the adaptive hydraulic system automatically changes the feed of the auger depending on the hardness of the soil. This allows you to provide automatic protection of the machine against overload, as well as to eliminate the danger of the auger stopping due to its clogging the auger with soil. This makes it easier for the operator to control the machine and reduces power losses during work operations. Design of an adaptive hydraulic system was developed for the BAM-2014 backhoe loader, manufactured by the Budagromash Machine-Building Company, Kyiv (Ukraine). In the developed adaptive hydraulic system, the calculated power losses for soil drilling operations with an auger with a diameter of 400 mm are reduced by (7.7...15.6) kW, depending on the operating modes, compared to the hydraulic system of the BAM-2014 mobile machine.

The developed adaptive hydraulic system is intended for use in mobile machines. Such machines are equipped with variable working bodies and can perform a wide range of operations during all seasons of the year. Such operations include: digging and drilling of soil, movement of overall goods, loading of bulk materials, planning of soil areas, ensuring the work of lifts. Machines with such adaptive hydraulic systems are designed for use in construction, in transport, in forestry, in the agro-industrial complex and utilities.

**UA.18.****Title****Hydraulic system****Authors**

Leonid KOZLOV

**Institution****Vinnitsia National Technical University****Patent**

Patents of Ukraine No. 79364/2013

**Description**

The hydraulic system includes an adjustable pump with a regulator, several hydraulic cylinders, a section directional valve. Each section of the directional valve includes an original slide with manual control, which ensures the direction of the working fluid from the pump to the hydraulic cylinder. The slide also connects the hydraulic cylinder to the pump regulator through special radial channels in the housing.

The hydraulic system ensures the operation of the hydraulic cylinder from the adjustable pump, with the possibility of proportional control of the speed of the piston. At the same time, the speed of the piston will not depend on the load. The pump supply will be proportional to the speed of the hydraulic cylinder. On the basis of patent No. 79364, the hydraulic system of the manipulator, were produced. Experimental studies of the efficiency of the hydraulic system of the manipulator have been carried out. The hydraulic system ensures the accuracy of stabilization of the speed of hydraulic cylinders within  $\pm 5\%$  of the set value when the pressure value changes in the range of (1.0...16) MPa. This provides better controllability of the manipulator and the accuracy of pointing at the object increases by 30%. When using the developed hydraulic system in the backhoe loader type 2102 (Ukraine), non-productive losses during the operation of the manipulator are reduced to 16 kW with a total power of the installed pumps of 35 kW.

The hydraulic system is intended for use in backhoe loaders based on wheeled tractors with an engine capacity of up to 80 kW. Due to the regulation of flow and pressure in the developed hydraulic system, the possibility of energy-saving use of a wide range of variable working bodies is ensured: manipulators, drilling equipment, hydraulic hammers, hydraulic shears, etc.

**United Kingdom**  
*By TISIAS*

<b>UK.1.</b>	
<b>Title</b>	<b>MIXED-FLOW CENTRIFUGAL PUMP</b>
<b>Authors</b>	Andrew Smith
<b>Institution</b>	<b>RAYDYNE ENTERPRISES LTD.</b>
<b>Patent</b>	US9410548B2
<b>Description</b>	<p>This recently patented Mixed Flow Centrifugal Pump introduces several new inventive concepts. These concepts deliver greater pumping efficiency and production cost efficiency to the pump industry. It increases pump design options and combinations of construction materials. The design principally utilizes the benefits of a specially engineered sinusoidal impeller within a toroid shaped pump chamber that closely mirrors the concave rotating profile of the sinusoidal impeller. This facilitates the use of double acting aqua plane technology to ensure ultra-smooth, reduced turbulence and interference, pumping efficiency and power.</p> <p>7. Buildings and Materials</p>

**United States of America***By TISIAS***US.1.****Title****SELF-GENERATING DEVICE AND MECHANICAL SYSTEM USING THE SAME****Authors**

Young Suk Woo and Chang Deuk Woo

**Institution**

N/A

**Patent no.**

U.S. Patent No. 11,285,975

**Description**

A self-generating device equipped in a mechanical system including a power generating part, an operating part, and a main shaft, the self-generating device comprising: the main shaft rotating according to a rotational force powered by the power generating part and transferring the rotational force to the operating part, wherein the operating part performs mechanical motion using the transferred rotational force; a rotor assembly combined with the main shaft and rotating along with the main shaft according to the rotational force, and a stator assembly surrounding the rotor assembly and staying stationary relative to the rotation of the rotor assembly, wherein magnetic field around the rotor assembly and the stator assembly changes according to the rotation of the main shaft, and the self-generating device generates induced electricity.

**Class no.**

6. Mechanical Engineering – Metallurgy

**US.2.****Title****B-posi+ive****Authors**

GIUSEPPE DEL GIUDICE

**Institution**

N/A

**Patent no.**

N/A

**Description**

B-posi+ive is designed to help a person improve their attitude by improving feeling and emotional intelligence. It detects feeling by using mobile phone camera/flash, and allows a person to track thoughts, feelings and behaviors. Tracks feedback about thoughts, feelings and behaviors. B-Positive has helped hundreds of people feel better and offers 30 day FREE trial to help improve a person's attitude. Currently 100 subscribers and counting! B-posi+ive has the potential to help millions of people by improving attitude.

**Class no.**

14. Others

**U.S.A.**by  
*AI-JAM US***US.3.****Title****New brainwave analyzer made with an Arduino and bread board circuit****Authors**

Jaeho Joo

**Institution****Penn Foster High School****Description  
EN**

It is considered that many studies related to EEG still approach as a method of integrative understanding through primitive analysis.

The progress from wired to wireless means that as the realm of communication expands, the time that made the study of telepathy, the brain-to-brain wireless information transfer process, realistically arrived at the same time. In the method of the invention, two people wear the same brain signal measuring device.

The purpose of the invention is to investigate the effect of changes in one person's brainwaves on other people's brainwaves. It is a method using the production of EEG signal power amplification circuit and the projecting of the amplified signal to the receiver by the driving hardware, i.e., a speaker, a sensitive coil, or a flashing lamp.

**US.4.****Title****The Digital Cognitive-Learning Type Device for Homeschooling****Authors**

Wooju An, Daniel Yoo, Lee Soojeong, Chun Sangwoo,

**Institution**

**Fairmont Preparatory Academy,  
Korean International School,**  
Cheongshim International Academy,  
Fayston preparatory School

**Description  
EN**

Students sometimes get visual information via google and can enjoy playing with various video contents. This white paper explores the potential of digital devices as an educational tool for young students to acquire the knowledge they learn. Within the scope of this study, it is efficient to analyze students' academic ability and learning efficiency by digital device, apply K-means clustering and the latest data analysis methods, and use digital devices with

unique control functions. Confirmed that it is the source of various tools. In this paper, we propose to utilize the abundant data for true social interaction of social media as a new tool for learning research.

US.5.	
Title	<b>Water purifier filter replacement notification system for reducing plastic waste</b>
Authors	William Minh Chung, Chae Tae Woong, Yune Sanje, Yune Sanghyeok
Institution	<b>Korea International School,</b> Fauston Preparatory School, Filters used in water purifiers have a certain filtering capacity and therefore must be replaced regularly. However, generally, water purifier management companies or users replace filters periodically, regardless of the amount of water being purified. They either schedule regular visits from a manager or call for a replacement if the filtered water has an odor. However, water purifier companies cannot accurately determine when to replace a filter because usage frequency and the amount of water being purified varies depending on the location. If the timing of the filter replacement is not accurate, there are issues such as not being able to drink clean water or wasting consumables due to early replacement of the filter. Therefore, the invention aims to accurately determine the filter replacement time through a measuring device, which will result in significant cost savings and material conservation.
Description EN	

US.6.	
Title	<b>The separation and analysis of micro plastics in cosmetic products</b>
Authors	Yoojin Hur We examine the importance of understanding the chemical composition of cosmetics and personal care products, as well as the potential health risks associated with exposure to certain chemicals found in these products. This paper also highlights the need for more rigorous testing and regulation of cosmetic products to ensure their safety for consumers.
Description EN	Through our analysis of the CSCP data, we identify common chemicals of concern found in cosmetics and personal care products, such as phthalates and parabens, and

their potential health effects, including reproductive and developmental harm, cancer, and endocrine disruption. We also discuss the challenges associated with regulating the use of these chemicals in cosmetic products, as well as opportunities for innovation and alternative ingredients. This paper provides valuable information for researchers, policymakers, and consumers interested in understanding the chemical composition of cosmetics and personal care products, and the potential risks associated with their use. Our findings emphasize the need for continued research and regulation of cosmetic products to ensure their safety and protect public health.

<b>US.7.</b>	
<b>Title</b>	<b>The Application of Markov Decision Process for Minesweeper game</b>
<b>Authors</b>	Jaemin Hur
<b>Institution</b>	<b>Oaks Christian School</b>
<b>Description</b> <b>EN</b>	This essay discusses about how a most efficient strategy of playing a Minesweeper game can be derived. By the nature of the Minesweeper's game environment, numerous possible situations and outcomes exist depending on the player's decision at every step. Thus, the first thing to investigate in this research was to clarify where to click in the first step, which takes a significant role in designing a strategy. However, there were limitations to revealing the winning strategy by inspecting the micro-situational probabilities that ensure the player wins without any hazards by human effort. Therefore, more simulations and novel strategies were to be studied with help of the advanced computer-based computations.
<b>US.8.</b>	
<b>Title</b>	<b>Smart Robot by Using LiDAR Sensors and Ultrasonic Sensors to Map The Surroundings And Dust Information</b>
<b>Authors</b>	Honggeol Jun
<b>Institution</b>	<b>Marshall School</b>
<b>Description</b> <b>EN</b>	A robot cleaner is a device that automatically recognizes and cleans the surrounding area, removing dirt and small debris from the floor. This type of cleaner is becoming increasingly popular as modern people lead busy lives and seek out



convenient solutions.  
However, many robotic vacuum cleaners struggle to navigate around obstacles, spending a lot of time circling furniture or objects and failing to clean effectively. To address this issue, we have designed a smart robot that can map the indoor space structure in one go. By utilizing a LiDAR sensor, our invention can effectively detect dust and clean it.

<b>US.9.</b>	
<b>Title</b>	<b>Wireless Power Experimental Device in water</b>
<b>Authors</b>	Yunchang Hur
<b>Institution</b>	<b>Wilbraham &amp; Monson Academy</b>
<b>Description</b> <b>EN</b>	This device is a fun tool for experimenting with chemical knowledge. It demonstrates that tap water is an electrolyte and allows users to experience the principle of turning on and off the LED light based on the type of water solutions and the conditions of electricity to conduct electricity in water. It is an electricity experiment learning device that enables students to understand the direction of current in water and the difference between AC and DC electricity by changing the direction of the current to the anode and cathode with electricity of about 24V. The device uses the phenomenon of weak electricity passing through water to achieve this. It allows for direct experience of gas generation and chemical reactions using electrolysis in such a solution, and the distribution of the electric field can be observed with the naked eye.
<b>US.10.</b>	
<b>Title</b>	<b>Personal Privacy Invasion of Surveillance and Seizure of Smartphone</b>
<b>Authors</b>	Clair Yoon Kang
<b>Institution</b>	<b>Seoul International School</b>
<b>Description</b> <b>EN</b>	In recent years, there has been growing concern over the government's ability to access and search the contents of individuals' smartphones. Many believe that this practice is a violation of the Fourth Amendment's protection against unreasonable searches and seizures. Smartphones contain a wealth of personal information, including emails, text messages, photos, and location data. This information can provide a detailed picture of an

individual's private life and could potentially be used against them in criminal proceedings.

Some argue that the government has a legitimate interest in accessing this information in order to investigate and prevent criminal activity. However, others contend that this interest does not outweigh the individual's right to privacy.

Furthermore, the process by which law enforcement obtains access to a smartphone is often murky and lacks transparency. In some cases, warrants may be obtained without sufficient evidence or oversight.

As technology continues to advance, the issue of smartphone surveillance and seizure is likely to become even more complex. It is important for lawmakers and citizens alike to consider the balance between privacy and security, and to ensure that the Fourth Amendment's protections are upheld in the digital age.

<b>US.11.</b>	
<b>Title</b>	<b>A Study on Space Debris and Satellite Deorbiting Systems</b>
<b>Authors</b>	Chanwoo Lim
<b>Institution</b>	<b>Hankuk Academy of Foreign Studies</b>
<b>Description EN</b>	<p>This research begins with an overview of the mechanics of orbits and the increasing danger of space debris. It then proposes a solution to the problems with current deorbiting systems. The document provides a descriptive analysis of the shortcomings of current ideas and advocates for the development of a deorbiting mechanism fueled by lithium-ion batteries. This proposal explains the benefits and advantages of this method compared to conventional deorbiting methods.</p> <p>Keywords: Orbits, Space Debris, Kessler syndrome, Deorbiting methods, Lithium-ion Battery</p>
<b>US.12.</b>	
<b>Title</b>	<b>Research of the Secret of baseball on Magnus Effect</b>
<b>Authors</b>	Sang Yoon Nathan Kim
<b>Institution</b>	<b>United World College East Campus</b>
<b>Description EN</b>	<p>The study is largely divided into two parts. First, the process of visualizing the Magnus effect of a breaking ball by changing the spin rate in a baseball field, and second, the</p>

process of quantitatively measuring the Magnus force by a simple measuring device. Through the experiment with a simple measuring device, the relationship between Magnus effect and several variables such as spin rate, the size and surface of ball will be studied and analyzed.

<b>US.13.</b>	
<b>Title</b>	<b>Research on the development of array modules for space debris monitoring phased array radars</b>
<b>Authors</b>	Andrew Chung
<b>Institution</b>	<b>Crean Lutheran High School</b>
<b>Description</b> <b>EN</b>	This study describes the design and measurement results of an array module corresponding to the transmitter/receiver of a phased array radar for monitoring space debris. Since the radar for space debris monitoring in this study uses the S-band frequency band, the phased array radar system is composed of a digital radar structure. However, it is difficult to digitize the transmitter/receiver module, which amplifies the radar signal with high power to meet the operating distance of the radar. This study designed and measured the array module of this digital phased array radar in an efficient structure that uses a common transmission/reception path. In addition, a one-piece cooling structure that effectively cools the heat generated when applied to the phased array and improves the weight of the system is proposed. The measured results of the produced array module showed a single array module transmission output of 56dBm or more at a maximum pulse width of 300usec in the frequency band of 2.9~3.35GHz, and the pulse flatness met 0.5dB. The maximum duty cycle was 10%. The noise figure of the receiver satisfied the characteristic of 4dB or less.
<b>US.14.</b>	
<b>Title</b>	<b>Data-Driven Approaches to Predicting Baseball Player Performance and Optimizing Training Programs</b>
<b>Authors</b>	Min Jae Choi
<b>Description</b> <b>EN</b>	We analyze several key features that are commonly used to evaluate the performance of baseball players, including batting average, on-base percentage, slugging percentage, and various pitching statistics such as earned run average and strikeout rate. Our results show that certain features, such as on-base percentage and strikeout rate, are

particularly important in predicting player performance. In addition, we discuss the importance of personalized training programs for baseball players, based on their individual strengths and weaknesses. By analyzing player performance data and identifying areas for improvement, coaches and trainers can develop customized training programs that address specific weaknesses and help players reach their full potential. Overall, this research highlights the importance of using data-driven approaches to improve the performance of baseball players. By leveraging advanced statistical techniques and personalized training programs, coaches and trainers can help players optimize their performance and achieve greater success in the sport.

<b>US.15.</b>	
<b>Title</b>	<b>Analysis of Potential Water Scarcity and Efficiency and Impact of Global Fast Fashion Consumption</b>
<b>Authors</b>	Gyurin Kim
<b>Description</b>	The rampant consumption culture of fast fashion in modern times is intricately linked with the issue of water scarcity, which is one of the most pressing global environmental concerns. Moreover, the increasing demand for custom-made clothing among consumers is leading to a significant decline in water-use efficiency. This research paper examines the potential social, economic, and environmental impacts of water-use efficiency in the context of fast fashion consumption and its associated environmental issues. Water scarcity is a critical issue affecting both individuals and businesses worldwide. Despite the adverse impact of human activities on freshwater systems, water-related risks tend to receive less attention in public discussions than other perceived risks. To address this gap, we propose a new way for corporate facilities to assess the potential positive impact of improving water-use efficiency in water-stressed areas. This metric evaluates water stress levels from a regional perspective, acknowledging that water stress levels can vary significantly within countries. This analysis aims to highlight the significance of water-related issues for sustainable development and to draw attention to the need for action to address this pressing global concern.
<b>EN</b>	

**US.16.****Title** **The NFT Project for Marketing and Promotion****Authors** Allen Yujoon Lee**Institution** **The Brook Hill School****Description**  
**EN**

NFT marketing is mostly done through the social platform Twitter, and continuous communication with the community that holds NFTs is important. The website should include a story that specifies the background of the project and the characteristics of the NFT assets, and a clear project roadmap that allows for the assessment of benefits given by holding NFTs and the sustainability of the NFT project is necessary for smooth sales of NFTs.

**US.17.****Title** **A real-time sensing device that can predict the loneliness index Platform for assisting elderly people living alone using the Internet of Things****Authors** Suho Ihn**Institution** **British International School Ho Chi Minh City****Description**  
**EN**

Recently, it has been discovered that many people living alone, not only elderly people living alone but also those who are isolated and lonely due to changes in industrialization and nuclearization, lead tragic lives of loneliness and even commit suicide. In order to somewhat address this social tragedy, we have been volunteering with a school group since last year to help elderly people living alone.

We aim to prevent suicide by using Internet of Things technology to check the behavior patterns of these elderly people in real-time while maintaining their privacy, and detecting prevention factors that deviate from certain patterns.

**US.18.****Title** **Correlation study between countries during COVID-19 in the context of economics****Authors** Juyoung Chun**Institution** **Tabor Academy****Description**  
**EN**

The Coronavirus pandemic has left the world puzzling about the ideal answer to maintain economic stability in case of a future virus outbreak. Many countries worldwide suffered

immediate financial repercussions from late actions against the virus. Some, such as South Korea, sustained a stable economy throughout the pandemic. Due to numerous factors determining the exact reason why some thrived while others perished, it is difficult to decipher the primary cause. Considering the health and economic policies of two comparative countries, this article seeks to identify how each solution impacted the nation's interpandemic economy—specifically, the decline in GDP, currency value drop, and unemployment rates. The article solely focuses on the individual countries' economies during the first two years of the pandemic, without any other determining factors in the current day. This paper will attempt to figure out the ideal model of economic response to a global pandemic by examining qualitative and quantitative data from two comparative nations, South Korea and the United Kingdom.

<b>US.19.</b>	
<b>Title</b>	<b>Experimental Study on Diabetes and Ischemic Stroke Risk: Two Factors</b>
<b>Authors</b>	Woojin Kim
<b>Institution</b>	<b>Cheongna Dalton School</b>
<b>Description</b>	Ischemic strokes and diabetes are serious and life-threatening diseases that affect many people worldwide. According to recent studies, diabetes increases the risk of ischemic stroke, making it important to take preventive measures. To better understand this relationship, we conducted experiments to investigate the effects of hyperglycemia, atherosclerosis, and blood flow rate. Our findings show that smaller blood vessels are more susceptible to atherosclerosis, which in turn increases the risk of ischemic stroke. However, socio-economic problems, sex, race, and age can also play a role in exacerbating this risk. Therefore, it is important for people to have regular check-ups to monitor their blood vessels and heart health to prevent diabetes and its associated complications.
<b>EN</b>	Furthermore, our study suggests that blood vessels with atherosclerosis cause slower blood flow to the brain, which can lead to cognitive impairment and other neurological problems. This highlights the importance of maintaining healthy blood vessels through lifestyle changes such as a healthy diet, regular exercise, and medication if necessary.

Additionally, further research is needed to better understand the mechanisms underlying the relationship between diabetes, atherosclerosis, and ischemic stroke so that more effective preventive measures and treatments can be developed.

**US.20.****Title**

**Noise canceling device using the simplest circuit by appropriate technology**

**Authors**

Park Hangyul

**Institution**

**Orange Lutheran High School**

**Description  
EN**

Recently, a wide variety of building materials have been developed to reduce noise. However, I came up with the idea of electronically analyzing the characteristics of sound and reducing noise, as the cost of construction can be prohibitively expensive. While complete elimination of noise would require several layers of functional materials to absorb and block sound, we focused on a cost-effective approach using appropriate technology to minimize noise.

**US.21.****Title**

**Marketing to Workation Travelers**

**Authors**

Soyeon Chae

**Institution**

**Korea International School Jeju**

**Description  
EN**

Recent years have shown a dramatic increase in the share of remote workers, fueled by technological improvements that have made remote work more efficient, like video-conferencing platforms, and a global pandemic, which provided a powerful incentive for companies to allow employees to work from the safety of their own homes. This development has given workers unprecedented geographical freedom, spawning a phenomenon known as the “workation,” a trip that fuses work and vacation, enabling workers to travel to vacation destinations while continuing to perform their job duties remotely. Hotels around the world are rushing to capitalize on the new trend and market themselves to workation travelers. However, such efforts have been hindered by a dearth of research on the needs and preferences of this growing demographic. This paper aims to fill that void with data from an original study in which prospective workation and vacation travelers were asked about a range of trip considerations, including purpose,

duration, budget, amenities, and destination. It finds that the preferences of workation travelers are distinct from those of conventional vacation travelers in a number of key areas. In particular, workation travelers reported themselves more interested in longer trips and assigned higher value to work-enhancing amenities such as a comfortable workstation, high-speed internet, and meeting or conference rooms. However, the results also show considerable variance among workation travelers, suggesting that hotels should not treat this group as monolithic and may benefit from marketing themselves to niche sub-groups within the workation traveler demographic.

**US.22.****Title**

**Universality and Conditionality in Cash Transfer Programs: Lessons from the COVID-19 Stimulus**

**Authors**

Sunghun Park

**Institution**

**Seoul Scholars International**

**Description  
EN**

This paper evaluates the effectiveness of the Economic Impact Payments (EIPs), a series of three unconditional cash transfers that were extended to the vast majority of households in the United States. First, it examines how effective EIPs were in achieving their primary objectives of stimulating economic activity and providing relief to those in need. Second, it examines their principal side effects, such as changes in inflation and inequality. From these observations, lessons are drawn about how cash transfer programs can be better designed in the future, both on a temporary basis to mitigate the impact of pandemic-like disruptions and on a permanent basis. The paper concludes that unconditional universal cash transfers are not the most effective method of stimulating the economy and may contribute somewhat to inflation, but they also reduce inequality and could be warranted if the paramount goal is quickly getting relief to those in need.

**US.23.****Title**

**The development of IoT TagBag**

**Authors**

Andrew Junyoung Lee

**Institution**

**Busan Foreign School**

**Description  
EN**

According to a study by USNews.com, “On average, an individual forgets about 5 items each day”. In fact, in our



recent survey of high school and college students, 81% of participants stated that they often worry about forgetting something but don't know what they might be forgetting (Appendix E). Most instances of forgetting important items occurred when individuals forgot to place items in a bag, purse, or suitcase to bring with them. As a result, we developed TagBag: a smart bag attachment targeted towards busy high school and college students who constantly stress about forgetting items due to their busy work schedules. TagBag has the ability to remind you to bring important belongings, keep an inventory of all items, and store a variety of lists for different scenarios such as a list for traveling and one for work. With this technology, we can alleviate the stress and anxiety of forgetting items before it happens.

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**US.24.**
**Title**

**Appropriate Technology for Developing a Simple Water Purifier**

**Authors**

Yeseung Lee

**Institution**

**Hankuk Academy of Foreign Studies**

**Description  
EN**

While drinking water from the water purifier at home, I realized that the taste of water differs from restaurant to building. I felt the taste of tap water on some floors and suddenly wondered if there are various chemical substances mixed in tap water, and if this water is really safe to drink. Also, how good would it be if we could filter and drink this water on the spot? This is the reason why we started experimenting to filter contaminated water. In particular, we wanted to combine the materials of various water purifier filters to develop appropriate technology for effectively purifying water in developing countries or areas with contaminated water. We filtered dirty water and inferred the filter principle and tools that can be filtered most effectively, and wanted to confirm whether the expected results were obtained.

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**US.25.**
**Title**

**Earth's magnetic field monitoring system to predict global disaster accident**

**Authors**

Jinwoo Park

**Institution**

**Stevenson School**

**Description**  
**EN**

Recently, YouTube and movie "Core" have been expressing very serious concerns about the Earth's magnetic field. In fact, analyzing the magnetic field is said to be effective in short-term earthquake predictions. Scientists have observed that the continuous decrease in the Earth's magnetic field over the past 300 years means that the magnetic reversal phenomenon has already begun. And through past magnetic research, it was discovered that periodic magnetic reversals have occurred. The reversal of the magnetic field has also been well explained to have catastrophic effects on Earth's living organisms. The increasing frequency of earthquakes in recent areas, the decrease in the rotation speed, and the death of flocks of birds or whales can also be related to this. Therefore, in order to raise awareness about changes in the Earth's magnetic field, we have come up with a way to create a rotating coil and maintain a stable rotation speed while turning on LED lamps with the induced electromotive force of the Earth's magnetic field to observe changes.

The idea of using a rotating coil and LED lamps to observe changes in the Earth's magnetic field is an interesting one. It could potentially provide valuable insights into the ongoing magnetic reversal phenomenon and its effects on the planet. However, it is important to note that this method is only one of many tools that can be used to study the magnetic field, and it may not be the most effective or accurate method in certain situations.

**US.26.**

**Title**  
**Authors**  
**Institution**

**The Correlation between Digital Literacy and Business Competitiveness in Data-driven Online Industries**

Eugene Lee  
**BCC**

**Description**  
**EN**

In today's digital age, online business has become an integral part of the global economy. With the vast amount of data available, businesses must have a strong understanding of digital literacy in order to effectively utilize data-driven decision making to remain competitive in the marketplace. This study examines the relationship between digital literacy and business competitiveness in the context of data-driven online business. Using case study analysis, we investigate the level of digital literacy in various online business industries, including e-commerce, social media, and digital advertising. We also explore the extent to which digital literacy has contributed to business competitiveness, measured by factors such as market

share, revenue growth, and customer satisfaction. Through this analysis, we aim to provide insights into the importance of digital literacy in the success of data-driven online business. Our findings show that digital literacy plays a critical role in the success of online businesses. Businesses with a higher level of digital literacy are better equipped to effectively analyze and interpret data, leading to more informed decision-making and increased competitiveness. Additionally, our research highlights the need for ongoing education and training programs to improve digital literacy among businesses and their employees. In this study provides important insights into the relationship between digital literacy and business competitiveness in the context of data-driven online business. Our findings emphasize the need for businesses to invest in digital literacy education and training in order to stay competitive in the rapidly evolving digital marketplace.

<b>US.27.</b>	
<b>Title</b>	<b>Smart pillows with tilt adjustment and temperature control using IoT Technology</b>
<b>Authors</b>	Seungwoo Lee
<b>Institution</b>	YISS
<b>Description</b>	Lately, I have been finding science to be incredibly fascinating and engaging, so much so that I find myself studying it deep into the night. However, I have noticed that after my late-night study sessions, I often have difficulty falling asleep. I was puzzled by this and decided to do some research to find out why. Upon conducting my research, I was quite alarmed to learn that there has been a significant increase in the number of people suffering from sleep disorders, just like me.
<b>EN</b>	As I delved deeper into the subject, I came across various studies and articles that shed light on the potential causes and remedies for sleep disorders. I realized that my situation might require more than just adjusting my sleeping habits. I was determined to find a more effective solution to my problem. After much contemplation, I stumbled upon the idea of a bed and a smart pillow that can automatically induce sleep. This revolutionary technology could help people like me who suffer from sleep disorders. With the help of a smart pillow, I could finally get the restful sleep that I crave, without resorting to medication or other potentially harmful remedies.

US.28.	
Title	<b>Predicting the Availability of Mental Health Treatment for Trauma Patients using Machine Learning: An Analysis of Relevant Factors</b>
Authors	Seung Woo You
Institution	SIS
Description EN	<p>The availability of mental health treatment for patients with trauma is an important issue that needs to be addressed. In this study, we conducted a data analysis on a survey dataset to examine the availability of treatment for patients with trauma. The dataset included information about the demographics, work environment, medical benefits, and other factors related to mental health treatment. Our analysis showed that the majority of patients who received treatment were between 25 and 35 years old, regardless of their nationality. Moreover, we found that if employees had medical support options, such as insurance, they were more likely to seek mental health treatment. Additionally, our analysis revealed that certain features, such as care-options, leave availability, work_interfere, family history, benefits, and country where they live, had a significantly higher impact on predicting whether a patient should receive treatment for their mental illness or not. We used this information to design a machine learning model that accurately predicted whether a patient should receive treatment for their mental illness based on the relevant features in the dataset, with an accuracy of 85%.</p> <p>Our findings could have important implications for mental health policy and intervention strategies. Health care professionals and policy makers can use our results to develop more effective programs and interventions to address the issue of mental health treatment availability for patients with trauma. Additionally, our study provides a framework for future research in this area, including the use of machine learning models to predict the need for mental health treatment in different patient populations. Overall, our study highlights the importance of addressing the issue of mental health treatment availability for patients with trauma, and provides valuable insights for improving mental health care delivery and outcomes.</p>

# Vietnam

By SANVIC

## VN.1.

<b>Title</b>	<b>A WEARABLE SOFT DEVICE FOR ASSISTANCE IN ARM AND HAND REHABILITATION</b>
<b>Authors</b>	<b>Vu Minh Quang, Nguyen Minh Hieu, Doan Minh</b>
<b>Institution</b>	Newton Gramma School, Hanoi City, Vietnam; Han Thuyen High School, Bac Ninh Province, Vietnam HUS High School for Gifted Students, Hanoi City, Vietnam
<b>Patent</b>	Patent pending

## Description

The structure of the device consists of 3 main parts: soft rehabilitation gloves, soft rehabilitation elbow sleeve as shown in Fig. 1, and control box. Soft actuators (as shown in Fig. 2) are made of soft materials (rubber, silicone, fabric) that enable flexible movements, safety, comfort, and lightweight. The soft actuators have a segmented and chambered structure that bends upon an input air pressure simulating bending actions of finger and elbow. Each actuator is activated by pressing a button at the control box.

The soft rehabilitation gloves employ five pneumatic soft actuators supporting the movement of five fingers. The actuators can be operated independently or synchronously depending on the user's choice. They are mounted on a customized fabric glove that helps to properly position each soft actuator to the fingers.

The soft rehabilitation elbow sleeve is made up of 2 soft actuators placed parallel to each other to increase the load capacity of the mechanism when the user wants to use it to support the carrying of heavy objects. In order to change the curve deformation into a V-shaped deformation simulating the shape of an elbow, the two ends of the mechanism are constrained by a layer of unstretchable fabric.

## Class

4. Medicine



# NATIONAL EXHIBITORS

Universities  
Research Institutes  
Companies  
Individuals

## University POLITEHNICA of Bucharest

<b>RO.1.</b>	
<b>Title EN</b>	<b>Equipment for electrical discharge machining micropins and microholes with torsional and longitudinal ultrasonic vibrations of electrode-tool</b>
<b>Authors</b>	Liviu Daniel Ghiculescu, Ovidiu Dorin Alupei Cojocariu, Roxana Marinescu, Nicolae Zmarandache, Claudiu Pîrnău, Gabriela Marina Ene
<b>Institution</b>	<b>University Politehnica of Bucharest</b>
<b>Patent no.</b>	Patent application No. A 00698/2019
<b>Description</b> <b>EN</b>	The equipment for electrical discharge machining (EDM) micropins and microholes with tool ultrasonic vibration is composed mainly by the device of ultrasonic chain orienting and clamping and the device of tool orienting. The micropins are generated by tubular tool inner surface, and the microholes by tubular tool exterior surface. The tool executes torsional vibrations for micropins / microholes with circular section, and longitudinal vibrations for micropins / microholes with profiled section.
	The tool is assembled by metal gluing on ultrasonic chain. Four holes are achieved into the horn with curved longitudinal axes, supplied with dielectric liquid by nozzles positioned in nodal plane. The ultrasonic chain is positioned vertically or inclined by spherical surface and blocked by a screwed lid with spherical shape.
	<p>The tool guiding is achieved by low friction coefficient, nonconductive material bushing, positioned by two conjugated spherical surfaces, and blocked by frontal lid.</p> <p>Tool guiding is achieved on conjugated surface of the bushing by horn penetration into bushing next to the guiding surface and bringing the tool within an inner cone of the bushing. The position of guiding bushing can be adjusted by moving the tool orienting device vertically on a column depending on workpiece height with bushing blocking and preventing its rotation.</p> <p>Claims: combination of torsional and longitudinal vibrations at microEDM, tool orienting device, dielectric supply system.</p> <p>Applications: in every industry - IT, electronics, medical, automotive, polymers injection etc. - that need miniaturization of the quality and precision surfaces on hard conductive materials, like micropins and microholes.</p>



**RO.2.**

**Title EN** MECHANO-ELECTRIC LAUNDRY DRYER  
**Authors** MICULESCU Florin, MICULESCU Marian, COSTOIU Cosmin-Mihnea, CHIVU Oana-Roxana, BARBU Catalin-Alexandru, SEMENESCU Augustin  
**Institution** **University POLITEHNICA Bucharest**  
**Patent no.** Patent RO131500-2017  
**Description EN** The patent relates to a mechano-electrical laundry dryer which can be used in households or hotels, for smaller or larger, coloured or white clothes or towels. The laundry dryer is characterised by autogenerating air streams which dry the clothes hanged on any type of holder by its horizontal translation motions, at rights angle with clothes or towels' positioning plane.

**RO.3.**

**Title EN** DIALYSIS MEMBRANE WITH THE ABILITY OF CONTROLLED RELEASE OF ACTIVE SUBSTANCES FOR THE CONCOMITANT TREATMENT OF CHRONIC RENAL DYSFUNCTION AND LIVER CANCER AND THE PROCEDURE FOR OBTAINING IT  
**Authors** VOICU Ioan Stefan, OPREA Mădălina, PANDELE Andreea Mădălina, SEMENESCU Augustin, COSTOIU Mihnea Cosmin, MICULESCU Florin, ANTONIAC Vasile Iulian, MATES Ileana Mariana, CIOCA Lucian Ionel  
**Institution** **University POLITEHNICA Bucharest**  
**Patent no.** PatentnApplication A 00062/2023  
**Description EN** The invention uses a dialysis membrane that can treat both chronic kidney disease by hemodialysis and liver cancer by chemotherapy at the same time. The procedure will have a major impact on the quality of life of patients suffering from medical conditions. The dialysis membrane with the ability of controlled release of doxorubicin for the simultaneous treatment of chronic renal dysfunction and liver cancer, according to the invention, significantly improves medical procedures for the simultaneous treatment of the two diseases.

**RO.4.**

<b>Title EN</b>	<b>SURFACE ACOUSTIC WAVE BIOSENSOR BASED ON GRAPHENE FUNCTIONALIZED WITH ANTI-ALPHA-FETOPROTEIN MONOCLONAL ANTIBODY, FOR THE DIAGNOSIS OF LIVER CANCER</b>
<b>Authors</b>	VOICU Ioan Stefan, PALLA-PAPAVLU Alexandra, ANTONIAC Vasile Iulian, MICULESCU Florin, SEMENESCU Augustin, COSTOIU Mihnea Cosmin, MATES Ileana-Mariana, PRISECARU Delia -Alexandra
<b>Institution</b>	University POLITEHNICA Bucharest
<b>Patent no.</b>	Patent Application A 00062/2022
<b>Description EN</b>	The invention refers to a biosensor for the rapid and easy diagnosis of liver cancer by qualitatively and quantitatively determining the tumor marker – alpha-fetoprotein (AFP) directly from the blood (without the need for serum separation). The sensor-sensitive part is represented by the functionalized graphene with anti-alpha-fetoprotein monoclonal antibody that is deposited on the surface of the surface acoustic wave sensor (SAW) by direct laser-induced transfer (LIFT).

**RO.5.**

<b>Title EN</b>	<b>Mechatronic System for Pelvic Girdle Stability and Gait Movement Control for People with Neurological and Musculoskeletal Conditions – CoMControl</b>
<b>Authors</b>	Petre Lucian SEICIU, Valentin BARBU, Constantin Romica STOICA, Mihaela Anca ALEXE, Georgiana Ionela PADURARU, Delia Alexandra PRISECARU, Mihai BERTEANU, Ileana CIOBANU, Alina Nela ILIESCU, Cosmin FRONE, Florian BADEA,
<b>Institution</b>	<b>University POLITEHNICA of Bucharest</b>
<b>Patent no.</b>	A/00193/2022
<b>Description EN</b>	CoMControl aims to improve the medical rehabilitation of patients with locomotor disabilities, by controlling and moving their Center of Mass (COM) during gait. The system is autonomous and assists 4 degrees of motion of the patient's pelvis while ground or treadmill walking. The system presents a new suspension system that support and control the patient posture. Key innovative features: 1. Assisting patient's CoM movement, during active

walking, in three directions, on predetermined or random trajectories, like normal and personalized physiological gait trajectory.

2. All the driving systems are mounted on CoMControl and below patient's COM.

3. New patient suspension and support subsystem that eliminates the disadvantages of current suspension systems. For safety reasons, the supporting system is mounted both above and below patient's COM.

4. The system embodies the concept "Patient Follows System" at the pelvic girdle level in that the command-and-control system notices the patient's intention to move and commands the start of the movements of the driving actuators.

5. The patient's intention to move is sensed by the goniometric motion sensors (accelerometers) mounted on the patient.

6. The signals from the sensors are collected by a usual portable system (smart phone), amplified, processed by a motion analysis application and transmitted to the actuator control system, so that the speed of the step-by-step motors can be independently controlled for the forward movement (right wheel and left wheel), for the lateral displacement of the CoM, for the vertical displacement of the CoM and for the rotation around the vertical axis.

## RO.6.

<b>Title EN</b>	<b>Spastic Forearm Positioning Device for Botulinum Toxin Injection after Stroke – ArmInject</b>
<b>Authors</b>	Petre Lucian SEICIU, Tudor PRISECARU, Georgiana Ionela PADURARU, Mihai BERTEANU, Ionel MIHAI Valentin BARBU
<b>Institution</b>	<b>University POLITEHNICA of Bucharest</b>
<b>Patent no.</b>	RO134191A2/2020
<b>Description EN</b>	The patent presents the Spastic Forearm Positioning Device for Botulinum Injection after Stroke (ArmInject) for spasticity treatment purpose. The actual botulinum toxin injection methods are not accurate due to the spastic arm and forearm movement. Frequently, the target muscle is not reached by the botulinum toxin, so that the treatment is inefficient. ArmInject is developed to position and block the spastic forearm, facilitating precise botulinum injection in

the spastic muscle.

ArmInject advantages:

1. Positioning and blocking of the forearm to forbidding its spastic movement.
2. Arm, fore-arm and hand setting-up, positioning and locking, according to the patient's anatomy, as following:
  - a. All necessary refinements are ensured by set-up and positioning of all the moving parts.
  - b. Blocking is made using either Velcro bands (for arm and fore-arm) or by hand screwing the striated nuts.
3. Fore-arm positioning on ventral, dorsal side or on any other intermediary position.
4. Right or left arm use possibility.
5. Any type of chair mounting possibility.
6. Efficiency increasing and time shortening of toxin botulinum treatment.
7. Treatment can be carried out by one single person, without other therapist's help.
8. Simplicity and cheapness because: standard parts are cheap; manufactured parts are simple and made from cheap materials; technology is simple; labour cost is low.

## RO.7.

### Title EN

**Composition and Procedure for Making Alginate-Based Microspheres and Titanium Oxide (TiO<sub>2</sub>) Nanoparticles with Applications in Environmental Protection**

### Authors

Predescu Cristian, Matei Ecaterina, Răpă Maria, Predescu Andra Mihaela, Popa Elisabeta Elena, Berbecaru Andrei Constantin, Țurcanu Anca - Andreea, Deak Gyorgy, Dumitrescu Florina - Diana, Moncea Mihaela - Andreea

### Institution

University POLITEHNICA of Bucharest

### Patent no.

RO135381/2022

### Description EN

The invention refers to a process for obtaining microspheres based on sodium alginate, polyphenols and TiO<sub>2</sub> nanoparticles with antioxidant, antifungal activity and capacity to retain heavy metals from waste water. The process, according to the invention, consists in the preparation of the following solutions: polyphenol extract from rose petals, 2% sodium alginate solution by dissolving the polysaccharide in the polyphenol extract by mechanical stirring, and TiO<sub>2</sub> nanoparticles from titanium

tetraisopropoxide, acetic acid concentrated and solution of polyvinyl pyrrolidone dissolved in ethyl alcohol, by electrospinning followed by calcination, adding of nanoparticles to the alginate solution, extruding the solution into a vessel containing calcium chloride solution as a crosslinking agent, resulting microspheres that exhibit antifungal properties against *Aspergillus niger*, as well as retention capacity of  $\text{Cu}^{2+}$  from contaminated waters.

**RO.8.****Title EN****Synthesis Procedure of  $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{TiO}_2$** **Nanocomposite through Recovery of Ferrous Waste****Authors**

Predescu Cristian, Predescu Andra Mihaela, Matei Ecaterina, Berbecaru Andrei Constantin, Coman George, Tarcea Claudia, Răpă Maria

**Institution**

University POLITEHNICA of Bucharest

**Patent no.**

RO135716/2022

**Description  
EN**

The invention refers to a process for the synthesis of a  $\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{TiO}_2$  nanocomposite by utilizing a ferrous waste such as mill scale, which is mainly composed of 95% iron oxides, metal oxides, carbon and oil. The process according to the invention, in a first stage, consists in using a  $\beta\text{-Fe}_4\text{S}_5\text{O}_{21}$  precursor from mill scale waste currently used for obtaining magnetite, followed by obtaining the  $\text{Fe}_3\text{O}_4\text{-SiO}_2$  binary nanocomposite by adding an aqueous ammonia solution of 28% concentration and tetraethyl orthosilicate, stirring the reaction mixture at room temperature for 3 hours and then adding isopropanol in the presence of diethylenetriamine and titanium isopropoxide, the final product being dried in an oven at  $100^\circ\text{C}$  for 4 hours, after which it is thermally treated in a drying oven at a temperature of  $550^\circ\text{C}$  for one hour. The  $\beta$ -type precursor -  $\text{Fe}_4\text{S}_5\text{O}_{21}$  was obtained from mill scale waste from the lamination process, by grinding them to a  $4\text{ }\mu\text{m}$  granulation, followed by precipitation with a 40% NaOH solution, washing and drying in an oven at a temperature of  $60^\circ\text{C}$ .

**RO.9.****Title EN**

Alloy type FeCrAl(Y) and procedure and method of obtaining a product from this alloy.

**Authors**

Geantă, V., Voiculescu, I., Ștefănoiu, R., Fugaru, V., Stanciu, E.M., Pascu, A., Postolache, C., Ioan, M.R.

**Institution**

**University Politehnica of Bucharest, IFIN H-H Măgurele**

**Patent no.**

Patent no. 133180/30.08.2022.

The invention "Metallic material microalloyed with zirconium, yttrium, hafnium and titanium for 4R generation nuclear power plants and methods of obtaining and laser processing" refers to a multi-element metallic material from the FeCrAl system, with the chemical composition Fe = 70%, Cr = 16%, Al = 8%, microalloyed with 1.5% elements. The material shows good resistance to oxidation, corrosion and erosion at high temperatures, capable of self-generating protective layers of renewable aluminum oxide, with high adhesion to the substrate, in liquid metallic media (lead, lead-bismuth mixtures), resistant to gamma radiation.

It is obtained through the RAV-VAR process. from metal elements of advanced purity (over 99.5 %).

**Description  
EN**

The process of superficial laser processing allows obtaining superimposed layers of remelting, with fine grain and a high content of complex, adherent and uniformly structured metal oxide, with thicknesses between 2 and 6  $\mu\text{m}$ , which represent barriers against the corrosive or erosive effects produced by the agent metallic coolant. Laser processing is performed on microalloyed FeCrAl samples, preheated at 320°C for 30 minutes, followed by controlled cooling at 150°C/hour. The working parameters are: Laser power - 180W; Processing speed - 65 cm/min; Spot size - 1mm; Optical module tilt - 2-5° in the direction of travel; Protective gas – argon; Vertical coaxial jet through the processing head - 12 l/min; Additional lateral jet (45° inclination) - 18 l/min; The working distance between the optical processing module and the part - 12mm.

**RO.10.**

<b>Title EN</b>	Coated rods for brazing and process of making.
<b>Authors</b>	Binchiciu, E., Voiculescu, I., Geanta, V., Binchiciu, A., Stefanoiu, R., Tihanov-Tănăsache, D., Binchiciu, H
<b>Institution</b>	<b>University Politehnica of Bucharest, SUDOTIM AS Timișoara</b>
<b>Patent no.</b>	Patent no. 132041/30.06.2022.
<b>Description EN</b>	<p>The invention "Coated rods for brazing" consists in the obtaining of three types of rods VIAg25SnSiPR, VIAg30SnR and VIAg40SnR characterized by the fact that they consist of a solid core of alloys developed in accordance with EN ISO 17672:2010, of the type of bare rods, with deviations with a diameter between 0 - 0.08 mm, on which are deposited by coaxial extrusion, composite covers that are made up of 60-65% deoxidizing fluxes, in accordance with EN 14045:1999, of 15-20% plasticizers mixed with binders and 10-15% metal nano-powders from type alloys: 50%Cu-40%Sn-8%P-2%Si; 50%Cu-45%Sn-5%Si; 50%Cu-47Sn-3%P-Cu-Zn-Sn-Ag, with a limited content of residual elements. They allow obtaining suitable properties for brazing, by improving adhesion based on diffusion processes, ensuring wetting, surface deoxidation and increasing tear resistance characteristic.s</p> <p>The process of obtaining brazing rods is characterized by the fact that it has the following stages: straightening, washing and physico-chemical control of the bare rods, granulometric control of the powders of the constituents and dosing of the coating mass recipes, making the composite material by wet homogenization of the components at temperatures between 45-65°C depending on the type of product, obtaining coated rods by hot extrusion, drying, calcination, control of the brazing operation and the physico-chemical properties of the deposits.</p>

**RO.11.**

<b>Title EN</b>	<b>Glass functionalization and decoration with nanoparticles: a challenging way to induce new applications</b>
<b>Authors</b>	Cornelia Ioana Ilie, Ludmila Motelica, Angela Spoială, Denisa Ficai, Ovidiu Cristian Oprea, Anton Ficai
<b>Institution</b>	University Politehnica of Bucharest

<b>Patent no.</b>	Patent application No. A100797/06.12.2022
<b>Description</b> EN	The invention refers to modifying the glass surface according to a self-assembly methodology induced by the layer-by-layer deposition of appropriately chosen components. The first stage is represented by the silanization of the glass surface or the deposit by any other specific methods of a layer that allows the (self)assembly of successive layers and that changes the properties of the surface. The first deposited layer can result from a silanization with agents or even the deposition of oxide or polyethylene glycol (PEG) layers. Then, through successive treatments, homogenous or heterogeneous supramolecular structures are formed. The surface modification can be done in stages, using PEG, of different molecular masses or direct silanization. Later, superstructures with properties strongly dependent on the chemical nature and deposition characteristics can be deposited by layer-by-layer deposition.

**RO.12.**

<b>Title EN</b>	<b>Controlled release systems for maintaining the balance of the gastrointestinal microbiota and improving health and method of obtaining them</b>
<b>Authors</b>	Gabriela PETRIȘOR, Ludmila MOTELICA, Ioana BARDIS, Laura-Denisa DRAGU, Lilia MATEI, Ioana-Madalina PITICA, Denisa Ficai, Irina FIERASCU, Radu Claudiu FIERASCU, Ovidiu Cristian OPREA, Anton FICAI, Coralia BLEOTU
<b>Institution</b>	University Politehnica of Bucharest
<b>Patent no.</b>	A/00649/18.10.2022
<b>Description</b> EN	The imbalance of the microbiota is an important factor in the body, being directly involved in numerous processes that can generate various health problems / diseases. In this context, this request proposes the delivery of prebiotics (especially polyphenols) intended for the rebalancing of the microbiota or antibiotics to combat some opportunistic microorganisms in the colon: Candida Albicans, Clostridium difficile, staphylococcus aureus, etc. or of some pathogens such as: salmonella, shigella, vibrio cholerae, etc [5]. The technical problem that needs to be solved involves the loading of the biologically active substances of interest inside the porous structure in order to protect them and release them,



unaltered, at the level of the microbiota, mostly located at the level of the colon.

Additionally, understanding the mechanisms of multiple drug resistance (MDR) of bacteria in the intestinal microbiota is one of the major problems facing humanity today.

The technical solution underlying this patent application is based on the use of MCMs loaded with natural substances such as polyphenols (known for their antioxidant, antimicrobial, antifungal and anticarcinogenic activities) and antibiotics to be used as targeted delivery systems of biological substances assets. The proposed products must be able to meet specific characteristics, such as the ordered porous structure specific to each active compound (to ensure advanced control of loading capacity and appropriate release profile), uniform particle size, pore volume must be large for to improve loading capacity, specific surface to be adequately functionalized so that the delivery of active substances is targeted at the level of the colon and according to an appropriate profile to improve the quality of the intestinal microbiota and the inflammatory response and finally ensure a positive impact on human health.

### RO.13.

#### Title EN

**Innovative antimicrobial food packages for advanced food security**

#### Authors

Ludmila MOTELICA, Anton FICAI, Bogdan-Stefan VASILE, Denisa FICAI, Ovidiu-Cristian OPREA

#### Institution

University Politehnica of Bucharest

#### Patent no.

Project 573PED/2022: PN-III-P2-2.1-PED-2021-3414

#### Description EN

Nowadays food preservation, quality maintenance and safety are major growing concerns of the food industry. It is evident that over time consumers' demand for natural and safe food products with stringent regulations to prevent food-borne infectious diseases. Active antimicrobial food packaging systems are supposed not only to passively protect food products against environmental factors, but also to inhibit or retard microbial growth on food surfaces, extending food shelf life. Replacing conventional packaging with some antimicrobial ones could reduce food loss (30% of food is wasted in developed countries at retail and consumer level).

Nanostructured antimicrobials have a higher surface area-to-volume ratio when compared with their higher scale counterparts. Therefore, antimicrobial nanocomposite packaging systems should be particularly efficient in their activities against microbial cells.

ZnO has found its way in many applications in daily life such as in drug delivery, cosmetics, medical devices, dentistry and orthopaedics. The use of ZnO in cosmetics is not limited to the sunscreens, while in dentistry, ZnO is used as a fill material due to its ability to block microbial leakage and is considered an antiseptic material. ZnO containing products are non-toxic to oral tissues when they come into direct contact.

The main objective of the project is to obtain antimicrobial packaging materials based on recycled polyethylene and ZnO NPs loaded with natural antimicrobials and tailor them for different types of foodstuff (as the pathogens for fruits are totally different from those specific to meat based food for example). In order to enhance the food quality perception, the natural antimicrobials (from essential oils) will be chose to match the products that will be packed. For example, vanilla, nutmeg or cinnamon antimicrobials can be used for bakery products, lemon, peppermint or grapeseed antimicrobials for fruits and thyme, basil or oregano antimicrobials can be tested for meat based products. These innovative packaging materials will retain some of their antimicrobial activity even after use and being recycled again, which is beneficial regardless of the future uses.

#### RO.14.

<b>Title EN</b>	<b>Magnetic smart drug delivery systems for theranostic using a personalized approach</b>
<b>Authors</b>	Denisa Ficai, Ludmila Motelica, Cornelia Ioana Ilie, Angela Spoială, Ovidiu Cristian Oprea, Anton Ficai
<b>Institution</b>	University Politehnica of Bucharest
<b>Patent no.</b>	Project PN-III-P1-1.1-TE-2021-1342, no 96
<b>Description EN</b>	Cancer is one of the most widespread group of diseases causing about 14.6% of all human deaths, representing a major public health problem worldwide. The standard treatment is usually causing side effects which can be reduced by targeting delivery with various nanostructures,

including magnetic nanoparticles. Due to the fact that bare  $\text{Fe}_3\text{O}_4$  nanoparticles are highly susceptible to degradation/dissolution in acidic and oxidative conditions as well as to the in vivo conditions, coating an outer protective layer to it is very important for maintaining the stability of the magnetic component until cellular internalization. Also, the proper choice of the shell will be essential in assisting the internalization of these nanostructures inside the tumor cells and further delivering the antitumoral agents directly inside the cells. It is desired that no delivery to happen before the internalization. As functionalization agents, natural catabolism products will be used. The most promising classes of compounds which will be taken into account are dicarboxylic amino acids, hydroxyacids and ketoacids. The antitumoral activity will be assured by the presence of hydrophobic and hydrophilic agents, the mechanism of delivery being different. Along with the synthetic, hydrophilic cytostatics (cisplatin, irinotecan, etc.) natural, non-toxic and commonly found in the diet, antitumor compounds, such as Bisabolol and Lycopene will be considered.

**RO.15.****Title EN**

**Long-Lasting Innovative NanoCoatings for Heritage preservation**

**Authors**

Denisa Ficai, Ludmila Motelica, Cornelia Ioana Ilie, Angela Spoială, Ovidiu Cristian Oprea, Anton Ficai

**Institution**

University Politehnica of Bucharest

**Patent no.**

Project PN-III-P2-2.1-PED-2021-2526, no 736

**Description  
EN**

The scope of the current project proposal is to develop innovative nanostructures for the treatment of various surfaces such as stone, cement-based composites, glass, wood, or other materials, in order to ensure the detergency of the system, anti-adherent, antibacterial and antifungal activity, as well as sealant and healing capacity of the cracks. For this purpose, new silica-based coatings (monosiloxane with different functional groups and disiloxane) will be considered and further used as linkers for the decoration with Ag, Au, Cu, ZnO,  $\text{TiO}_2$  nanoparticles. The siloxane-based solutions called coupling agents can react with nanoparticles, by chemically binding Au, Cu, Ag nanoparticles via thiol groups or ZnO or  $\text{TiO}_2$  nanoparticles (NPs) via disiloxane

agents, conferring complex surfaces with the above-mentioned specific properties and, important to mention, having long-lasting efficiency. The multiple currently available solutions for treating these surfaces are aiming both to prevent the formation of biofilms and to change the appearance of the treated surfaces. These systems are based on various chemical methods using specific detergents and biocides, mechanical cleaning using various cleaning technologies such as sandblasting, laser cleaning or biological cleaning using enzyme-based detergent systems or a mixture of enzymes and bacteria that have the role of cleaning the affected surfaces. The major disadvantage of these solutions is represented by the fact that the usual treatments are offering only short/ medium term protection to these surfaces, thus requiring the frequent repetition of these treatments. Moreover, the biocidal compounds are reaching the natural environment, raising pollution issues, but also inducing the degradation of the treated surfaces, as recently happened with some of the Brâncuși masterpieces, such as “Poarta sărutului” and “Masa tăcerii”.

**RO.16.****Title EN**

**NANOTECHNOLOGY FOR EMERGING  
POLLUTANTS REMOVAL FROM WASTEWATER  
USING PHOTOCATALYTIC PROCESSE**

**Authors**

Cristina Ileana COVALIU-MIERLA, Iuliana PAUN, Ioana Corina MOGA, Gigel PARASCHIV, Sorin Ștefan BIRIȘ

**Institution**

University Politehnica of Bucharest

**Patent no.**

Project No 39/2020

**Description  
EN**

The nanotechnology showed new and efficient modalities for pollutants removal from wastewaters by using nanomaterials which have unique special properties. The aim of this research is to resolve the problem of wastewater of treatment containing as emerging pollutants quaternary ammonium salts, which are difficult to degrade biologically and, in some cases, even toxic. Quaternary ammonium compounds are cationic surfactants, used in many cosmetic and cleaning product, for disinfecting surfaces. Because of their multiple uses, cationic surfactants are considered common constituents of wastewater. This innovation describes an experimental which applies photocatalysis and TiO<sub>2</sub> nanomaterial for removal of

benzyltrimethyltetradecylammonium chloride from wastewater. The maximum wastewater treatment efficiency was 98 % within 12 h.

**RO.17.**

<b>Title EN</b>	<b>BIOTECHNOLOGY OF INDUSTRIAL WASTEWATER DEPOLLUTION USING ORANGE PEELS</b>
<b>Authors</b>	Ionela- Simona ANTONIE, Gigel PARASCHIV, Cristina Ileana COVALIU-MIERLA
<b>Institution</b>	University Politehnica of Bucharest
<b>Patent no.</b>	Phd thesis
<b>Description EN</b>	<p>Industrial wastewater contains significant amounts of heavy metals, including cadmium, chromium, cobalt, copper, zinc, and nickel, which can enter the human body through the food chain and drinking water. The conventional methods for heavy metals removal from wastewater may be ineffective or cost-expensive, especially when the metal ion concentrations in solution are in range of 1-100 mg/L. and lignin in orange peels make them a promising bioadsorbent material.</p> <p>This innovation shows the ability of orange peels to adsorb Ni(II) ions from wastewater, considering factors such as pH and initial metal ion concentration. The highest wastewater treatment efficiency (93%) was obtained after 6 h of for a concentration of Ni (II) in wastewater of 1 g/L.</p>

## Technical University of Cluj-Napoca, România

<b>RO.18.</b>	
<b>Title EN</b>	<b>Airborne wind power system</b>
<b>Authors</b>	Ștefan Breban, Marius Alexandru Drancă, Ion Mălăel
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO133886- B1/29.04.2022
<b>Description EN</b>	<p>The airborne wind system is raised and maintained in the air with the help of balloons filled with a gas lighter than air, and/or using the lift force of elements with an aerodynamic profile; it consists of one or more wind turbines that drive electric generators; the orientation of the turbine/s, in the direction of the wind, is done with one or more tail vanes mounted on a horizontal support or on the sides of the wing with an aerodynamic profile; it is anchored to the ground by one or more cables that also ensure the transfer of electrical energy to the ground; is equipped with an assembly composed of an axial-radial bearing and an element with sliding contacts that allows the rotation of the anchored assembly according to the wind direction and at the same time ensures the electrical connection with the electrical conductors in the cable/cables.</p>
<b>RO.19.</b>	
<b>Title EN</b>	<b>In-wheel direct drive electric machine for railway transportation vehicles</b>
<b>Authors</b>	Ștefan Breban, Marius Alexandru Drancă, Marius Fărtan
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO134496- B1/30.06.2022
<b>Description EN</b>	<p>The invention presents an electric propulsion machine, with permanent magnets and axial flux, consisting of a stator mounted on a fixed shaft and a rotor consisting of permanent magnets mounted on a ferromagnetic part attached to the vehicle wheel. The ferromagnetic piece has a dual functional role: mechanical and rotor yoke. The wheel consists of a main steel piece, an elastic element (rubber), a steel wheel rim and a clamping ring. The wheel is mounted on a fixed axle by means of a radial-axial bearing intended for the railway field, in classic construction, with spacer rings and mechanically fixed caps with screws, which allows rotational movement and radial-axial fixation of metal wheel.</p>

<b>RO.20.</b>	<p><b>Interleaved voltage step-up/step-down electronic converter</b></p> <p>Petre Dorel Teodosescu, Vasile Mihai Suciu, Norbert Csaba Szekely, Alexandru Mădălin Păcuraru, Mircea Bojan, Zsolt Mathe</p> <p><b>Technical University of Cluj-Napoca</b></p> <p>Patent OSIM: RO134350- B1/ 28.01.2022</p> <p>The invention relates to an electronic converter with an interleaved structure intended for applications with electrical energy storage, renewable sources, electronic consumers, and electric vehicles, in which:</p> <ul style="list-style-type: none"> <li>• the voltage value from the power supply is too low for the intended application, with operation in the input voltage amplification mode - voltage raising converter (Boost);</li> <li>• the voltage value from the power supply is too high for the intended application, with operation in the input voltage attenuation mode - voltage step-down converter (Buck);</li> <li>• energy circulation is bidirectional – voltage raising/lowering converter (Boost/Buck).</li> </ul>
<b>RO.21.</b>	<p><b>Method of electrodeposition of zinc-nickel alloy on stainless steel substrate</b></p> <p>Horațiu Vermeșan, Mihail Chira</p> <p><b>Technical University of Cluj-Napoca</b></p> <p>Patent OSIM: RO134133- B1/29.04.2022</p> <p>The invention relates to a method of zinc-nickel alloy electrodeposition on the stainless steel parts through several stages. Electrodeposition of zinc-nickel alloy on stainless steel is important in applications where stainless steel is in contact with a less noble metal. Electrodeposition of zinc-nickel alloy on stainless steel is used especially in the automotive industry. The method of electrodeposition of the zinc-nickel alloy on a stainless steel substrate according to the invention consists of: chemical degreasing (only if the parts are dirty, oily); washing in water; surface preparation in alkaline solution; washing in water and electrolytic zinc in alkaline Zn-Ni solution.</p>
<b>RO.22.</b>	

<b>Title EN</b>	<b>Method and sistem for attenuating the faults that appear in data processing units implemented using digital circuits</b>
<b>Authors</b>	Zsofia Lendek, Alexandru Amăricăi-Boncalo, Oana Amăricăi-Boncalo
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO134587- B1/28.10.2022
<b>Description EN</b>	The patent refers to a method and system for mitigating probabilistic errors that occur in digital circuit implementations where the data processing is based on addition, multiplication, and accumulation operations or can be decomposed into such operations. The system consists of two instances of the data processor connected in parallel, each consisting of the one hand of the block that implements the procedure, usually a mathematical rule, and on the other hand of the block for calculating the correction input, each having access and using the results produced by the other circuit. The method, according to the invention, involves the creation of a dynamic model that describes the current state of the circuit and the calculation of correction factors based on this model.

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<b>RO.23.</b>	
<b>Title EN</b>	<b>Intelligent automation system based on a distributed, reconfigurable and adaptive architecture</b>
<b>Authors</b>	Mircea Murar, Stelian Brad
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO129401- B1/30.08.2022
<b>Description EN</b>	The invention represents an enhanced system used to control and configure the functionalities of intelligent equipment and of the overall process. It is characterized by a rapid reconfigurable, adaptive and dynamic architecture which is capable to respond, using its resources, to any process or change in order to quickly and efficiently react to meet the requirements. Equipment's are endowed with a minimum level of distributed intelligence and communication options.

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<b>RO.24.</b>	
<b>Title EN</b>	<b>Composite plates of natural fibers and process used for obtaining it</b>
<b>Authors</b>	Iacob Florea, Daniela Lucia Manea



<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO134330- B1/30.06.2022
	The invention relates to obtaining composite plates made from natural fibers of sheep's wool intended for the thermal insulation of building constructions that meet the defining regulations for a thermal insulation material, and the process for obtaining them.
	Composite boards are made from a mixture of sheep wool fibers, mixed with glue (adhesive) and various binders (clay, Portland cement, plaster, hydrated lime, hydraulic lime NHL 3.5, lime, washable lime, starch, bone glue, and rosin).
<b>Description</b> <b>EN</b>	By removing the disadvantages of the wool-based insulation products, which come in different forms (mattresses or rollers), the innovative character of this invention consists in ensuring dimensional stability of the insulating material.
	The process of obtaining the plates consists in wool fiber loosening, wool dosing, hydrating it by spraying water into wool mass in an equal amount to wool mass, dosing the adhesive and binder, water, spraying the mixture into wool mass, pouring the mixture in-mold, the compression of the composite plate for 24 hours, its stripping and the compression interval of 48-72 h.

**RO.25.**

<b>Title EN</b>	<b>Desulfatization, optimization and application technique of the spent plates provided from car battery</b>
<b>Authors</b>	Simona Rada, Răzvan Opre, Andrei Pintea, Eugen Culea
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO134764- B1/30.12.2022
	The invention relates to a efficient desulfatization technique of the spent plates from a car battery in order to obtain optimized materials which can be used to make new electrodes for batteries. According to the invention, the recycling process is based on the melt-queching method, uses plates with high wear from a spent car battery and allows the conversion of sulfated phases into metal oxides.
<b>Description</b> <b>EN</b>	The process of regeneration and optimization of recycled electrode materials for the applications on batteries is realized by the adding of the suitable contents of nickel (II) oxide or cobalt (II, III) oxide.

<b>RO.26.</b>	
<b>Title EN</b>	<b>Process for obtaining nanocomposite food packages</b>
<b>Authors</b>	Anca Peter, Camelia Nicula, Anca Mihaly Cozmuta, Leonard Mihaly Cozmuta, Virginia Danciu, Gheorghe Lucian Baia, Gabor Kovacs, Alexandru Ciric, Mihaela Begea, Liliana Craciun, Grigore Craciun, Gheorghe Dutuc, Anca Falup, Wanda Ziemkowska, Agnieszka Jastrzebska, Patrycja Kurtycz, Ewa Karwowska, Ewa Miaskiewicz-Peska, Monika Zaleska Radziwill, Andrzej Olszyna, Antoni Kunicki, Karolina Sitarz, Magdalena Roslon
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent OSIM: RO130496- B1/30.08.2022
<b>Description EN</b>	<p>This invention relates to processes for obtaining intelligent food packaging which ensure the food preservation extend its shelf life. It is proposed a process of obtaining active packaging that ensures the preservation of as many types of food as possible, for a longer duration, both at the ambient temperature of 10-30° C and at refrigeration (0-10° C).The used raw materials were paper and polypropylene, respectively modified with nano-structured materials, such as:</p> <ol style="list-style-type: none"> <li>1. Mixed composite titanium dioxide - silicon dioxide modified with silver nanoparticles</li> <li>2. Titanium dioxide modified with gold nanoparticles</li> <li>3. Titanium dioxide modified with nitrogen and silver nanoparticles.</li> </ol> <p>The advantages of obtaining smart food packaging are:</p> <ul style="list-style-type: none"> <li>- it prolongs the shelf life of food products;</li> <li>- ensures the preservation of the properties of food throughout its storage in smart packaging;</li> <li>- stimulates the growth of lactic acid bacteria in dairy products packaged in smart packaging.</li> </ul>
<b>RO.27.</b>	
<b>Title EN</b>	<b>Innovative use of sheep wool and polyurethane foam for obtaining materials with sound-absorbing properties</b>
<b>Authors</b>	Ovidiu Nemeş, Simona Ioana Borlea (Mureşan), Ancuţa-Elena Tiuc, Gyorgy Deak
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00320/10.06.2022
<b>Description</b>	The aim of this work was to obtain materials with sound-

**EN** absorbing properties using sheep wool and rigid bicomponent polyurethane foam. Were obtained four materials composed of three layers, a layer of sheep wool previously processed by hot pressing at 80°C and 5 MPa, with final thicknesses of 2, 4, 6 and 12 mm; a layer of rigid bi-component polyurethane foam, with a thickness of 8....37 mm and a transition layer, 1...20 mm thick, resulting from the migration of polyurethane foam during the multilayer panel manufacturing process into the wool layer and/or the migration of wool into the polyurethane foam layer. Wool and polyurethane foam are the combination of sound insulation and sound absorption - wool absorbs sound and reduces it, and due to the rigid structure of polyurethane foam (closed pore structure), it does not allow sound to travel further, resulting in sound insulation. The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range 800 ÷ 3150 Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool.

**RO.28.****Title EN**

**Parallel robotic system for bilateral shoulder medical rehabilitation**

**Authors**

Paul-George-Mihai Tucan, Doina Liana Pislă, Liviu-Călin Vaida, Adrian Pislă, Bogdan George Gherman, Iosif Bîrlescu

**Institution**

**Technical University of Cluj-Napoca**

**Patent no.**

Patent application OSIM: A/00683/12.11.2021

**Description  
EN**

The invention describes a robotic system based on end-effector configuration for bilateral recovery of shoulder joint movements. The robot has 3 active joints needed to achieve flexion/extension, adduction/abduction of the shoulder and pronation/supination movement of the forearm. The system is intended for patients with brachial monoparesis resulting from an injury to the central nervous system or peripheral nervous system. The robotic system is suitable for rehabilitation of both upper limbs. The robotic system works with the help of three degrees of mobility achieved with the help of three active rotation joints whose axes intersect at the same point, which is materialized in the form of the center of rotation of the patient's shoulder undergoing robotic assisted medical rehabilitation.

<b>RO.29.</b>	
<b>Title EN</b>	<b>Reactive energy compensation method at the point of common coupling as secondary electronic function</b>
<b>Authors</b>	Sorin Ionut Salcu, Mircea Bojan, Mihai Adrian Iuoraş, Lucian Nicolae Pintilie, Petre Dorel Teodosescu
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00528/30.08.2022
<b>Description EN</b>	The invention is related to an alternating current supply grid, which serves electric consumers that may present reactive behavior. The main objective of the invention concerns the algorithm and method of managing the reactive energy in the mentioned grid type and their use for the control of an electronic converter that can compensate reactive energy. Moreover, the purpose of the invention is to increase the exploitation level of the total installed power of electronic AC-DC converters that mainly supply their own consumers, and to serve some secondary electronic functionalities for reactive energy compensation at the point of common coupling to the supply grid, by observing and modifying their behavior level.
<b>RO.30.</b>	
<b>Title EN</b>	<b>Electronic micro-inverter for energy conversion from photovoltaic panels</b>
<b>Authors</b>	Petre Dorel Teodosescu, Vasile Mihai Suci, Norbert Csaba Szekely, Alexandru Madalin Păcuraru, Mircea Bojan
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00527/30.08.2022
<b>Description EN</b>	The invention relates to an electronic microinverter structure, composed of a boost converter and a conversion stage from DC to AC, intended for electrical energy harvesting from renewable energy sources, such as the photovoltaic panels and its injection into the local or public alternating voltage grids. The electronic microinverter according to the invention uses a reduced string of photovoltaic panels with a maximum power tracking system, thus reducing losses due to partial shading, respectively by increasing the conversion efficiency from direct voltage to alternating voltage by using a three-level voltage converter and a half-bridge inverter.

<b>RO.31.</b>	
<b>Title EN</b>	<b>Workbench for automatic control of anesthesia</b>
<b>Authors</b>	Clara Mihaela Ionescu, Cristina Ioana Muresan, Eva-Henrietta Dulf, Isabela-Roxana Birs, Radu Adrian Munteanu
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00185/11.04.2022
<b>Description EN</b>	<p>The workbench allows the testing of different automatic control strategies in anesthesia. It consists of two main components: a patient simulator, respectively a control system to monitor the patient's vital signs, respectively to adjust the dosage of drugs automatically based on a control algorithm. The patient simulator is an application that simulates the effects of drugs (analgesics, sedatives, muscle relaxants) on the state of hypnosis, analgesia and neuromuscular blockade of a patient under anesthesia. The measured variables are transmitted to the control system, represented by a microcontroller. The advantages of the workbench consist in providing the analysis, optimization, testing and validation of a closed-loop control system to assist the anesthesiologist in the phases of induction, maintenance and recovery from anesthesia.</p>
<b>RO.32.</b>	
<b>Title EN</b>	<b>Sheep wool based modular panel and the method used for obtaining it</b>
<b>Authors</b>	Tünde-Orsolya Dénes, Daniela-Roxana Tămaș-Gavrea, Raluca Iștoan, Ancuța Elena Tiuc, Daniela Lucia Manea, Ovidiu Vasile
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00176/05.04.2022
<b>Description EN</b>	<p>The invention relates to a modular panel based on sheep wool fibers, and the method of obtaining it, in order to meet the requirements of quality in construction regarding noise protection and the sustainable use of natural resources. Each module consists of a triple layered panel, having a composition similar to that of sandwich panels. The structure of the layered panel is made of two outer layers of hydrated lime-based plates, which delimit a mattress made of sheep wool fibers placed between them.</p> <p>The weighted sound reduction index of the modular panel is <math>R_w (C;Ctr) = 38 (-2, -8) \text{ dB}</math>.</p>

The layered panels have high sound absorption coefficient values at low frequencies. The maximum value is 0.90 at the frequency of 524 Hz.

The coefficient of thermal conductivity of the layered panels is 0.077 W/mK.

<b>RO.33.</b>	
<b>Title EN</b>	<b>High throughput spacewire to – IEEE 802.11 bridge for on-board communications of space vehicles</b>
<b>Authors</b>	Emanuel Dumitru Pușchiță, Sandor Botond Kirei, Tudor Palade, Andra Elena Iulia Păstrăv, Rareș Călin Buta, Cristian Codău, Adrian Călin Fărcaș
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00200/19.04.2022
<b>Description EN</b>	The invention refers to a spacecraft radio communication bridge that allows the replacement of SpaceWire cable communication links between spacecraft equipment/systems with IEEE 802.11 radio communication links. The bridge is composed of the following major components: level translator, control unit, radio transceiver and an antenna array, the components being integrated on a PCB. The control unit is implemented on an FPGA and comprises a subsystem for managing the Space Wire cable link and a programmable system, respectively. The programmable system allows the subsystem to manage the cable link, control the radio transceiver, and coordinate two-way data transfer.
<b>RO.34.</b>	
<b>Title EN</b>	<b>Complex composite powder comprises iron coated with layer of iron oxide and then coated with fine particles of iron-silicon-aluminum or iron-aluminum or iron-silicon alloy</b>
<b>Authors</b>	Traian-Florin Marinca, Bogdan Viorel Neamțu, Florin Popa, Ionel Chicinaș
<b>Institution</b>	<b>Technical University of Cluj-Napoca</b>
<b>Patent no.</b>	Patent application OSIM: A/00413/14.07.2022
<b>Description EN</b>	A complex composite powder comprises iron with particle size of 10-200 $\mu$ m, coated with a layer of iron oxide, and then coated with composite layer (L2) of fine particles of iron-silicon-aluminum or iron-aluminum or iron-silicon

alloy. The ratio of iron and iron-silicon-aluminum alloy is 0.1-99.9%, and the amount of silicon and aluminum in the alloy is 0.1-30 wt. % and large areas of iron being embedded in a complex matrix based on aluminum oxide and silicon oxide which has areas/particles of iron-silicon-aluminum dispersed.

<b>RO.35.</b>	
<b>Title EN</b>  <b>Authors</b> <b>Institution</b> <b>Patent no.</b>	<b>Eco-inovative road concrete based on cement, glass frit and aggregate from recycled concrete waste for construction applications "BcR-G"</b> Ofelia-Cornelia Corbu, Attila Puskas <b>Technical University of Cluj-Napoca</b> Patent application OSIM: A/00618/10.10.2022
<b>Description</b> <b>EN</b>	The invention refers to a new eco-innovative and sustainable "BcR_G" Road Concrete based on high quality Portland cement with recycled waste from: 1) uncontaminated concrete in the form of alternative aggregate successfully replacing non-renewable natural aggregates, derived from the recycling of concrete waste, collected, sorted, washed, ground/sorted into 4/8 mm particle size fractions and 2) glass in the form of under-100 $\mu\text{m}$ powder, as a secondary raw material (1.39÷2.8)% of the cement quantity, solving an environmental pollution problem by reducing landfill waste and the exploitation of natural aggregate, with various applications in the field of construction, i.e. infrastructure, roads, platforms, pavements, etc. , becoming a composite material with high abbrasion resistance and high mechanical strength, for improving the quality of life through sustainable design.
<b>RO.36.</b>	
<b>Title EN</b>  <b>Authors</b> <b>Institution</b> <b>Patent no.</b>	<b>ToF normal estimation for pulse based ToF camera using CNN</b> Szilard Molnar, Levente Tamas <b>Technical University of Cluj-Napoca</b> Patent application OSIM: A/00292/30.05.2022
<b>Description</b> <b>EN</b>	A system and method for automatically computing spatial surface normals in 3D data from the pulse based Time-of-Flight (ToF) cameras is provided. Moreover, the system comprises a component which is using convolutional neural

network (CNN) for computing the normals of a 3D pointcloud sensed and returned from the ToF camera depth images. The CNN is based on the 3 channel composition of information which is trained on a large real and synthetic dataset, for which an automatic 3D point processing chain is used to determine the normals. During the evaluation mode, the CNN is able to compute the normals of the pointcloud from the ToF camera, ensuring a fast and robust normal estimation for the pointclouds.

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**RO.37.**
**Title EN**

**Modular and reconfigurable structure for a router gantry CNC machine**

**Authors**

Cornel Ciupan, Claudiu-Ioan Rusan, Mihai Ciupan

**Institution**

**Technical University of Cluj-Napoca**

**Patent no.**

Patent application OSIM: A/10073/2022

**Description  
EN**

The invention relates to a mechanical structure for a router gantry machine. The structure of the machine, made of extruded aluminum profiles, consists of two upright beds (M) connected by connecting elements (5) and a table (B) that can be placed at different heights, the uprights (M) having the guides placed at the top on which the gantry (G) moves, in the shape of a straight beam, which provides increased rigidity compared to a "U" shaped gantry.

By applying the invention, the following advantages are obtained:

- modular mechanical structure, simple and reliable, at a low production cost;
- increased rigidity in relation to the weight of the structure;

reconfigurable structure in relation to the dimensions of the parts and the type of operation (milling, laser or AWJ cutting).



## “Gheorghe Asachi” Technical University of Iasi

### RO.38.

**Title EN** **Synthesis of 4-aminobenzene-sulfatriazole**

**Authors** Cernătescu Corina, Mocanu Anca Mihaela

**Institution** “Gheorghe Asachi” Technical University of Iasi, Faculty of  
“Cristofor Simionescu” Chemical Engineering and  
Environmental Protection  
Innovative project

**Description EN** In order to increase the number of biologically active heterocyclic compounds, an original nitroderivative was synthesized, which was subsequently reduced to obtain the corresponding aminoderivative, with potential bioactivity and susceptible to subsequent condensation reactions with halogenated derivatives or substituted phenols. There are numerous heterocyclic compounds that are pharmacologically active and have significant applications in many common disorders. Triazoles derivatives have the potential to serve as enticing linker molecules that join two pharmacophores to create a novel bifunctional medication. As a result, these substances have grown more important and useful for creating bioactive molecules. The pharmacological effects of triazole derivatives include antibacterial, antioxidant, anticancer, antiviral, anti-inflammatory, and analgesic. Triazole moiety is present in many marketed medications.

### RO.39.

**Title EN** **RHEOLOGICAL STUDY OF COSMETIC CREAMS  
WITH BASIL EXTRACTS OBTAINED BY  
ULTRASOUND**

**Authors** Claudia Cobzaru, Cobiliță Cătălina Elena, Maricel Danu,  
Gabriela-Antoaneta Apostolescu,  
Ramona Tataru-Fărnuș, Corina Cernătescu\*

**Institution** “Gheorghe Asachi” Technical University of Iași,  
“Cristofor Simionescu” Faculty of Chemical Engineering and  
Environmental Protection, Romania

**Description EN** This study presents the rheological properties of cosmetic creams formulated with basil extracts that were obtained by ultrasounds. Rheological measurements showed that all of the analyzed cosmetic creams with basil extracts have a time-dependent pseudoplastic behavior. In the case of cosmetic

creams obtained in the laboratory, they are homogeneous, have a fine texture and a specific smell of basil, and on the other hand, they are moderately absorbed and give it long-lasting hydration and a velvety skin. In order to compare, from a rheological point of view, the extracts of basil were also added to a commercially purchased crude cream.

**RO.40.****Title EN**

Collaborative Online International Learning in Digital Fashion - DigitalFashion

**Authors**

Irina Ionescu, Manuela Avădanei, Emil Constantin Loghin, Andreea Talpă, Carmen Tiță

**Institution**

"Gheorghe Asachi" Technical University of Iasi, Romania / Faculty of Industrial Design and Business Management  
2021-1-RO01-KA220-HED-000031150

**Description EN**

The DigitalFashion project enables education providers to deliver new digital training methods, allowing students and professionals to quickly master key technologies for the design and production of customised products in a virtual environment and fully make use of the knowledge in the entire supply chain. This knowledge mainly lies on digitization which is both a common and an important topic to all the partner countries. Develop three databases (library of knowledge) of textile materials, colors and garment styles as well as two fashion knowledge bases that will be built and integrated into the platform. Develop a supportive platform that will permit fashion students and fashion teachers to design together, in an interactive way, a garment for a specific customer. The special requirements of the customer for the garment will also be communicated via the platform and taken into account in the final design.

**RO.41.****Title EN**

**Green reactive extraction process for vitamin B9 separation**

**Authors**

Alexandra Blaga, Lenuta Kloetzer, Dan Cascaval, Anca Irina Galaction

**Institution**

**Gheorghe Asachi Technical University of Iași**  
**"Grigore T. Popa" University of Medicine and Pharmacy Iași**

**Description**

Patent application No A00116/10.03.2023

Vitamin B9 is an essential component for human health, and its

**EN** separation using a green extraction procedure is critical to the pharmaceutical and chemical industries. The invention refers to a process for separating folic acid from aqueous media. This can be a novel functional and highly efficient separation method in chemical and pharmaceuticals industries for vitamin B9 production. The process, according to the invention, involves contacting the folic acid solution with the organic phase consisting of heptane and Cyphos 103 and stirring at 1200 rpm for 10 minutes. The subsequent separation of the phases is carried out by centrifugation at 4000 rpm. For the purposed process (recovery of vitamin B9 from diluted broths) using ionic liquids and heptane the efficiency of the process reached 99.56% for 120 g/L Cyphos 103 and pH 4 of the aqueous folic acid solution.

\* This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2021-0153, within PNCDI III

#### **RO.42.**

**Title EN** 2-Ketogluconic acid separation process using a phosphonium ionic liquid

**Authors** Alexandra Blaga, Alexandra Tucaliuc, Anca Irina Galaction, Dan Cascaval

**Institution** Gheorghe Asachi Technical University of Iasi  
"Grigore T. Popa" University of Medicine and Pharmacy Iasi

**Description EN** Patent application No. A00117/10.03.2023  
The important chemical compound 2-ketogluconic acid is produced physiologically by the bacteria Gluconobacter oxydans, Pseudogluconobacter saccharoketogenes, or Pseudomonas sorbosoxida and is used to make D-isoascorbic acid, a common dietary antioxidant. The invention refers to a process for separating 2-ketogluconic from aqueous media. The process, according to the invention, involves contacting the 2-ketogluconic acid solution with the organic phase consisting of heptane and Cyphos 103 and stirring at 1200 rpm for 10 minutes. The subsequent separation of the phases is carried out by centrifugation at 4000 rpm. For the purposed process using ionic liquids and heptane the efficiency of the process reached 90% yield for pH 3 and 160 g/L Cyphos 103.

\* This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2021-0153, within PNCDI III

**RO.43.****Title EN**

Development of functional sustainable products for children

**Authors**

Victoria Danila, Antonela Curteza, Stela Balan

**Institution**Technical University Gheorghe Asachi Iasi  
DM / 203338**Description  
EN**

The development of the sustainable functional product for children focuses on the requirements of use and its handling in clinical conditions. The design of the proposed product allows users to perform their manipulations quickly, which implies a reduction in time and less energy consumption. Therefore, the novelty and originality of the product is to provide a functional and sustainable support, which represents an advantage for users and the staff who care. The quality of materials and manufacturing processes, the functionality and efficiency of the product, the look and feel of the product were taken into account.

**RO.44.****Title EN****AR physics made for students (ARphymedes)****Authors**

Dorin Lucache, Cristian Gyoza Haba

**Institution**

Gheorghe Asachi Technical University of Iasi

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**Description  
EN**

To make physics in schools more accessible to students. Augmented reality (AR), unlike any other technology, provides an authentic, immersive and interactive learning experience for students. It brings a unique opportunity to draw the attention of students by enabling them to conduct an unlimited repetition of experiments, thus also making teachers less dependent on available resources and variable conditions in schools. We propose hands-on experience of a developed educational tool, which combines the use of a textbook and an AR via a smartphone application. By telling the story of the important historical milestones in physics, the newly developed tool will set the student on a path of exploration showing an evolution of physics in time, including presentation of significant events, with an opportunity to interactively test and experiment the presented issues. The developed tool goes even further by

explaining the technical application using 3D models and by offering the trials, where students can test their understanding and their technical skills.

This research was supported by the Erasmus plus Programme of the European Union Arphymedes, grant agreement number 2020-1-SK01-KA201-078391.

#### RO.45.

##### Title EN

#### **The Intelligent Detector For Radioactive Particles Spread Over Large Geographical Areas**

##### Authors

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OSIM RO A/00627 / 2019

##### Description EN

The intelligent detector for radioactive particles spread over large geographical areas refers to a method and a system for real-time detection of the presence of radioactive particles in the environment, interconnecting the universe of bees with their self-organizing capabilities as a carrier and transporter of radioactive particles with the universe of computers which processes information on their presence and nature and sends alert messages in case of radioactive contamination. Local computer network is based on Embedded Linux Machine with ARM processors. It contains a local computer network with ionizing radiation sensors (GM and SiPM), a weather micro-station module used to estimate the direction of movement of radioactive particles, a GPS module used to obtain information on the geographical location of the detector, a GSM module used to transmit alert messages in case of radioactive danger, a photovoltaic power supply module used to ensure energy autonomy. Experimental system use Layens beehives with 20 frames (440x340mm wide) and more than 70 000 bees and is located in the area of uranium mining in Tulghes-Grinties, Neamt County. The Layens hive is for successful overwintering

and rapid spring colony buildup even in the cold climates in Romania. As environment bioindicator, bees are an excellent/robust sensor. Computer network is based on Embedded Linux Machine with ARM processors. The project has been expanded with educational facilities to help researchers/teachers and students from Romania to participate at IAEA Research Activities or UNESCO-Guerlain program. This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI – UEFISCDI, project number 471/2020, within PNCDI III.

**RO.46.****Title EN**

**Antioxidant natural compounds from indigenous flora in combating skin oxidative stress**

**Authors**

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<sup>2</sup> **Technical University “Gheorghe Asachi”, Iasi, Faculty of Chemical Engineering and Environmental Protection “Cristofor Simionescu”**

**Description EN**

Skin oxidative stress and its pathological consequences are extensively studied and well documented. Along with new therapeutic solutions come multiple challenges in terms of pharmaceutical performances, consumer preferences and chemical engineering criteria for extraction and processing. Natural compounds from plants meet plenty of safety, therapeutic and biotechnological requests and represent a valuable, well-established still modern ingredients. This article presents a summary of the experimental research dedicated to certain indigenous Romanian plant sources, both spontaneous and cultured, with focus on extraction optimum methods and parameters, along with physico-chemical characterisation.

***Galium verum* L.** – rich in iridoid glycosides terpenes, polyphenols, polysaccharide complex, anthraquinones, acids, saponines, vitamin C.

***Crocus sativus* L.** – contains carotenoids, glycosides, monoterpenes, flavonoids, vitamins, aminoacids and apocarotenoids (crocin, crocetin, safranal, picrocrocin).

*Acmella oleracea*– with *spilanthol* as the most abundant active principle antiseptic, anaesthetic, analgesic and antioxidant agent. All the vegetal extract show evidence of their potential as essential ingredients for to modern, efficient dermato-cosmetic formulas.

**RO.47.****Title EN****Configurator of Technical Documentation for Learning in the Virtual Environment****Authors**

Carmen Tiță

**Institution**

"Gheorghe Asachi" Technical University of Iasi, Romania /  
Faculty of Industrial Design and Business Management  
PhD Thesis

**Description  
EN**

The Covid-19 pandemic has produced an important impact in education. The developed soft application has the accessibility of its students to the learning platforms, the quality of the information, the degree to which the materials have been adapted to the online format. The configurator of technical documentation for learning in the virtual environment has the role to facilitate the students' understanding of the links that are made between several disciplines within the Faculty-DIMA: Textile Structures, Weaving, Basics of Textile Technology, Construction and Modeling of Clothing, Technologies for Textiles, Design of Technological Processes for Textiles, Processes and Machines for Textiles, Quality Assurance in Garments, Patents have appeared for various elements of the product of men's shirt at EPO.

**RO.48.****Title EN****ADAPTIVE FACADE SYSTEM WITH PHOTOVOLTAIC FUNCTION AND INTELLIGENT SHADING****Authors**

Gabriel Tudora, Florina Pantilimonescu, Daniel Petrișor, Ana-Cristina Tudora

**Institution**

Gheorghe Asachi Technical University of Iasi  
Patent application No a 2022 00398, Romania

**Description  
EN**

The patent describes a facade system composed of modules with photovoltaic panels, each module capable of performing 360° rotations and adjusting colour and opacity. The facade system presents a highly efficient clean energy solution by producing electricity and simultaneously shading the interior space, thus acting in passive climate control. Moreover, it offers a diverse

and dynamic aesthetic to the building, bringing it closer to achieving the off-grid goals or Near Zero Energy. The modules would automatically align according to the sun and weather while generating electricity as well as climate controlling the interior of the building by adjusting their opacity and degree of shading. The aim is maximising the generation of electricity while rationalizing the energy consumption of the building and upholding both technical and architectural requirements. The invention has the following components: supporting network of tie rods (1) (2), modules (3) with translucent solar panel (14), electrical wiring for energy transportation (4), electrical wiring for monitoring and control of the modules (5), electricity collection subsystem (6) (7) connected to the central electronic circuit with the function of coordinating the individual panels and the role of collecting and distributing electricity (8), 2 servo-electric motors (9) (13), metallic frame with mounting brackets (10), photovoltaic panel and an LED system, monochromatic liquid crystal panel (14).

#### RO.49.

<b>Title EN</b>	<b>Development Of Organizational Innovation Capability By Delone And Mclean Model</b>
<b>Authors</b>	<b>Ștefana-Cătălina POHONȚU-DRAGOMIR, Ionut Viorel HERGHILIGIU, Adrian VILCU</b>
<b>Institution</b>	Gheorghe Asachi Technical University of Iasi, Romania The DeLone and McLean Model of Information Systems Success, belonging to William H. DeLone and Ephraim R. McLean, is a model measuring the success of the information system. Although this model is widely spread among both theorists and practitioners, fewer studies have been made on showing its impact on organizational innovation capability. The purpose of our study is based on a systematic literature review to bring to the attention of researchers and practitioners the gaps in the application of the success measurement model. Also, by presenting the application gaps, we want to advance the gaps within the model as well. Does this tool for measuring the success of the information system can influence the managerial decision-making process through the obtained results in the sense of adopting measures and implicitly implementing
<b>Description EN</b>	



them to finally reach organizational innovation? Using the model as a tool to measure success, the main actors in the decision-making process, the managers, can take, after analyzing the results, decisions to improve the information system that is still in development, a system that is always being perfectible. One of the managerial targets is represented by innovation, both at the level of the information system and every extent of the variable belonging to information, system, or service. In terms of a conceptual point of view, this study is the subject of a doctoral research program aiming to represent the first step before testing and validation in practice. Thus, the research will focus on testing all variables and their dimensions comprised within the model by taking them as individual relations and impacts.

#### RO.50.

##### Title EN

**Technical resilience - models, metrics, methods and algorithms**

##### Authors

Adrian VÎLCU<sup>1</sup>, Ionut Viorel HERGHILIGIU<sup>1</sup>, Ioan-Bogdan ROBU<sup>2</sup>, Marius PÎSLARU<sup>1</sup>, Ion VERZEA<sup>1</sup>, Victoria-Larisa IVASCU<sup>3</sup>, Cristina Maria HERGHILIGIU<sup>1</sup>

##### Institution

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<sup>2</sup>Alexandru Ioan Cuza University of Iasi

<sup>3</sup>Polytechnic University of Timisoara

##### Description EN

The concept of technical resilience has gradually become a methodology for evaluating the functioning of any technical system, a methodology that includes definitions, concepts specific to each technical field, metrics for approximating the resilient character (particular to each technical approach), analysis methods - based on artificial intelligence, algorithms. Thus, in the current research, we analyzed the resilience of 2 types of technical systems - one from the textile field - rolling mill and another from the mechanical area - honing machine. The resilience parameter, for both approaches, considers the failure events occurring within the technical systems, the time to remedy the effects produced by them, the time of good operation - the average time between two failures and the time to recover the essential functions of the two systems. In the first approach, the technical resilience character was approximated by the technical utility coefficient, and the method used for its calculation is part of class IA - neural networks. The resilience

character of the mechanical system was approximated by a mathematical relationship that involves the availability parameter calculated at the moments characterized by the defect, to which a regression method is applied to correspond to the resilient behaviour of the system over time.

The innovative character of the research is the application of a new metric (the technical utility coefficient) for evaluating the resilient nature of a technological system and through the methodology of analyzing the resilient character by analyzing the regression slopes of the resilience points calculated in the moments of failure, depending on time.

### RO.51.

#### Title EN

**Organizational sustainability score – probability approach using fuzzy logic**

#### Authors

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#### Description EN

Literature emphasized the importance associated to organizational performance assessment in terms of sustainability. Hence sustainability assessment requires a systematic, structured and integrated approach that considers all organizational sustainability aspects. Organizational sustainability evaluation represents likewise a complex approach, presented in literature as sometimes contradictory and unclear, but characterized by a current need for flexible statistical methods and techniques, which have a wider spectrum of applicability. The methodological approach associated to this research, is a statistical one. Hence, (i) the studied population definition and the analyzed sample is considered [final sample analysis includes 30 large Bucharest Stock Exchange companies], (ii) the variables are identified and the analysis models/ methods are chosen, (iii) the data used in the analysis are collected and statistical processed. In the last phase, using fuzzy logic, the probabilities diagram of obtaining an organizational sustainability score will be determined according to identified dimensions. Thus, the research results aim to

provide to decision makers an organizational viable perspective, and therefore to help them to identify what actions to take in order to make the organizational system sustainable.

**RO.52.**

<b>Title EN</b>	<b>Mechatronic Decontamination System used in textile recycling process</b>
<b>Authors</b>	Alexandra Bodoga, Andreea Nistorac
<b>Institution</b>	"Gheorghe Asachi" Technical University of Iasi
	Regardless of the recycling process (high temperatures, chemical and/or high pressure), the post-pandemic context requires decontamination step before starting any process for the safety of the human resource in any industry and the reintroduction of some used materials in a new cycle of life.
<b>Description EN</b>	The general objective of the ReTex project consists in the development of a decontamination method of the biological load of used footwear and clothing products intended for recycling and reintegration into the economic circuit using a mechatronic system.

**RO.53.**

<b>Title EN</b>	<b>Concrete modified with nanoclay and titanium dioxide nanoparticles with a positive impact on strength, durability, and sustainability</b>
<b>Authors</b>	Georgiana Bunea, Sergiu-Mihai Alexa-Stratulat, Ionuț-Ovidiu Toma, Petru Mihai
<b>Institution</b>	<b>"Gheorghe Asachi" Technical University of Iasi</b>
	The impact of nanoclay (NC) and titanium dioxide nanoparticles (TiO <sub>2</sub> ) on the material properties of cementitious materials was tackled individually. However, the two nanoparticles have complementary effects, which, when combined, lead to a more sustainable, durable, and resistant cement-based composite. Both nanomaterials succeed in filling concrete pores, thus decreasing the water penetration depth, the water absorption percentage, and the permeability coefficient. The corrosion resistance of the reinforcement is also increased. Due to their nanoscale size and large particle surface area, they provide more nucleation sites for the development of CSH crystals, which are the basis for strength improvement.
<b>Description EN</b>	Apart from the aforementioned properties, nanoclay particles succeed in reducing plastic shrinkage, when they are added to the composite.

Titanium dioxide is known to promote photocatalytic reactions when used in the cement matrix. It succeeds in cleaning the surrounding atmosphere by breaking down pollutants. It has been proven to improve the durability to chloride and sulphate ions and the resistance to freeze and thaw cycles. When subjected to radiation, the linear attenuation coefficient increases as the percentage of  $\text{TiO}_2$  particles increases within the concrete. However, the cost of using  $\text{TiO}_2$  particles at a large scale is very high, compared with nanoclay. Therefore, combining the nanoclay particles, with already proven pozzolanic effect, with the smaller inert  $\text{TiO}_2$  nanoparticles provides a more economical solution. The new nanoparticle-modified composite can be used in building construction in various types of environments, protecting the reinforcement, increasing the lifespan of the building, and reducing the quantity of pollutants.

#### RO.54.

<b>Title EN</b>	<b>Phosphating process for titanium alloy with Zn-Zr phosphate solution</b>
<b>Authors</b>	<b>Diana Petronela BURDUHOS NERGIS, Costica BEJINARIU, Andrei Victor SANDU, Petrica VIZUREANU, Nicanor CIMPOESU, Dumitru-Doru BURDUHOS-NERGIS</b>
<b>Institution</b>	<b>„Gheorghe Asachi” Technical University of Iasi</b>
<b>Description EN</b>	<p>The procedure described in the invention involves phosphating titanium alloys with phosphating solutions based on Zr and Zn to create porous thin coatings that can enhance the biological response of titanium implants by boosting osseointegration and enhancing corrosion and wear resistance. Through a phosphating process that includes grinding, degreasing, pickling, surface activation and phosphating phases, a coating of phosphate based on Zr and Zn is deposited. Also, the phosphating process parameters were changed to produce a homogenous layer that could enhance the titanium alloy's characteristics and lower the likelihood of implant rejection. The invention's applications have the following benefits: it can be applied quickly by immersion without using extra energy; it allows for the formation of layers with high adhesion to the substrate; the formed layers exhibit stability over time; and it enhances osseointegration due to the substrate's increased resistance to corrosion and wear as well as its morphological features that encourage cell adhesion.</p>

**RO.55.**

<b>Title EN</b>	<b>Clinically tested mechatronic devices for hand rehabilitation</b>
<b>Authors</b>	Poboroniuc Marian, Radu Ionascu, Roman Andrei, Piseru Andrei, Piseru Teodora, Alexandru Mitocaru, Alina Baciuc, Danut Irimia
<b>Institution</b>	<b>“Gheorghe Asachi” Technical University of Iasi</b> RO130961/30.08.2021 & Patent application No. 072/2017 The proposed system evaluates the flexion and extension of the hand, stimulates the increase of muscle strength, as well as the coordination of fine movements of the patient's hand. Fine motor skills such as precision, dexterity and coordination of the hand are improved too. The use of an exoskeleton type system for passive mobilization and functional electrical stimulation, with surface electrodes, improves the remaining voluntary movement the patients may perform. A comprehensive testing of the system functionality was carried out in a technical laboratory of the university, as a preamble for a first set of clinical trials at the Neurology Department of the Clinical Rehabilitation Hospital of Iasi. Clinical tests are still running. Among the 21 patients who participated in the clinical study, more than half of them had a good or very good evolution of the global motor deficit in the upper limb following the use of the proposed system (assessment performed by using the Fugl-Meyer-UE scale components II, III and IV of section A). The evaluation of the hand is performed with a novel grip force tracking system which effectiveness can be practically evaluated during the conference.
<b>Description EN</b>	

**RO.56.**

<b>Title EN</b>	<b>Installation for Wastewater Treatment by Photo-Sono-Chemical Methods</b>
<b>Authors</b>	Gabriel Dan Suditu, Mircea Teodor Nechita, Adrian Cătălin Puițel, Elena Niculina Drăgoi
<b>Institution</b>	<b>„Gheorghe Asachi” Technical University of Iasi</b> Patent application No. RO135064A2/2019 This patent aims to provide a small-scale industry ready complete system designed for wastewater treatment. The system's intended function is not simply the combination of three separate reactors and, hence, treatment modalities, but rather the achievement of a synergistic effect between them. A series of parameters directly affecting the removal efficiency were studied (flow rate, flow regime, stirring intensity, UV intensity, US frequency, inlet/outlet position). The system was successfully tested on various classes of pollutants such as: colorants (Eriochrome Black T, Methylene Blue, Bromocresol Green), pulp and paper residues (Black Liquor), antibiotics (Erythromycin, Rifaximin), and cyanides.
<b>Description EN</b>	

**RO.57.**

<b>Title EN</b>	<b>Device for continuous generation of bioactive solions</b>
<b>Authors</b>	SANDU I G; SANDU I; SANDU A; VASILACHE V; VIZUREANU P; EARAR K; STIRBU C M; CRISAN D R A; CHIRAZI M; STIRBU C; DROB A; BALAN G; HONCERIU C
<b>Institution</b>	<b>„Gheorghe Asachi” Technical University of Iasi</b> Patent application No. RO135064A2
<b>Description EN</b>	The invention refers to a device for the continuous generation of saline nanoaerosols of the Aitken type, which is based on the principle of operation of the filter with a wide conveyor belt in a closed circuit, framing three sectors in the form of an equilateral triangle, with sequentially differentiated distribution on three processes distinct: impregnation by light sorption from the supersaturated solution of halo-salts, extraction by vacuuming, with suction of dry air from the halochamber, dispersion by purging with hot and humid air in the halochamber. This device allows the achievement of optimal levels of bioactive solions (hydrated saline aerosols) for halocameras with multiple uses, such as: eliminating or stopping the formation of biofilms through microbiological contamination (virotic, bacterial, fungal, etc.) of prostheses during the manufacturing period, storage and implantation of bones and teeth, prevention and treatment of cardio-respiratory, osteo-muscular and psycho-motor conditions, as well as for improving the physical performance of children, the elderly and people who work under conditions of high effort or performance athletes.

**RO.58.**

<b>Title EN</b>	<b>Spark plug with double electrical discharge</b>
<b>Authors</b>	Dragoş-George Astaneî
<b>Institution</b>	<b>„Gheorghe Asachi” Technical University of Iaşi, Faculty of Electrical Engineering</b> EPO Patent no. EP3955400B1 / 2022
<b>Description EN</b>	This invention refers to the special design of a spark plug with double electrical discharge that may be used for all types of internal combustion engines having a spark-ignition system fueled by gas or other light combustion fuels, without requiring structural modifications of the engines. The double spark plug is composed by three electrodes (high voltage, ground and intermediate electrode) generating two electrical discharges and thus increasing the contact surface between the plasma and the air/fuel mixture compared to a conventional spark plug.

The main advantages of the double spark plug are: can be easily implemented on all types of internal combustion engines; increase the plasma volume (more than double compared to a conventional spark plug); promotes the rapidity and the quality of the combustion in order to reduce the fuel consumption and of the unburned hydrocarbon emissions; assures a qualitative combustion process and a high operation stability of the engine in difficult conditions as lean fuel mixtures.

## RO.59.

### Title EN

**Cosmeceuticals against skin oxidative stress - dermatocosmetic emulsions with plant-based bioactives**

### Authors

Claudia Maxim<sup>1</sup>, Simona Barna<sup>1</sup>, Adriana Trifan<sup>2</sup>, Valentina Zaharia<sup>1</sup>

### Institution

<sup>1</sup> “Gheorghe Asachi” Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Iași, România

<sup>2</sup> “Grigore T. Popa” University of Medicine and Pharmacy Iasi, Faculty of Pharmacy, Department of Pharmacognosy-Phytotherapy, Iasi, Romania

### Description EN

In recent times, consumers' interest for commercial products has been noticed, including cosmetics and personal care items with natural ingredients. The popularity of products that are natural, sustainable, and ecologically friendly is rising and the industry has been looking for natural alternatives to the synthetic functional ingredients. This study focuses on developing an innovative formulation for dermatocosmetic O/W emulsions comprising emulsifiers, emollients, humectants, and preservatives based on renewable raw materials. Dermato-emulsions were prepared using a non-ionic, non-ethoxylated emulsification system composed of cetearyl olivate and sorbitan olivate. As a dispersed phase, we use a mix of vegetable oils like Plukenetia volubilis Seed Oil, Vaccinium macrocarpon Seed Oil, Euterpe oleracea oil, and as a continuous phase Rosa damascena water hydrosol. The O/W emulsions contain an active complex with potential antioxidant activity based on a plant-derived monoterpene phenol, bakuchiol, and a peptide, n-prolyl palmitoyl tripeptide-56 acetate.

A preliminary assessment of the dermato-emulsions stability was performed through sensory analysis, conductivity, and optical microscopy. DPPH and ABTS assays were used to highlight the optimal concentration and combination in the formulation, in terms of antioxidant properties and safety level of the plant-based active complex. The results confirmed that emulsions possess good stability and compatibility of components over time. Also, the results from DPPH and ABTS assays showed that the proportions of the biologically active complex used in the formulation suitable for

topical use due to their antioxidant effect with the aim of decreasing skin oxidative stress.

**RO.60.****Title EN**

**Preparation method of ecofriendly geopolymer bricks reinforced with recycled glass fibers**

**Authors**

Dumitru-Doru BURDUHOS-NERGIS, Petrica VIZUREANU, Andrei-Victor SANDU

**Institution**

**“Gheorghe Asachi” Technical University of Iasi, Faculty of Materials Science and Engineering**

**Description EN**

The invention presents an innovative method of obtaining bricks and other types of precasts from geopolymer composites reinforced with recycled glass fibers. Moreover, the fiber-reinforced geopolymers are cured at room temperature and use coal ash as a raw material and recycled glass fibers to improve the flexural strength and remove the main limitation associated with the brittleness of the previously developed products.

Project “Network of excellence in applied research and innovation for doctoral and postdoctoral programs / InoHubDoc”, project co-funded by the European Social Fund financing agreement no. POCU/993/6/13/153437 and Project “Performance and excellence in postdoctoral research 2022”.

**RO.61.****Title EN**

**A new generation of metallic biomaterials for medical applications**

**Authors**

Madalina Simona BALTATU, Petrica VIZUREANU, Andrei-Victor SANDU

**Institution**

Faculty of Materials Science and Engineering, "Gheorghe Asachi" Technical University

**Description EN**

The scientific relevance of the project consists in the improvement of Ti alloys, by obtaining a new, original alloy system (Ti-Mo-Zr-Mn), which has properties suitable for the human body for biomedical applications (the alloy system is made up of biocompatible elements and will present improved mechanical properties, corrosion resistance, etc.) and which will remove the disadvantages of the existing alloys on the market (Ti6Al4V, CoCrMo alloys and stainless steels).

Project “Network of excellence in applied research and innovation for doctoral and postdoctoral programs / InoHubDoc”, project co-funded by the European Social Fund financing agreement no. POCU/993/6/13/153437 and Project “Performance and excellence in postdoctoral research 2022”.



## University Politehnica of Timișoara

### RO.62.

**Title EN** A-S-F super-aspirated air filter  
**Authors** Corneliu BIRTOK-BANEASA  
**Institution** Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara  
**Patent** POCU / 993/6/13/153437 (Postdoctoral Studies Programs / InoHubDoc)

### Description EN

This study presents a method for optimizing the intake system in the case of the internal combustion engine by implementing an axial super-aspirated air filter with special functions. The axial super-aspirated air filter has the following functions: capture, recovery, increasing the air speed and reducing the temperature. The advantages are the reduction of fuel consumption and polluting emissions. This paper was financially supported by the Project “Network of excellence in applied research and innovation for doctoral and postdoctoral programs / InoHubDoc”, project co-funded by the European Social Fund financing agreement no. POCU/993/6/13/153437

### RO.63.

**Title EN** EQUIPMENT FOR REDUCING OF HYDRAULIC INSTABILITIES GENERATED BY THE SWIRLING FLOW FROM THE CONICAL DIFFUSER OF HYDRAULIC TURBINES  
**Authors** Susan-Resiga Romeo Florin, Bosioc Ilie Alin, Tanasa Constantin, Stuparu Adrian Ciprian, Szakal Raul Alexandru  
**Institution** Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Mechanical Engineering, Hydraulic Machinery Laboratory  
**Patent** a 2022 00182, BOPI nr. 8/2022

### Description EN

The invention refers to a new equipment for eliminating/reducing the pressure fluctuations associated with the vortex rope, which appear at partial discharge in the conical diffuser of hydraulic turbines, especially those with fixed blades (ex: Francis turbines). The new equipment can be applied both in new hydropower plant constructions and in the case of existing ones. The main element of the invention is the so-called free runner, which connected to a

shaft passing through the turbine rotor, eliminates the rope vortex and the pressure fluctuations associated with it, which are very harmful to the hydraulic turbines. The major advantages of the invention are: simple construction and implementation as well as low maintenance costs. Furthermore, it does not produce any other negative effects on the flow in the conical diffuser or on the turbine.

**RO.64.**

<b>Title EN</b>	<b>Enhancing the cavitation erosion resistance of GX40CrNiSi25 - 20 cast stainless steel by surface TIG remelting</b>
<b>Authors</b>	Daniela COSMA (ALEXA), Ion MITELEA ,Ilare BORDEAȘU, Dragoș UȚU and Corneliu Marius CRĂCIUNESCU
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	PhD Thesis
<b>Description EN</b>	<p>This study aims to reduce the negative impact of cavitation erosion on the components of mechanical systems, using the TIG technique of surface local remelting</p> <p>From cast steel bars, GX40CrNiSi 25–20, (1.4848): EN 10295 having the chemical composition C = 0.38%, Cr = 25.20%, Ni = 20.8%, Si = 1.62%, Mn = 1.49%, Mo = 0.34%, P = 0.031%, S = 0.027% cavitation tests were performed . Their surface was modified from a microstructural point of view, by local remelting using the WIG technique, with non-fusible electrode and using welding currents of different intensities (Is = 100 A; Is = 150 A; Is = 200 A). The other technological parameters were kept constant: electric arc voltage, Ua = 10 - 11 V; welding speed, vs = 15 cm / min .; electric arc length, L = 2 mm; step between rows, P = 3 mm.</p>

**RO.65.**

<b>Title EN</b>	<b>Assessment of water resources using Landsat satellite imagery</b>
<b>Authors</b>	Codruta Badaluta-Minda, Mihai Valentin Herbei
<b>Institution</b>	<b>Politehnica University Timisoara; Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I</b>
<b>Patent</b>	February 2021, Vol. 20, No. 2, 301-308
<b>Description</b>	Observation of surface water is very important for studying

**EN** hydrological processes and last advances in satellite-based optical remote sensors have promoted the field of sensing surface water of a certain area or from a catchment area. GIS techniques were used to extract data NDWI, MNDWI, and AWEI indices from Landsat-8 satellite in images to evaluate their performances for the extraction of surface water. The objective of this research was to extract these surface water bodies from the hydrographic basin of river Barzava based on the indices resulting from the processing of satellite images after that, the obtained data are used for the purpose of finding correlation and regression equations between the reflectance of satellite image and the measured parameters of the water. Automatic water extraction index, introduced by addition and subtraction of bands with the coefficients. AWEInsh and AWEIsh can visually extract a large portion of the water pixels, eliminating most of the classification errors for shadows and other non-water surfaces, whereas AWEIsh is for removing shaded pixels and AWEInsh for the urban areas. The study highlights the coverage of areas with surface water bodies in the river basin, using high-resolution images, and the coefficient of correlation between NDWI, MNDWI, AWIR, and WIR was used as a statistical measure of successful the regression model to explain the variation of the observed data.

#### **RO.66.**

**Title EN** **Analysis and development of the experimental manufacturing process of porous ceramic filters for automotive industry**

**Authors** Robert BUCEVSCHI, Ana SOCALICI, Adina BUDIUL-BERGHIAN, Corneliu BIRTOK-BĂNEASĂ

**Institution** Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara

**Patent** PhD Thesis

**Description EN** The study presents the results obtained from research activities in the field of material engineering, activities focused on obtaining methods for porous ceramic materials intended for air filtration. The purpose of the experimental studies is the development and improvement of the manufacturing process for the filter element made by porous ceramic. The innovation presented by this concept of filter element is the exclusive use as a filtration medium of a

porous ceramic mixture. The disseminated results also show the influence of the obtaining process on the density and mechanical strength of the filter element.

**RO.67.**

**Title EN** Electric assisted self-adaptive hybrid transmission  
**Authors** ROMEO CĂTĂLINOIU, SORIN AUREL RAȚIU, IMRE ZSOLT MIKLOS  
**Institution** Coramex by Service Automobile SA, Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara  
**Patent** 00889/ 12.12.2019  
 The proposed solution refers to an implementation of patent application no. 00889/ 12.12.2019 and consists of a gearbox intended to equip vehicles with pedals. The gearbox is a mechanical reducer characterized by the fact that it provides assistance when pedaling through an electric motor, assistance that can be achieved in three modes: low, medium and high, self-adaptive depending on the value of the load torque that must be overcome. The major advantage is that changing gears becomes unnecessary.  
**Description EN**

**RO.68.**

**Title EN** Malware detection based on performance counters using deep learning classification models  
**Authors** Ciprian-Bogdan Chirila, Omar Mohamed  
**Institution** Politehnica University of Timisoara, CITT Politehnica 2020  
**Patent** TRL 2-3  
 Security exploits and subsequent malware is a challenge for computing systems. For detecting anomalies and discovering vulnerabilities in computing systems several methods are used: i) malware aware processors; ii) static program analysis; iii) dynamic program analysis. Malware aware processors require online hardware which is not always a practical and scalable solution. Static analysis methods imply automated static analysis tools that have a limited performance with a detection capability that not always meets the requirements of the project regarding the criticality of the application. Dynamic analysis on the other hand overcame static analysis in latest trends. In this trend  
**Description EN**

performance counters analysis are used in several approaches. Operating system performance counters are collected and stored as time series in two contexts: i) in the presence and ii) in the absence of malware. Ten deep learning models are used for time series classification. From the experiments we learned that 2 models are able to detect accurately the presence of malware in an infested operating system, while the rest of the models tend to overfit the data.

**RO.69.**

<b>Title EN</b>	<b>Charge/discharge/check characteristics of Ni-MH and Li-ion batteries</b>
<b>Authors</b>	Gidali Adrian, Simon Florin
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Sc Garage Training SRL, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	<b>didactic experimental simulator</b> Didactic simulator Hybrid Vehicle System (Toyota HSD - Hybrid Synergy Drive - serial/parallel), dedicated to the study and understanding of the operating modules of the various configurations existing in the structure of electric and hybrid vehicles:
<b>Description EN</b>	<ul style="list-style-type: none"> <li>- functional electric motors/generators MG1/MG2, synchronous-permanent magnets,</li> <li>- PowerSplit gearbox mechanism,</li> <li>- MG1 and MG2 control unit,</li> <li>- inverter/converter,</li> <li>- functional air conditioning electric compressor,</li> <li>- high voltage battery+ECU BMS - Battery Management System.</li> <li>- Li-ion 50.4V battery pack with built-in BMS (Porsche e-Formula).</li> </ul>

**RO.70.**

<b>Title EN</b>	<b>ISTRIBUTED SYSTEM AND METHOD FOR REMOTE TECHNICAL ASSISTANCE TO FLEXIBLE MANUFACTURING CELLS</b>
<b>Authors</b>	<b>Ioan Silea; Romina Druta</b>
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020</b>
<b>Patent</b>	A/2022/00047
<b>Description</b>	The invention refers to a distributed collaboration system,

**EN** which allows efficient communication between one or more experts remote technicians (usually in different locations of the manufacturer/supplier of a flexible manufacturing cell) and a operator located in the operating location of the flexible manufacturing cell.

In particular, flexible cells with machine tools, manipulators and robots are targeted.

The system is made up of intelligent devices that are the basis of the exchange of information between those who collaborate, video-indicator devices for guiding and visibly indicating, in real time to the assisted person, the various actions that must be performed, a device (similar to a joystick) through which the expert autonomously changes the position of the cameras remote video-indicators (ie located in the area of the flexible manufacturing cell).

Through the 4G/5G mobile network, the data package is transmitted from the specialist to the platform where it is found the operator who requires help (assistance, collaboration). This data package contains commands related to the real-time selection of any of the installed video-indicator assemblies, changing the video camera characteristics of the selected assembly (at/at in the area of the flexible cell for which assistance is provided), as well as commands related to the change the angle at which the video camera takes the flow of information.

**RO.71.**

**Title EN** **Morphology of non-metallic inclusions in continuously cast steel semi-finished products for the automotive industry**

**Authors** **Iulia Poenaru, Ana Socalici, Adina Budiul Berghian, Zaga Trišović, Corneliu Birtok Baneasa**

**Institution** **Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara; Academy of Technical Applied Studies, Belgrade**

**Patent** **PhD Thesis**

**Description EN** **Non-Metallic Inclusions are chemical compounds consisting of a combination of a metallic element (Fe, Mn, Si, Al, Ca, etc.) and a non-metallic one (O, S, N, C, etc.). The most common inclusions include oxides, sulphides, oxy-sulphides, phosphates, nitrides, carbides and carbo-nitrides. One of the essential points in steelmaking is the control of**

non-metallic inclusions from the morphological point of view, their composition, size, quantity and distribution. Reducing the occurrence of defects is a point of major importance as their correction or removal requires time and high costs. The purity of steel in non-metallic inclusions depends on the genesis (origin-source, formation, birth, therefore also the moment of appearance) and on the morphology of the inclusions (physico-chemical changes, structure and chemical composition). Industrial research focused on steel S 355 J2, according to EN 10025:2004. The developed steel is cast continuously in the form of billets with a diameter of 177 mm, semi-finished products intended for the manufacture of hydraulic cylinders in the automotive industry.

**RO.72.****Title EN****NON-STEEL REINFORCEMENTS  
FOR FIBRE REINFORCED CONCRETE****Authors****Andrei-Mihai BACIU, Imre KISS****Institution****Politehnica University of Timisoara, CITT Politehnica  
2020, Faculty of Engineering Hunedoara****Patent****PhD Thesis****Description  
EN**

One of the materials that is the basis of constructions around the world is reinforced concrete, a material with truly remarkable properties and strengths. Reinforced concrete is a combination of adequate reinforcement and concrete designed to work together to resist applied loads.

Properly placed reinforcement in concrete improves its compressive strength, the improper placement of the reinforcement designed to resist tension being one of the most common causes of structural concrete failures. In addition to its use to resist various tensions, reinforcements are used in concrete to minimize cracking, or more precisely, to promote numerous small cracks in place of fewer large cracks, in concrete structures.

Also, reinforcements are used in concrete to limit widths and control spacing of cracks due to stresses induced by temperature changes and shrinkage. Concrete with fibres is stable, resistant, durable and much lighter than normal concrete. Unlike concrete with fibres, normal concrete is prone to cracking and has a lower tensile strength. With the help of suitable additives, such as fibres, concrete types with

greatly improved properties are created.

### RO.73.

#### Title EN

**A COMPRESSION MOULDING PRESS USED TO PRODUCE PLATE COMPOSITE PARTS**

#### Authors

Mihai-Paul TODOR, Imre KISS

#### Institution

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

#### Patent

PhD Thesis

COMPRESSION MOULDING is one of the oldest manufacturing technique used to rapidly cure large quantities of complex fibre-reinforced polymer parts on a rapid cycle time. Compression moulding is a high-volume, high-pressure method suitable for moulding fibre or fabric reinforcements –unidirectional tapes, woven fabrics, randomly oriented fibre mat or chopped strand– into a polymer matrix material.

#### Description EN

In fact, the COMPRESSION MOULDING is a manufacturing process in which three-dimensional shapes are sandwiched between two matching moulds, using heat and pressure. The material is placed in a temperature controlled cavity – defined between two heated metal moulds mounted in pneumatic presses – then shaped under intense pressure and heat (from 120–2000C) until the part cures. Therefore, the process parameters includes moulding TIME, TEMPERATURE and PRESSURE.

Compression features fast moulding cycles and high part uniformity and it provides design flexibility and nice surface finishes. In addition, it is one of the lowest cost moulding methods compared with other methods such as transfer moulding and injection moulding, due to the labour costs are low, the trimming and machining operations being minimized.

We'll show how anyone can use this process to create plate composite prototypes using a composite moulding press, designed and realized within the faculty's Laboratory.



**RO.74.**

<b>Title EN</b>	<b>POST-CONSUMER ALUMINIUM SCRAP – A CHALLENGE IN ALUMINIUM RECYCLING</b>
<b>Authors</b>	Ciprian BULEI, Imre KISS
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	PhD Thesis
<b>Description EN</b>	<p>ALUMINIUM is one of the most recyclable materials, as it can be recycled over and over again, and is one of few materials that keeps its properties after recycling. It can be re-melted and used again and again in new products, making it an environmentally friendly metal and a sustainable material. This makes aluminium an excellent material to meet the needs and challenges of different products.</p> <p>Also, aluminium recycling offers advantages in terms of environmental and economic benefits. Therefore, more aluminium must be collected, sorted, and returned into the economy as new products. Aluminium recycling is the process by which various scrap aluminium can reuse in products after its initial production and involves simply re-melting these scraps.</p> <p>This work provides an overview of the basic aluminium recycling process, using postconsumer scrap in the melting process in few laboratory experiments. Typically, postconsumer aluminium scrap is a mixture of alloys and sometimes even a mixture of metals, the main sources for aluminium scrap being the packaging, technology, construction, and the transport industry. In our experiments, different aluminium scrap sources were considered: mixed packaging aluminium scrap and used beverage can scrap, aluminium from electric cables and aluminium from collected castings.</p>

**RO.75.**

<b>Title EN</b>	<b>RARE, DEFICIENT OR CRITICAL METAL RAW MATERIALS RECOVERY &amp; USE IN THE POWDER METALLURGY</b>
<b>Authors</b>	Andrei Vasile FODOR, Imre KISS
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	PhD Thesis
<b>Description</b>	ACCESS TO RAW MATERIALS is fundamental in a

**EN** functioning, modern and sustainable society. The technological development have increased global demand for many raw materials. Many of the critical metals are very important constituents in products, but they are rarely used in large volumes and are minor components compared with base metals (copper, zinc, lead, aluminium and iron). Modern technological developments and innovations generate increasingly complicated products that require access to a number of “new” raw materials. RECYCLING is very important to achieve resource efficiency and reduce environmental impact. However, the recycling rate for several of the critical raw materials is still low. Even with a very high recycling rate, recycling will not suffice to meet future demand. On another hand, the mining and metal extraction are only economically sustainable if they are profitable. This also applies to many critical metals that are usually extracted as by-products from other metal extraction and require their own processes in the mine, concentrator, metal production or metal refining. The monitoring of the situation and systems for the development of the RARE, DEFICIENT OR CRITICAL METAL RAW MATERIAL base and the results of research into the application of innovative technologies open up new opportunities and perspectives.

#### **RO.76.**

**Title EN** **The development of environmental monitoring sensors based on n-TiO<sub>2</sub>/p-CuMnO<sub>2</sub> oxide heterojunctions**

**Authors** Mircea Nicolaescu, Cornelia Bandas , Corina Orha, Carmen Lazău, Viorel Serban

**Institution** **Politehnica University of Timisoara, CITT Politehnica 2020, National Institute for Research and Development in Electrochemistry and Condensed Matter**

**Patent** PhD Thesis

**Description EN** In this scientific research, we investigated the use of an n-TiO<sub>2</sub>/p-CuMnO<sub>2</sub> semiconductor oxide heterojunction for the development of sensors aimed at environmental monitoring, specifically in the detection of UV radiation and CO<sub>2</sub> in the gas state. Various designs of sensitive modules were tested depending on the intended application. For UV detection, two distinct designs were employed. A simple and cost-effective device was developed by directly growing titanium

oxide on a titanium support, followed by the deposition of a layer of CuMnO<sub>2</sub>. Additionally, we utilized an FTO conductive glass substrate to create a transparent and self-powered sensor based on the oxide heterojunction, enabling the development of self-powered UV sensors. For gas sensing, we grew zinc oxide nanowires on a zinc substrate, and then deposited a layer of CuMnO<sub>2</sub> to achieve the behavior of the heterojunctions. Furthermore, the gas testing was conducted at 400 PPM CO<sub>2</sub> in an Ar carrier gas with varying testing temperatures.

**RO.77.****Title EN**

**Method of platinum recovery and capitalization from residual aqueous solutions**

**Authors**

Lupa Lavinia, Cochechi Laura, Țolea Nick Samuel, Lazău Radu

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020**

**Patent**

OSIM - A/00056/ 08.02.2023

**Description  
EN**

The invention relates to a method of platinum recovering from residual aqueous solutions by adsorption on new and efficient adsorbent materials, followed by their reutilization in the form of photocatalysts in the treatment process of waters containing undesirable organic compounds. The layered double hydroxides (LDH) of Mg<sub>3</sub>Al, respectively Zn<sub>3</sub>Al functionalized with ionic liquid, trihexyl tetradecyl phosphonium chloride (IL) are used as adsorbent materials. Functionalization of LDH with IL is done by ultrasonication or co-synthesis. The recovery of platinum from aqueous solutions is carried out by adsorption on the newly synthesized materials. The adsorption process proceeds in dynamic mode at a solid:liquid=1:1 ratio, stirring time 60 min, ambient temperature, using aqueous solutions with an initial concentration of platinum ions up to 500 mg/L. The recovery of platinum ions is carried out by using exhausted adsorbent materials with a content of up to 250 mg Pt/g in the form of photocatalysts in the treatment process of waters containing emergent compounds (Ci, dyes ≤ 50 mg/L, Ci, drugs ≤ 250 mg/L and Ci, phenolic compounds ≤ 200 mg/L). The photocatalysis processes take place at a ratio of aqueous solution: photocatalyst = 1 g/L, irradiation time 180 minutes, and ambient temperature. The proposed method is in

accordance with the European "green" agreement (European Green Deal: "Clean environment and zero pollution"), proposing a solution that falls within the closed cycle technologies of platinum recovery and revalorization.

**RO.78.****Title EN**

**MacPherson suspension study through numerical simulations**

**Authors**

PREDA Cosmin, BLEOTU Robert-Marian,  
PINCA-BRETOTEAN Camelia

**Institution**

**"Lucian Blaga" University of Sibiu, Politehnica University of Timisoara, CITT Politehnica 2020**

**Patent**

PhD Thesis

Summary

The purpose of this dynamic study by numerical simulations of the MacPherson strut suspension is to highlight the dynamic differences between the stock and heavy MacPherson suspension duty for the Volkswagen Jetta.

**Description EN**

One of the specific objectives of the paper is to compare the two types of springs, the stock with which the car is equipped at the factory and the modified one, the heavy duty variant. The second specific objective is to compare the two types of springs in relation to the two heights of the speed limiter (5 and 15 centimeters,) and the two types of tires (175/65 / R14, 195/65 / R15). The third objective of this paper is to perform a comparative analysis of the main components of a shock absorber assembly, statically through tests.

**RO.79.****Title EN**

**Micro mobile garden**

**Authors**

Pisleaga Mihaela, Adina Pascu, Gabriel Aranda  
**Politehnica University of Timisoara, CITT Politehnica 2020, GIS Community of Timișoara" Association, Delft University of Technology and Wageningen University & Research**

**Institution****Patent**

article EEMJ\_79\_Pișleagă\_23

**Description EN**

The latest UN report on climate change (IPCC) presents an urgent need to join forces to ensure a viable future for generations to come. More than 70% of the global population will live in cities by 2050, and we can contribute to a sustainable architecture of cities by strengthening the

relationship with nature. Using creativity and imagination, knowing the benefits of plants, how to grow them, how to maintain them and what we can use them for is the first step towards a sustainable future, towards green urban architecture. Growing plants can be both an enjoyable hobby and an activity that connects you with nature. Therapeutic (sensory) gardens have been known for a long time as necessary for recovery from trauma or ailments with the aim of maintaining an optimal mental tone. Aromatic plants, through their smell, taste, aromas, have a more intense effect, especially if they are cared for personally and can later be used in food. Using rainwater to water urban gardens is also a sustainable action against wasting resources and does not involve financial effort. The purpose of this presentation is to present the methods, results and conclusions of an educational project: Micro mobile garden, which aimed to reconnect students with nature. The case studies are carried out in two educational locations in the city of Timișoara, Romania

**RO.80.**
**Title EN**
**Device for measuring gas and air quality**
**Authors**

Gabriel Nicolae Popa, Corina Maria Diniș

**Institution**
**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**
**Patent**

Project

**Description**
**EN**

A device has been designed and built for measuring gases (LPG gas, methane, carbon monoxide, hydrogen, ammonia) concentration in the air, as well as measuring air temperature and humidity. The device uses four electrochemical gas sensors, an electrochemical sensor for measuring air quality, a sensor for measuring temperature and humidity that are connected to an Arduino development board that is connected to a 2x16 LCD display with six buttons and one electromagnetic relay. Each sensor (MQ types) usually measures more than two types of gas. The sensors also have a digital output that becomes 1 logic when a preset value has been exceeded, set from a potentiometer located on the sensor board. The analogue outputs from each sensor are connected to the analog inputs (A1, A2, A3, A4, A5) from an Arduino Uno development board. A 2x16 character LCD shield is connected to the Arduino Uno development board.

Arduino Uno's A0 analogue port is connected to the the LCD screen with six buttons. In addition, the device also uses a digital temperature and humidity sensor (DHT 11) which is powered between +5V and ground which has a pin through which the information (regarding temperature and humidity) is digital transmitted (serially) to the digital port 7 of Arduino Uno.

**RO.81.****Title EN**

**DC linear voltage-sinusoidal signal converter with adjustable frequency**

**Authors**

Gabriel Nicolae Popa, Iosif Popa, Sorin Ioan Deaconu

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

No. 130458/30.05.2022

**Description  
EN**

The DC linear voltage-sinusoidal signal converter with adjustable frequency provides a periodic sinusoidal signal at the output that depends on the DC voltages applied on two inputs: a DC voltage is applied to one of the inputs, which linearly modifies the frequency of the output signal, and on the other of the inputs applies a DC voltage which linearly changes the amplitude of the signal from the output of the converter. The DC linear voltage-sinusoidal signal variable frequency converter comprises seven functional blocks: two analogue multiplication circuits, two analogue difference circuits, one non-inverting amplifier and two integrated circuits.

**RO.82.****Title EN**

**Experimental stand for automotive CAN network**

**Authors**

Gabriel Nicolae Popa, Corina Maria Diniş

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

Project

**Description  
EN**

The stand contains a simulation block with digital and analogue inputs (which simulates a normally open switch - kick down acceleration and normally closed switch for the door; lighting measurement for light control; fuel level measurement; ambient temperature measurement; car battery voltage measurement) connected to an Arduino Uno (simulates an ECU 1), which is connected to a MCP 2515 CAN, which is a node for the CAN network that connects

via two wires (CAN-L, CAN-H) to another MCP 2515 CAN node in connection with an Arduino Nano (simulates ECU 2). A laptop is connected to the Arduino Nano (ECU 2, to display the information on several lines of information), through the serial port, to analyze the data transmitted from the Arduino Uno (ECU 1).

**RO.83.**

**Title EN** **Experimental stand with VAR regulator for low voltage installations**  
**Authors** Gabriel Nicolae Popa, Corina Maria Diniş, Angela Iagăr  
**Institution** **Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**  
**Patent** Project

**Description EN** The receivers of reactive energy are three-phase induction motors, power transformers and under-excited three-phase synchronous motors. Generators of reactive energy in electrical installations are overexcited synchronous motors, capacitors and no-load electrical cables. The load power lines have an inductive character. The experimental stand can be used to study on the improvement of the power factor, during deforming regime, in low voltage electrical installations with the specialized VAR-metric regulator. The ESTAmat RPR 12 regulator, which uses three-phase low voltage capacitor batteries, is specially designed to improve the power factor in electrical installations. When conducting the experimental measurements, a power quality analyser type CA 8334 B was used.

**RO.84.**

**Title EN** **Experimental stand with PLC, DC motor and incremental encoder**  
**Authors** Gabriel Nicolae Popa, Corina Maria Diniş  
**Institution** **Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**  
**Patent** Project

**Description EN** The PLC (programmable logic controller) is an electronic equipment used to automation of industrial processes. With the help of this device, combinational and sequential control installations can be realized in programmed logic (usually, using LAD or FBD). Sensors and transducers provide the information from the process, necessary to manage the

industrial process. Depending on the specifics of the industrial process, in addition to the PLCs, actuation elements such as: electric, pneumatic and hydraulic are used. Contactors are electrical devices used to supply electrical consumers.

**RO.85.**

<b>Title EN</b>	<b>Imagine and color recognition with the help of AI created in Python</b>
<b>Authors</b>	Robert MUTU, Mihaela POPA
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	Student Project
<b>Description EN</b>	The following project presents what can be achieved with image recognition and color recognition. Image recognition, in the context of machine vision, is the ability of software to identify objects, places, people, written texts, and actions in images. Computers can use machine vision technologies in combination with a camera and artificial intelligence software to achieve image recognition. Image recognition is used to perform many machine-based visual tasks, such as labeling the content of images with meta-tags, performing image content searches, and guiding autonomous robots, self-driving cars, and accident-avoidance systems. While human and animal brains recognize objects with ease, computers have difficulty with the task.

**RO.86.**

<b>Title EN</b>	<b>Recycling used batteries in the context of the circular economy of the industrial era 4.0</b>
<b>Authors</b>	<b>RUS Ioan Alexandru, mentors Eugen-Viorel NICOLAE, Corneliu BIRTOK-BANEASA</b>
<b>Institution</b>	<b>University of Pitesti, Faculty of Mechanics and Technology, Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	PhD Thesis
<b>Description EN</b>	Electric car batteries are a challenge for the world's electrified future. Automakers are investing billions in electrification, with the hope that the next generation of vehicles will be cleaner than their gasoline-powered predecessors. The International Energy Agency estimates that there will be 148-230 million battery-powered vehicles



worldwide, representing up to 12% of the global car fleet. Used batteries can be an opportunity for a greener car future. Global demand for batteries is expected to grow 14-fold by 2030, and the EU could account for 17% of this demand. This is mainly due to the evolution of the digital economy, renewable energy and low-carbon mobility. The increasing use of battery electric vehicles will make this market a strategic one globally. Li-ion battery recycling concerns exist in China, South Korea, Japan, the US, Canada and the European Union. Recycling processes include several stages: mechanical (shredding, cutting), pyrometallurgical (melting, pyrolysis) and hydrometallurgical, through which useful metals are separated and recovered. Currently, the amount of batteries that end up being recycled is estimated at 100,000 tons. This leads to the creation of an important market for recyclers or opportunities for material companies to become recyclers. The recycling of batteries from electric vehicles alone could reach 10% of the total recyclable volume in 2030, higher than the contribution of the mining sector.

**RO.87.**

<b>Title EN</b>	<b>Recovery of iron-containing waste in the steel industry</b>
<b>Authors</b>	Ana SOCALICI, Erika ARDELEAN, Marius ARDELEAN, Vasile PUTAN
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	Research project
<b>Description EN</b>	In the context of sustainable development, the resource efficiency, reuse and recycling of the steel in question of ferrous waste is very important for the steel industry. The efficiency and quality of raw materials and auxiliary materials is an integral part of the steelmaking process. The research project presents the results obtained from the processing of sludge (sintering sludge, sludge mill scale and ferrous sludge) resulting from the steel industry. From the point of view of the chemical and particle composition, the waste can be recovered by recycling, the choice of technology having to take into account all its qualitative characteristics. Experimental results lead to the conclusion that the waste analyzed can be processed by briquetting /pelletizing / agglomeration, which allows the recovery of waste with large particle size variation limits (desirable

below 2 mm). The composition of the recipes is determined according to the availability of small and powdery waste and the destination of the resulting by-products - steel industry.

**RO.88.****Title EN****GOLF 6 GTI EDITION 35****THE BEGINNING OF MY PROJECT****Authors**

Stefan RABULEA; Coordinators: Corneliu BIRTOK-BANEASA, Adina BUDIUL-BERGHIAN

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

Student Project

**Description  
EN**

My project is about the first steps that you must do in order to start tuning a 2.0Liter TFSI engine from the Volkswagen group and how to increase its power. The Volkswagen Golf 6 GTI Edition 35 is a special edition of the normal Golf 6 GTI, the anniversary for 35 years of the Golf GTI. It comes with the 2.0L engine from the Golf 6 R that outputs 235 horsepower (30hp less than the R to differentiate them). It also has a different turbocharger (K04) than it's normal version, gaining 25 more horsepower. The car is a forward-wheel-drive (FWD), but the Edition 35 also has a limited slip differential which helps with the traction. This specific car has a DSG automatic gearbox. My goal is to maintain the car in the best condition while I'll do some modifications to gain more horsepower and a better exterior look.

My project starts with doing the basic things when buying a second-hand vehicle:

- Engine oil and filters change;
- We also cleaned the lower crankcase and it looks like new;
- New DSG oil (for the gearbox) and filter;
- New timing chain, new timing belt, new chain tensioner;
- New spark plugs and the red ignition coils;
- New PCV Valve;

After the maintenance service, we also did some modifications for extra horsepower:

- Remus sport exhaust system

**RO.89.**

<b>Title EN</b>	<b>GOLF 4 1.9TDI. MY PROJECT FOR MORE HORSEPOWER</b>
<b>Authors</b>	Răzvan Antonio ARDEU; Coordinators: Corneliu BIRTOK-BANEASA, Adina BUDIUL-BERGHIAN
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	<p>Student Project</p> <p>My project starts with buying a new car, a simple Volkswagen Golf 4 with a 1.9Liter Diesel engine. Stock, it measured 116 horsepower (AJM engine code).</p> <p>This engine has a very good reputation in terms of modifying it for more horsepower as well as a very good reliability.</p> <p>The first things I did to the car were to make sure that the engine is in very good condition, so I changed the following parts for maintenance:</p> <ul style="list-style-type: none"> <li>-Timing belt;</li> <li>-Camshaft lifters upgrade;</li> <li>-Camshaft upgrade;</li> <li>-Cylinder-head bolt set upgrade;</li> <li>- Vacuum hoses.</li> </ul> <p>After that changes, I decided that it is the time to do some major upgrades to increase the cars` horsepower, stability and look. I started by replacing the stock exhaust with a new one that doesn`t have catalytic converters and the muffler.</p> <p>The next modification was to change the stock turbocharger (VNT15) with a bigger one from a 2.7Liter Diesel Audi (GTB1756VK). This bigger turbo helps with providing more horsepower. This new turbocharger needs to be cooled and the stock intercooler can`t do the job on such a big turbocharger, so replacing the stock intercooler was necessary.</p> <p>I bought a TurboWorks bigger intercooler (550x230x63), but this new one couldn`t fit in the original position. So I chose to place it at the front of the car, behind the front bumper. The stock clutch can`t support so much power, so it also needed a change.</p> <p>I decided to go from a double mass flywheel to a single mass flywheel, but the rest of the clutch parts are also brand new. This new flywheel is 7kg lighter than the stock one, so the car will have a faster acceleration.</p> <p>After all this modifications and a new software upgrade, the</p>
<b>Description EN</b>	

car measures 250 horsepower and 500nm of torque on the dyno test. In the near future, I will do a lot more modifications to the car.

**RO.90.****Title EN**

**Mercedes-AMG ONE**

**Authors**

Vlad-Nicolae-Cosmin CERTEJAN, Andrei-Alexandru CATANA; Coordinators: Corneliu BIRTOK-BANEASA, Adina BUDIUL-BERGHIAN

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

Student Project

Since the birth of Formula 1, engineers have been dreaming of bringing the supreme technology to the streets.

Mercedes-Benz, a brand of the Mercedes-Benz Group, has been involved in Formula One as both team owner and engine manufacturer for various periods since 1954.

The Mercedes-AMG Petronas F1 Team, which is based in Brackley, England, and possesses a German licence, as of 2022 majority owned by the Mercedes-Benz Group with Toto Wolff having a significant shareholding.

Mercedes returned to Formula One in 1994 as an engine manufacturer in association with Ilmor, a British independent high-performance autosport engineering company, which developed their engines.

**Description EN**

The company won one constructors' title and three drivers' titles in a works partnership with McLaren which lasted until 2009. Mercedes-Benz works on a vehicle that is inspired by the Formula 1 engine technology, peppered with superlatives road-legal racing car to emerge from Affalterbach.

Now the time has come. Here it is the Mercedes-AMG ONE. This car is a two-seater and will transfer the latest and most efficient Formula 1 hybrid technology almost like that one of the track, but this will be on the road.

The performance hybrid will produce over 1,000 horsepower at a maximum speed of over 350 km/h.

**RO.91.****Title EN**

**Solutions for breed the availability of the parallel gang shears assigned for cutting the metallurgical products**

**Authors**

Adina BUDIUL BERGHIAN

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

PhD Thesis

**Description  
EN**

This study proposed some solutions for the decrease of the unschedule stops of the 8000Kn shear with parallel gang assigned for cutting the metallurgical products. Analysis of data collected through observation of operation/failure of the shear allow construction of the so-called Pareto diagram, which is an analysis and assessment method that at the same time allow identification of several failures on which should be droved with priority. According to the results obtained by Pareto diagram, elements with the highest percentage of failure weight observation (19,67%) are the sliding plates which are mounted on the shear body, at the contact area of the upper slide.

Sliding plates are performed currently from CuZn37. As per gives obtained from exploitation and through the determination reaction from the translational couple is can caused the speed of effeteness volumetrically scilicet  $v=0,42380\text{mm}^3/\text{s}$ .

A proposal for the decrease of the speed of coupled respectively is the execution sliding plates from steel OL60 and these veneering with an alloy a cast-iron appointed sormait.

**RO.92.****Title EN**

**Moto Cross Enduro Beta by Razvan**

**Authors**

Razvan Dorian MAGDUT ; Coordinator: Corneliu BIRTOK-BANEASA

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

**Patent**

Student Project

**Description  
EN**

Beta motorcycles are known especially for enduro, cross and trial models. Beta, of Italian origin, is distinguished by the production of its own engines. Beta made a name for itself when in 1997 the brand launched its first enduro Beta RR 50.

At first, small mechanical as well as electrical, aesthetic problems were solved by replacing the damaged parts with some new ones. In the end, it was painted to have a more pleasant appearance and to extend the life of the motorcycle. The result is a special one.

**RO.93.**

<b>Title EN</b>	<b>Tractor Same Corsaro 70 by Lucian</b>
<b>Authors</b>	Lucian Nicolae HENTIU; Coordinator: Corneliu BIRTOK-BANEASA
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	Student Project
<b>Description EN</b>	Tractors play an important role in the life and development of mankind. Same, of Italian origin, stands out for its high durability and simple maintenance regardless of the season, thanks to the air cooling system. The model in question is a Corsaro70 from 1981, which through increased care manages to overcome the challenges to which it is subjected in agricultural work. To begin with, the small technical problems, both mechanical and electrical, were solved. Later, a semi-cab was made for the additional protection of the driver, consisting of a frame, front windows and a rigid upper roof.

Finally, the whole assembly was painted to have an appearance as close as possible to new condition. The result is a special one, thus extending the life of the machine.

**RO.94.**

<b>Title EN</b>	<b>Preliminary investigation of dye-sensitized solar cell for an optoelectronic neural network with zero electric power consumption</b>
<b>Authors</b>	Melinda VAJDA, Nicolae MICLAU, Daniel URSU, Marinela MICLAU
<b>Institution</b>	<b>Department of Applied Chemistry and Engineering of Inorganic Compounds and Environment Politehnica University Timisoara; Department of Condensed Matter National Institute of Research and Development for Electrochemistry and Condensed Matter Timisoara</b>
<b>Patent</b>	PN-III-P2-2.1-PED-2021-0624
<b>Description</b>	The transformative potential of artificial intelligence (AI) to

**EN** contribute to the achievement of a green transition, in especially a sustainable development of urban areas, “smart city”, has been increasingly and prominently highlighted. At the same time, digital technologies such as AI considerably increase energy and resource consumption and create risks of adverse environmental effects. In this context, the solar cells open a new perspective as the most suitable candidate for zero electric power consumption. The dye-sensitized solar cell (DSSC) has the essential characteristics that could make these cells the ideal candidate for artificial intelligence system with zero electric power consumption. This new perspective for AI devices which are the optically learning solar cells, have the potential to serve as building blocks for intelligent optoelectronics enabling visually interacting machines that operate at minimal power and zero electric power consumption, in both outdoor and indoor lighting conditions. Here, we report a preliminary demonstration that dye-sensitized solar cells loaded with ultraviolet (UV) dye and visible (Vis) dye could learn using illumination time as a cue.

**RO.95.**

**Title EN** **INSTALLATION USED FOR THE COLLECTION AND STORAGE OF THE MICROPARTICLES RESULTED FROM THE WEAR OF THE CAR BRAKES**

**Authors** Pavel Ștefan, Ungureanu Daniel-Viorel, Pascu Ioan-Bogdan

**Institution** **Politehnica University of Timisoara,**

**Patent** Patent - A/000805/09.12.2022

**Description EN** The invention refers to an installation intended for the collection and storage of the microparticles generated by the wear of the brake pads of autovehicles, in order to reduce the pollution and limit various respiratory ailments for humans.

**RO.96.**

**Title EN** **INSTALLATION FOR CLEANING LIGHTING FIXTURES WITH DIFFUSER, AND FLUORESCENT TUBES OR LEDs, MOUNTED ON THE CEILING**

**Authors** Pavel Ștefan, Ungureanu Daniel-Viorel

**Institution** **Politehnica University of Timisoara**

**Patent** Patent - A/000806/09.12.2022

**Description**  
**EN** The invention refers to an installation intended for the cleaning operation of lighting fixtures equipped with a light diffuser and fluorescent tubes or LED tubes, fixed/mounted on the ceiling.

**RO.97.**

**Title EN** **Method for obtaining a reinforced alveolar structure**  
**Authors** Emilia Dobrin, Sorin Muşuroi, G.-V. Mnerie, C.M. Matei  
**Institution** **Politehnica University of Timisoara, National Research & Development Institute for Welding and Material Testing - ISIM Timisoara**  
**Patent** A / 00078 / 20.02.2023

**Description**  
**EN** The process for producing reinforced alveolar structures according to the invention solves the technical problem presented and eliminates the disadvantages mentioned in that the structure obtained, with components produced by 3D printing, can be configured from the design phase according to the material used for printing, the intensity and orientation of the anticipated mechanical stresses and the mechanical strength imposed on the final product. The structure is composed of a 3D-printed semi-finished product and metal fabric reinforcement, the joining of the structure components is done by ultrasonic welding equipment after the printing material, polymer or polymer with reinforcing agent (composite) is deposited layer by layer in a cellular volume structure with a configuration (cell size and orientation) determined by the mechanical strength requirements of the final product. Eco-nano-technologies and advanced materials" (new generations of environmentally friendly materials) in applications in renewable energy, wind power plants, etc., in entities aiming at the construction of blades for wind power plants, respectively the construction of propellers for industrial fans

**RO.98.**

**Title EN** **Conceptual Design of a Plant for Anaerobic Biological Treatment of Sludge from the Process of Sanitary Wastewater Treatment**  
**Authors** Zaga TRIŠOVIĆ, Corneliu BIRTOK BANEASA  
**Institution** **The Academy of Technical Applied Studies Belgrade, Politehnica University of Timisoara Romania**  
**Patent** COST Action CA21112  
**Description**  
**EN** Greenhouse gas emissions and climate change are global problems. Solution is to reduce fossil fuel use and increase



the use of renewable energy. One of those renewable energy sources is biogas which is a flammable mixture of gases that consists mainly of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>). Anaerobic digestion (AD) is an ecological, naturally occurring process where, in the absence of oxygen (anaerobic), organic matter decomposes to form a mixture of gases known as biogas.

In this project a conceptual design of a plant for biogas production using sludge separated from the primary and secondary sedimentation from the wastewater treatment for a city with 50,000 equivalent inhabitants (EI) is shown. The production and use of biogas has multiple positive effects, from the point of view of environmental protection, the use of renewable energy sources, and support for the national economy.

#### RO.99.

**Title EN**      **EduFinUPT - Mobile Application for Acquiring Financial Skills**

**Authors**      Daniela-Nicolia Pătruț, Larisa Ivașcu, Mădălin-Dorin Pop, Matei Tămășilă, Alin Artene, Alexandra Coroian, Timea Cisma, Andrei Agache

**Institution**      **Politehnica University of Timișoara**

**Description EN**      This mobile application aims to provide the theoretical basis in the financial domain for engineering students and the appropriate mechanisms to keep them engaged throughout this learning process. The EduFinUPT application represents a tool through which the transition to a digital educational regime will be made in favor of students by creating a dynamic context, which would stimulate their interest in accumulating new knowledge, regarding a field with a rather large impact on their further development, namely, the financial field. This application offers the possibility of learning beyond the contexts already existing in classical education, therefore, learning in a mobile environment, where users use mobile phones as a method of convenience. The possibility of individual management of their free time for cognitive development may be an advantage. Compared to other learning applications, it provides evaluation tests that can help students verify their knowledge status at any time. This application includes a learning guide and a learning dynamic based on continuous assessment.

**RO.100.****Title EN**

**Modeling an innovative infrastructural framework for autonomous cars**

**Authors**

Ciprian Sorin Vlad, Larisa Ivaşcu, Iulia-Ioana Mircea, Eugen Roşca

**Institution**

**Politehnica University of Timisoara, Politehnica University of Bucharest**

**Patent**

Doctoral research project

The opportunity for dynamic testing, research, and development of level 3, 4 and 5 technologies in the field of autonomous mobility, road safety and smart infrastructure by modeling an innovative infrastructure framework, which, by replicating real-scale traffic conditions, will facilitate the advance technologically, positioning Romania in the role of regional leader.

With 98% of road accidents linked to human error, the widespread use of autonomous cars with level 5 technology is expected to help meet the EU's target of approaching 0 deaths by 2050.

**Description  
EN**

Modelling such an infrastructure will start with the building of the simulation and the proposed driving scenario. Afterwards, the proposed driving scenario will be moved to the virtual testing stage. The assumptions and success ratings achieved in the virtual environment will then be tested in real-world conditions on the infrastructure modelled with the aim of validating them. Following these steps, autonomous driving can be included on public roads in Romania.

It is imperative that Romania starts testing autonomous cars. This research project aims to outline the concept of modelling an infrastructure segment to enable such testing. The expected results directly influence the possibilities of developing level 3,4,5 technology in the field of autonomous cars, The identification of new smart infrastructure and connectivity solutions and the determination of road safety improvement parameters.

**RO.101.****Title EN**

**Flexible production line - experimental teaching stand**

**Authors**

Gelu-Ovidiu TIRIAN

**Institution**

**Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara**

<b>Patent</b>	Research project
	One of the ways to achieve the goals of Industry 4.0 to produce products customized in one-piece batches is to have machines, equipment, and assembly cells designed so that the entire assembly system is flexible, which is also defined by the reference architecture. Production resources must therefore be modularized.
<b>Description</b> <b>EN</b>	The entire assembly system is created in a decentralized manner, where the individual modules are designed as a separate cyber-physical system, a mechatronic system with its own control system and connectivity. The module should include a standardized interface so that the module can be connected to the assembly system and manufactured. Industry 4.0 defines this concept as "Plug & Produce". Modularity is important not only at the level of local automated equipment, but also at the level of machines, stations, assembly cells, or lines.

**RO.102.**

<b>Title EN</b>	<b>Continuous casting process optimization through the intelligent water flow regulation system for secondary cooling</b>
<b>Authors</b>	Gelu-Ovidiu TIRIAN
<b>Institution</b>	<b>Politehnica University of Timisoara, CITT Politehnica 2020, Faculty of Engineering Hunedoara</b>
<b>Patent</b>	Research project
<b>Description</b> <b>EN</b>	It was realised developed and implemented, meant to control the casting process by an intelligent fuzzy-type system, allowing the control of the water flow rate in the secondary cooling, by appropriate distribution along the cooling area. This necessity is imposed by the fact that actual control systems do not correlate in real time the variations of the multiple variables related to the continuous casting process and stick to a rigid distribution of the water flow rate on each cooling area. The intelligent system is capable of eliminating this shortcoming, by controlling in real time the distribution of the water flow rate according to the real situation in the installation, working as an adaptive system.

## „Lucian Blaga” University of Sibiu

### RO.103.

<b>Title EN</b>	<b>Greenhouse Insulation Against Losses through Ground Thermal Conduction</b>
<b>Authors</b>	Oprean Constantin, Oprean Letiția, Țițu Aurel Mihail, Bondrea Ioan, Mărginean Ion, Moldovan Alexandru-Marcel, Bogorin-Predescu Marcel
<b>Institution</b>	Lucian Blaga University of Sibiu Patent No. 128180 / 30.06.2020
<b>Description EN</b>	Greenhouse insulation against losses through ground thermal conduction for improving the structure of the vegetable and flower greenhouses' foundation by inserting special under-layers with thermal conduction insulation role to the basic earth shell starting from the construction phase.

### RO.104.

<b>Title EN</b>	<b>Ribbed C-frame</b>
<b>Authors</b>	Cioară Gheorghe Romeo, Dan Ioan, Țițu Aurel Mihail, Oprean Constantin
<b>Institution</b>	Lucian Blaga University of Sibiu Patent No. 129637 / 30.10.2018
<b>Description EN</b>	Ribbed C-frame, with high rigidity, open label, made in one piece by molding. The C-frame is provided on the inside faces of the two walls with ribs different disposed in relation to the horizontal plane of the press table: horizontally; vertically; tilted on the left; tilted on the right; intersected in the network; curved, the ribs being oriented along of the isoclines of the tension state that manifest in the side walls of the frame. The ribs may be equidistant or not. They were designed dozens of variants.

### RO.105.

<b>Title EN</b>	<b>Mechanically vulcanized press</b>
<b>Authors</b>	Pollner Cosmina Andreea, Cioară Gheorghe Romeo, Țițu Aurel Mihail, Oprean Constantin
<b>Institution</b>	Lucian Blaga University of Sibiu Patent No. 129635 / 30.10.2018
<b>Description EN</b>	The invention relates to a mechanically vulcanized press with two screws, for vulcanization of parts of different sizes and configurations. Typically, the vulcanized presses are hydraulically operated. Specific equipment is relatively

expensive and maintenance is costly. Oil loss may occur, which negatively (adversely) affects the environment and the appearance of the workplace. The mechanically vulcanized press is simple and robust, requires minimal maintenance and is very durable. The precision of the machine is not affected by the temperature generated during the vulcanization process.

**RO.106.**

**Title EN** **Procedure for obtaining of hempseed oil enriched with Hibiscus extract, resistant to thermo-oxidative degradation**

**Authors** Oancea Rodica Simona, Drăghici Olga, Perju Mirabela  
**Institution** Lucian Blaga University of Sibiu  
 Patent No. 133811 – 29.11.2022

**Description EN** The invention relates to a procedure for the improvement of thermo-oxidative stability of edible hempseed oil as rich source of polyunsaturated fatty acids (PUFAs) known for their human benefits, through the addition of a natural extract from Hibiscus sabdariffa. This procedure presents the advantage of lipid protection against oxidation and of rising shelf life of the product, thus increasing bioavailability of PUFAs. The invention has practical significance either through sustainable utilization of resources rich in bioactives for the development of extracts with strong antioxidant properties, or by application of sustainable technologies for reduction of the use of synthetic food additives.

**RO.107.**

**Title EN** **Study and analysis of sandwich panels for use in the construction of cabin roofs used on construction equipment**

**Authors** Robert-Marian Bleotu, Cosmin Preda  
**Institution** Lucian Blaga University of Sibiu  
 Ph.D.Student Scientific Research Project

**Description EN** Sandwich panels have shown great interest in recent years, the tendency of engineers is to replace heavy and rigid structures with light structures that allow good energy absorption and good deformation values. One of the areas that need these panels is the design of cabins used on construction machines that are used in an environment where there is a danger of hitting various objects with their roof

structure, thus putting the health or life of the operators at risk. The objective of this study is to replace the classic cabin roofs with lighter roofs and better material properties. In order to achieve this objective, finite element numerical analyzes were carried out on different structures: thin-walled tubes and sandwich panels. In order to validate the proposed objective, a comparison analysis was made between a cabin with a classic roof and a cabin with the new roof.

**RO.108.****Title EN****Optimization and study of the cooling performance for the brake disc****Authors**

Cosmin Preda, Robert-Marian Bleotu

**Institution**

Lucian Blaga University of Sibiu

Ph.D.Student Scientific Research Project

**Description  
EN**

For any type of existing vehicle, one of the most important systems in its structure is the braking system. It is also the main safety element, which stops the vehicle by converting kinetic energy into heat. For constructive reasons and thermal efficiency, ventilated discs are the most widespread and used in industry, therefore, they will also be used in this scientific paper. Ventilated discs are often used to automobile application because of their higher heat dissipation. The purpose of this work is to create a thermally efficient design for ventilated brake discs by adopting three different designs from a constructive point of view. A special importance was also for the brake disc material, initially a semi-metallic material was chosen, being the most used for discs, later the ceramic material was also chosen. The design variant for the brake disc, to which the disc material and the thermal shield are added, lead to a significant improvement from a thermal point of view, which was also the main objective of this work

**RO.109.****Title EN****Height-adjustable electric desk****Authors**

Cernea Daniela-Elena, Florea -Toader Denisa, Gliga Paul, Gresoiu Nicolae-Claudiu

**Institution**

Lucian Blaga University of Sibiu

Student Scientific Research Project

**Description  
EN**

The desk has quality aluminum legs, electrically adjustable in height, able to support up to 60 kilos. To make the work

easier, it includes 2 sliding rulers that can be used by designers, architects or amateurs such as sketching, painting, and many others to make their job simpler. There are also storage spaces and containers for used utensils, drawers for storage under the worktop, USB ports for charging the phone and cable organizer. Working with smart devices more and more nowadays, the desk has a scanner attached to it, that allows the user to convert the work documents into electronic file with help of bluetooth connection. The worktop of the office can be tilted up to 65. At the base of the aluminum legs there are wheels with stops, which allow the workplace to be moved quickly.

**RO.110.****Title EN** Heat recovery unit**Authors** Marcu Donna Elena**Institution** Lucian Blaga University of Sibiu  
Student Scientific Research Project**Description  
EN**

The chimney is encased in a water tank. The heat we lose down the chimney plays a very important role. It heats the water in the water heater. Thus the hot water from the chimney through the return pipe 2 enters the main return pipe of the thermoseminar. Through the return system the cold water returns to the thermoseminar and splits, a quantity going into the thermoseminar and a quantity into the chimney bottle. Thus we have another pool of water that is heated with the same amount of wood as the initial installation obtaining more heat, the losses decreasing considerably.

**RO.111.****Title EN** Electric engine with coil**Authors** Căpățînă Alexandru – Ionuț, Ciuntu Sebastian - Gabriel**Institution** Lucian Blaga University of Sibiu  
Student Scientific Research Project**Description  
EN**

Our project is about an electric engine with coil, also known as an induction motor, is a common type of electric motor used for a wide range of applications. Induction motors work on the principle of electromagnetic induction, where the current flowing through the stator coil generates a magnetic field that induces a current in the rotor coil. This creates a

rotating magnetic field that drives the motor shaft. One of the most significant advantages of induction motors is their reliability, durability, and low maintenance requirements.

Is it also highly efficient, with low losses and high-power output. Moreover, it is easy to control and are widely used in various industrial and commercial applications. However, it does require an external power source to operate, and its speed is dependent on the frequency of the input power.

#### **RO.112.**

**Title EN** **Semi-Automatic Cleaning Device**

**Authors** Cornea Gabriela, Cisteian Silvana Denisa, Bitea Alexandru Paul

**Institution** Lucian Blaga University of Sibiu  
Student Scientific Research Project

**Description EN** The device is powered by two Li-ion batteries, with a maximum capacity of 20000mA, mounted on the lower part of the support. It is equipped with a tank supplied with clean water and cleaning solution plus an electric pump that serves to create the necessary pressure and the water is sprayed through ten nozzles. The method of taking up the carpet is made by a system of rollers arranged all around, actuated by an electric motor, and the release of water is done through a process similar to rolling with the help of two cylinders positioned horizontally, the released water being taken over by a concave tray up to the gray water tank. To clean the press, there is a button built into the upper part of the device that can be easily operated.



## Stefan cel Mare University of Suceava

### RO.113.

<b>Title EN</b>	<b>SOCKET SAFETY SYSTEM</b>
<b>Authors</b>	Ilie NIȚAN, Cezar-Dumitru POPA, Laurențiu-Dan MILICI, Mihaela PAVĂL, Ciprian BEJENAR, Ovidiu-Magdin ȚANȚA, Mihai CENUȘĂ, Oana-Vasilica GROSU
<b>Institution</b>	Stefan cel Mare University of Suceava
<b>Patent</b>	Patent Application no. A 2021 00759 / EP 21464004.7 The invention relates to a socket safety system, intended for overheating protection of the power plug terminals and for increasing the force at the contact level, using a system consisting of two springs that ensure a firm contact.
<b>Description EN</b>	The invention consists of a solution that is actuated by nitinol springs in response to the increase in temperature, leading to their compression, ensuring an increase in force, and therefore a firmly contact with the coupling terminals.

### RO.114.

<b>Title EN</b>	<b>INTELLIGENT SYSTEM FOR GRIP ENHANCEMENT</b>
<b>Authors</b>	Laurențiu-Dan MILICI, Ciprian BEJENAR, Ilie NIȚAN, Oana-Vasilica GROSU, Dragoș-Ionuț VICOVEANU, Laura-Cătălina DOSPINESCU, Mariana-Rodica MILICI, Artiom MOLDOVAN
<b>Institution</b>	Stefan cel Mare University of Suceava
<b>Patent</b>	Patent Application no. A 2022 00670 The invention relates to an intelligent system for grip enhancement of the footwear sole, depending on the temperature of the movement surface and in relation to the environmental conditions, based on the temperature difference, in that it is equipped with a thermo-mechanical conversion mechanism with a specific constructive form.
<b>Description EN</b>	

**RO.115.**

<b>Title EN</b>	<b>SOLAR HEATING SYSTEM TO MAINTAIN BATTERIES CHARGED</b>
<b>Authors</b>	Laurențiu-Dan MILICI, Ciprian BEJENAR, Ilie NIȚAN, Mihai DIMIAN, Mahmoud ABU-BANDORA, Irina ALISAVETEI, Visarion-Cătălin IFRIM, Constantin UNGUREANU
<b>Institution Patent</b>	Stefan cel Mare University of Suceava Patent Application no. A 2022 00748 The invention relates to a solar heating system, integrable in the constructive structure of a vehicle, intended to maintain the temperature and/or charge level of the batteries. It disposes of, so that the phenomenon is controlled through the specific constructive form that facilitates the conversion of solar energy, both in thermal energy as well as in electrical energy and because the system involves thermo-mechanical actuators with autonomous operation, suitable in the automatic regulation of this process.
<b>Description EN</b>	

**RO.116.**

<b>Title EN</b>	<b>INTERLOCKING SYSTEM</b>
<b>Authors</b>	NIȚAN Ilie, MILICI Laurențiu-Dan, POIENAR Mihaela, CERNUȘCĂ Dumitru, PAȚA Sergiu Dan, PIANÎH Alexei, PENTIUC Radu Dumitru, POPA Cezar Dumitru, RAȚĂ Mihai, UNGUREANU Constantin
<b>Institution Patent</b>	Stefan cel Mare University of Suceava European Patent no. EP 3536880/2020 The invention relates to an interlocking system made on the basis of two elastic elements of Nitinol, intended to lock doors, shutters, in order to assure constructions or installations. According to the invention, the interlocking system consists essentially of two springs of Nitinol (1) and (2) attached to one end of the fixed plate (3), and at the other end of the movable plate (4) with the interlocking element (5), whose bi-directional displacement obtained by heating the springs, controls the position of two cams (6) and (7) by means of guiding canals (8), (8'), (8'') on the grooves (9), (9'), (9'') and leads to the locking or unlocking of the mobile element (12).
<b>Description EN</b>	

**„Grigore T. Popa” University of Medicine and Pharmacy  
Iasi, Romania**

<b>RO.117.</b>	
<b>Title EN</b>	<b>INTEGRATED SYSTEM BASED ON TEXTILE ELECTRODES USED IN ECG MONITORING</b>
<b>Authors</b>	LUCA Cătălina, FURCOI Elena, BULGARU Cătălina, FUIOR Rober, CORCIOVĂ Călin
<b>Institution</b>	University of Medicine and Pharmacy Grigore T Popa, Faculty of Medical Bioengineering, Iasi, Romania -
<b>Description EN</b>	We designed a simple medical device developed in the form of a T-shirt, to be used for the continuous cardiac monitoring of athletes. The system allows a quick assessment of the patient's general condition, of cardiac rhythm disorders, which can be easily detected. The innovative part of the project carried out by us is represented by the electrodes made of conductive textile thread.

<b>RO.118.</b>	
<b>Title EN</b>	<b>INTERACTIVE DEVICE FOR COGNITIVE RECOVERY USING DIFFERENT APPLICATIONS USING PERSONALIZED RECOVERY PROGRAMS</b>
<b>Authors</b>	Băeșu Andra-Cristiana, Fuior Robert, Luca Cătălina, Corciovă Călin
<b>Institution</b>	University of Medicine and Pharmacy “Grigore T. Popa” Iasi, Faculty of Medical Bioengineering
<b>Description EN</b>	Cognitive stimulation starts at an early age and aims to acquire the necessary knowledge and essential problem-solving skills. Games and toys help the little one to develop a healthy way of thinking. Toys should be chosen as best as possible, depending on his age and abilities. As early as the age of one year, children start to show interest in toys and especially in the effects produced by their actions on toys. As the child develops fine motor skills and hand-eye coordination, he will be interested in increasingly complex games with an important role in his cognitive development. From this point, the child will also develop a preference for

toys, often wanting to choose them himself. This system is intended for both analysis and treatment of various cognitive deficits of patients. Through the set of multi-colored push-buttons that are connected to the Arduino UNO development platform, which "runs" a software that identifies whether the buttons have been pressed correctly to score the final score. The therapy session takes place at work sessions of 15-30 minutes, 3-5 times a week

**Keywords:** physiotherapist, microcontroller, recovery, interactive application, feedback

#### RO.119.

**Title EN**

**NON-INVASIVE VEIN DETECTION DEVICE**

**Authors**

Daniela GOLDAN , Cătălina LUCA , Călin CORCIOVĂ ,  
Teofil Ilie URSACHE

**Institution**

University of Medicine and Pharmacy Grigore T Popa,  
Faculty of Medical Bioengineering, Iasi, Romania

-

**Description  
EN**

This prototype has as its first objective the identification of superficial veins through the emission and detection of the infrared beam to help the specialist doctor in the noninvasive diagnosis of venous pathologies. To detect the disease at an early stage, this new diagnostic technique can be used as a screening test in medical clinics. The prototype is noninvasive, has small dimensions, so it can be used in any medical institution, easy to use and inexpensive device.

#### RO.120.

**Title EN**

**New Surface Reactivity in Pathogenic Response to  
Different Compounds with Antimicrobial Activity**

**Authors**

Mădălina POȘTARU<sup>1</sup>, Alexandra TUCALIUC<sup>2</sup>, Alexandra  
Cristina BLAGA<sup>2</sup>, Dan CAȘCAVAL<sup>2</sup>, Delia TURCOV<sup>1</sup>,  
Anca-Irina GALACTION<sup>1</sup>

**Institution**

<sup>1</sup>“Grigore T. Popa” University of Medicine and  
Pharmacy of Iasi, Faculty of Medical Bioengineering,  
Department of Biomedical Sciences, M. Kogălniceanu  
11-13, 700454, Iași, România.

<sup>2</sup>“Gheorghe Asachi” Technical University of Iasi,  
“Cristofor Simionescu” Faculty of Chemical Engineering

**and Environmental Protection, D. Mangeron 71, 700050, Iași, România.**

**Description  
EN**

Antibacterial coatings are designed to prevent non-specific interactions with components of the biological environment by decreasing initial bacterial attachment and inhibiting biofilm formation in the early stages after contact. The adhesion of bacteria to material surfaces (which leads to the formation of biofilms) and the associated risk of their bio fouling represent a threat to public health, water purification, but also in the use of medical implants, textiles, biosensors, as well as food packaging and food storage.

The research work aims at determining the antibacterial activity of some surfaces impregnated with various compounds with presumed antimicrobial activity.

The experiments were carried out under anaerobic sterility conditions, to facilitate the development of the E.coli culture.

Using Petri dishes, the microbial culture was brought into contact with surfaces impregnated with antibiotics, essential oils, colloidal silver and iodine. The antimicrobial activity of the compounds used in the study was determined by the Kirby-Bauer diffusion susceptibility test.

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**RO.121.**

**Title EN**

**Gallic acid separation process through reactive extraction**

**Authors**

Alexandra Blaga<sup>1</sup>, Alexandra Tucaliuc<sup>1</sup>, Madalina Postaru<sup>2</sup>, Dan Cascaval<sup>1</sup>, Anca-Irina Galaction<sup>2</sup>

**Institution**

**“Grigore T. Popa” University of Medicine and Pharmacy Iași**

**“Gheorghe Asachi” Technical University of Iași**

Patent application No A00120/12.03.2023

**Description  
EN**

Gallic acid (3,4,5-trihydroxybenzoic acid) is a phenolic acid that is present in a wide range of plant species in their leaves, roots, flowers, or stems. In the food and pharmaceutical industries, it has a wide range of applications. The method described in the patent involves reactive extraction onto a biphasic organic-aqueous system using dichloromethane, 80 g/L Amberlite LA2 as the extractant, initial phase pH equal to 2, and 10% octanol as a phase modifier. The organic phase is regenerated at 323 K with sodium hydroxide, allowing gallic acid recovery from the organic phase and its simultaneous regeneration.

**RO.122.****Title EN****Improved production of fungal amylase using an oxygen-vector****Authors**

Alexandra Blaga, Lenuta Kloetzer, Madalina Postaru, Dan Cascaval, Anca Irina Galaction

**Institution****“Grigore T. Popa” University of Medicine and Pharmacy****Iași****“Gheorghe Asachi” Technical University of Iași**

Patent application No A00122/12.03.2023

**Description  
EN**

Using the strain *Aspergillus terreus*, n-dodecane has been studied as an oxygen-vector for enhancing the production of amylase. Due to oxygen's low solubility in the growth medium, particularly at high viscosities, continuous oxygen supply is necessary for aerobic microbial cultivation. However, the limitations of oxygen mass transfer in these systems can be overcome by the addition of water-insoluble substances that have a strong affinity for oxygen, namely oxygen-vectors. 2 times increase in enzymatic activity was obtained when using 5% n-dodecane at 35°C. The maximum amount of biomass was produced at 35°C in the absence of oxygen-vector, whereas in the presence of 5% vol. n-dodecane, the amount of fungal biomass increased by about 70%, shifting the optimal temperature to 40°C and producing an increase in enzymatic activity of 2.30 times. Also, the addition of oxygen vector to the fermentation broth had a good impact on the fungal morphological growth, resulting in larger pellets with a more compact structure as compared to the system without n-dodecane and a higher production of amylase activity.

**RO.123.****Title EN****Impact of physiotherapeutic procedures on synovial fluid rheological parameters in knee osteoarthritis****Authors****Ilie Onu<sup>1,2</sup>, Daniela Matei<sup>1</sup>, Ionela-Lăcrămioara Șerban<sup>1</sup>, Dan Cașcaval<sup>2</sup>, Anca-Irina Galaction<sup>1</sup>****Institution****1."Grigore T. Popa" University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering, Dept. of Biomedical Sciences, M. Kogălniceanu 9-13, 700454 Iasi, Romania,****2. Doctoral School of Faculty of Chemical Engineering and Environmental Protection “Cristofor Simionescu”, Technical University “Gheorghe Asachi” Iasi, 700050 Iasi****Description  
EN**

Knee Osteoarthritis (KOA), is a degenerative disease, and the main cause is a slow degenerative process that will eventually lead to disability. Synovial fluid (SF) has

a lubricating, trophic, and shock-absorbing role, but in KOA. SF loses its non-Newtonian properties and becomes a Newtonian fluid. A study was designed to show the influence of physiotherapy (PT) on the rheological properties of SF viscosupplemented with HA-based biopolymer. We conducted a study to compare the combined effect of PT and intra-articular HA injections versus intra-articular injections in patients with moderate KOA. Twelve patients entered this study divided into two groups, the pilot group (PG) received HA (3 MDa) viscosupplementation, and PT (n=7), and the control group (GC) (n=5) received injections only. For rheological evaluation, a rotational parallel plate rheometer Kinexus Pro+ heated to 37° was used, in which SF was subjected to a series of flow and oscillatory tests to determine viscosity and elasticity modulus at different shear rates. Initial measurements for GP and GC were performed with fresh SF extracted from the knee joint into which the HA product was previously injected. The same measurements were made with SF extracted after 6 weeks in which GP had PT and the GC had no further treatment. The elastic and viscous response of the SF in the GP has similar properties to the initial one, suggesting that the HA biopolymer has been maintained over 6 weeks without important degradation. GP patients have clinical and functionally improvements than GC and GP patients showed less degradation of the viscosupplemented SF than GC patients.

<b>RO.124.</b>	
<b>Title EN</b>	<b>Diagnosis of pediatric wrist trauma through Artificial Intelligence-assisted X-ray analysis</b>
<b>Authors</b>	GHEORGHITĂ Andrei, AROTARITEI Dragoș, MANEA Florian-Cosmin, FILIPESCU Andra
<b>Institution</b>	<b>Faculty of Medical Bioengineering, University of Medicine and Pharmacy Grigore T. Popa, Iasi, Romania</b> -
<b>Description EN</b>	Digital radiography is widely available and the standard modality in trauma imaging, often enabling to diagnose pediatric wrist fractures. However, image interpretation requires time-consuming specialized training. Due to astonishing progress in computer vision algorithms,

automated fracture detection has become a topic of research interest.

Wrist fractures, which prevalence increases with age, are one of the most common fractures. Wrist radiographs are routinely acquired to assess injuries around the wrist, distal forearm and the carpal bones, in the acute setting as well as in follow-up. This is also true in the pediatric population. Distal radius and ulna fractures account for the majority of pediatric wrist injuries with an incidence peak in adolescence.

The application developed aims to detect wrist fractures in children, helping pediatric surgeons in training or emergency physicians who often interpret trauma radiographs, sometimes without the support of experienced pediatric radiologists, as radiologist shortages have been reported, which poses a risk to patient care.

The application is based on the YOLO ("You only live once") algorithm that detects and recognizes different objects in an image, in real time.

#### RO.125.

<b>Title EN</b>	<b>Enhancing road safety by integrating face recognition and eye tracking for real-time detection of driver drowsiness</b>
<b>Authors</b>	GHEORGHITĂ Andrei, TURNEA Marius, ROTARIU Mariana, ANDRIESEI Mădălina, PAMPU Irene, DUDUCĂ Irina,
<b>Institution</b>	<b>Faculty of Medical Bioengineering, University of Medicine and Pharmacy Grigore T. Popa, Iasi, Romania</b> -
<b>Description EN</b>	<p>A very common problem worldwide in recent years is the drowsy state of drivers. Tiredness behind the wheel is a serious issue that can affect drivers' ability to drive safely and is one of the reasons in approximate 20% of road accidents. This can be caused by a variety of factors, such as lack of sleep, the monotony of the road, medication or stress. Under these conditions, the driver's performance decreases considerably, attention is reduced, the time of reaction is slower, and information processing is less efficient.</p> <p>Our project purpose is to develop a mobile application based on an intelligent alert system for drivers, which will ensure</p>



vigilance and contribute to reducing the number of road accidents due to tiredness behind the wheel. It can detect when drivers are starting to get drowsy and lead them to take a break before it's too late. The application uses Face Recognition and Eye Tracking, the main purpose being to identify if the eyes are closed, and to issue an alarm signal if the situation is confirmed, to alert the driver.

The developed system is a convenient solution because by using a mobile phone that is now accessible to everyone, we can prevent the risk of injury to drivers. Due to its ease of use and low cost, this application will be indispensable for any driver who covers significant distances.

#### **RO.126.**

##### **Title EN**

**NOVEL METHOD FOR PERSONALIZED HEEL INSOLE**

##### **Authors**

Sînziana Anca Butnaru-Moldoveanu<sup>1</sup>, Denisa Şmadici<sup>1</sup>

##### **Institution**

**<sup>1</sup>“Grigore T. Popa” University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering, Departament of Biomedical Sciences, M. Kogălniceanu 11-13, 700454, Iaşi, România.**

##### **Description EN**

People spend most of their time engaged in physical activities, with their feet in direct contact with different types of surfaces. As this happens, forces are exerted on the feet. An uneven distribution of these forces, called plantar forces, especially at the heel level, can lead to numerous issues, such as plantar fasciitis, that can affect overall health.

A novel method was developed that aims to correct and treat the uneven distribution of plantar pressure at the heel level through the usage of personalized heel insoles using innovative techniques and materials.

To achieve a better plantar pressure distribution, a plantar analysis was performed using a pressure plate. A 3D model of the heel insole was developed based on the plantar analysis and a 3D scan of the foot. Further modelling of the interior geometry of the insole and local density where high pressures were recorded, was done in a 3D printing slicing software. The model was 3D printed, using FILAFLEX 82A, 1,75mm filament (Recreus). The insert created is a personalized 3D printed heel insert, with different local

densities in the geometry created inside the insole in areas where high values of the plantar pressure were observed. The material used is a flexible thermoplastic polyurethane, which is non-toxic and is safe to use in contact with the skin. This technique facilitates the technician's work through optimized and digitalized processes, with lower final costs and much quicker than using standard methods, as well as making sure that better results for the patient are achieved.

<b>RO.127.</b>	
<b>Title EN</b>	<b>Atmospheric plasma source for winemaking: on the color of young wine</b>
<b>Authors</b>	Andrei Vasile Nastuta <sup>1</sup> , Ramona Huzum <sup>2</sup> , <sup>1</sup> <b>“Grigore T. Popa” University of Medicine and Pharmacy</b>
<b>Institution</b>	<b>Iasi, Faculty of Medical Bioengineering, <sup>2</sup>„Alexandru Ioan Cuza” University of Iasi, Interdisciplinary Research Institute</b>
<b>Description EN</b>	Applications of plasma discharges at atmospheric pressure (appj) are widely spread in industry, medicine and nowadays in agriculture; therefore, it is of great importance to characterize plasma sources from electrical and optical point of view, in order to fulfill the appropriate applications requirements.
	We use an appj for treating liquid media - fresh must (grape juice) in order to improve the storage / quality of wine.
	The plasma source was characterized via electro-optical methods and plasma-treated liquid medium was investigated by means of UV-Vis spectroscopy, ATR-FTIR and pH. The results favor the usage of plasma discharge for activating the medium / preserving (wine).
<b>Description EN</b>	R. Huzum, A.V. Nastuta, Helium Atmospheric Pressure Plasma Jet Source Treatment of White Grapes Juice for Winemaking, Applied Sciences, 11 (18), (2021), 8498

**RO.128.****Title EN****Rehabilitation Gaming Systems****Authors**

CONDURACHE Iustina, IONIȚE Cătălin, TURNEA Marius, ROTARIU Mariana, GHEORGHÎȚĂ Andrei  
Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", Street University, no 16, Iasi, Romania

**Institution****Description  
EN**

Stroke is one of the main diseases and the quality of life is loss of in the near future. The Rehabilitation Gaming System (RGS) is an effective rehabilitation tool that uses virtual games to address deficits resulting from brain lesions in patients who have suffered a stroke. The platform uses task-oriented game training, adjusts complexity levels to patients' abilities, and uses ENG sensing technology to record muscle contraction. The system is designed as a portable device which is a home-based rehabilitation platform that offers personalized functional rehabilitation. The system only requires a PC, EMG sensor, and a microcontroller. The Low-Cost Rehabilitation System combines deficit movement training with a variety of virtual reality-based video games tailored to individual patients. As patients perform different tasks, they are motivated to do more because game is based on high score winning. The training programs are optimized through analysis of the patient's performance and complexity can be adapted to the user. The data from each training session is sent to clinicians for analysis and can be used to optimize and adjust individual rehabilitation programs remotely.

**RO.129.****Title EN****Low-Cost Device for Bilirubin Measurement****Authors**

Daniela GOLDAN<sup>1</sup>, Teofil Ilie URSACHE<sup>2</sup>, Mihai ARON<sup>1</sup>, Cristian ROTARIU<sup>1</sup>, Gabriela Gladiola PETROIU<sup>1</sup>

**Institution**

<sup>1</sup>Grigore T. Popa University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering,

Dept. of Biomedical Sciences, M. Kogălniceanu 9-13, 700454 Iași, România

<sup>2</sup>Gheorghe Asachi Technical University, Faculty of

## Electronics, Telecommunications and Information Technology, Carol I 11A, 700506, Iași, România

Jaundice is one of the most common diseases and becomes visible when the serum bilirubin concentration exceeds 50  $\mu\text{mol/l}$  (1 mg/dl) and the integument and sclera become yellow.

Our device measures the amount of transcutaneous bilirubin absorbed by using a light source and a colorimetric sensor. The light source contains a RGB LED (SMD LED) which provides three wavelengths for measurement: 480nm, 500nm, 520nm. As a receptor we use a colorimetric sensor TCS-34725 and the provided blue light beam is emitted to the dermis where it is reflected. The ATmega328 microcontroller computes bilirubin by using three values acquires (R - red, G - green, B - blue). In order to see the results of the processing step the device shows the final values on OLED display. The system is powered and charged by a TP4056 LiPo charging module connected to a 200mAh LiPo rechargeable battery.

### Description EN

The calibration will be performed by using real bilirubinometer in order acquiring a calibration curve and the MatLab programming platform where we assigned correction values to each input.

The flowchart contains the working principal of the device algorithm. From the stand by state the user will press the device button for 5 second in order to turn it on. After that on the display it will show a welcome message and after 20 seconds that message will be cleared from the OLED. If in the measurement state an error occurred, on the display will shows an error message for 30 seconds. If no error occurred, the results will be displayed on OLED for 30 seconds. If the device is not used, it will turn back in the stand by state. The average current consumption for the device, running on microprocessor is 45  $\mu\text{A}$ . We calculated the life expectancy of the device on a sensor node and assuming that the Li-Po 3.7 V rechargeable battery still maintaining 170mAh until capacity is exhausted, we obtain 3.5 hours for a non-stop usage. The proposed device for non-invasive monitoring of transcutaneous bilirubin concentration use low-cost components, shows the result instantly, it is portable, accurate, easy to use and inexpensive.

**RO.130.****Title EN****New frontiers in treatment of skin oxidative stress****Authors**Delia Turcov<sup>1\*</sup>, Madalina Postaru<sup>1</sup>, Anca Zbranca-Toporas<sup>1</sup>,  
Anca-Irina Galaction<sup>1\*</sup>**Institution**<sup>1</sup>“Grigore T. Popa”niversity of Medicine and Pharmacy  
Iasi, Faculty of Medical Bioengineering, 700454, Iasi,  
Romania**Description  
EN**

It is already over 60 years since oxidative stress is a major point of interest in medical scientific research due to the increasing incidence of pathology induced and aggravated by this redox imbalance directly proportional to the modernization of society, lifestyle change and modification of environmental conditions. Oxidative stress in the skin is well described and holds a certain place in the etiology of many disorders and skin conditions. Among the therapeutic strategies there are ingredients that become ubiquitous in products with wide use, precisely to control the continuous impact of pro-oxidants on the skin structures, but also because the inclusion of anti-oxidants in products that are already part of the daily routine is a safe, simple and easy way to ensure the skin, ingredients needed for redox balance.

Among the well-known ingredients (vitamins C and E, resveratrol), there are molecules that have more and more support for inclusion in dermo-cosmetic formulas. Both synthetic and natural ingredients are used, and the arguments are related to increased bioavailability, low toxicity, optimized therapeutic performance and good profitability. All of this leads to inherent challenges related to optimal dosage setting, successful associations, good extraction and processing methods, well controlled sources, efficient formulation and textures appreciated by consumers.

This article presents an up-to-date classification of antioxidants used in dermo-cosmetics and arguments for further research to optimize formulas with natural ingredients.

**RO.131.****Title EN****EBSTEIN'S ANOMALY AND 22Q11.21  
MICRODUPLICATION SYNDROME****Authors**

Alina Costina Luca, Chirvasa Ioana

**Institution****Faculty of Medicine, Grigore T. Popa University of  
Medicine and Pharmacy****Description  
EN**

Ebstein anomaly is a rare congenital heart malformation characterized by tricuspid valve displacement and right ventricle myopathy. 22q11.21 microduplication syndrome is an emerging genetic pathology with variable cardiac phenotype. Up to this moment, the incidence and prevalence are under debate. Our aim is to present the management and follow-up of a patient with a rare congenital heart disease and discuss the genotype-phenotype correlations. Ebstein anomaly is a congenital heart disease, with a wide spectrum of presentation. The management of this anomaly is complex and require a multidisciplinary team involvement. Due to the different forms of this malformation, numerous surgical techniques have been developed, which allow to adapt the surgical approach to the treated case and improve post operative results.

**RO.132.****Title EN****NON-CANONICAL CLINICAL MANIFESTATIONS  
IN CHILDREN WITH MIS-C****Authors**

Alina Costina Luca, Ioana Alexandra Pădureț

**Institution****Faculty of Medicine, Grigore T. Popa University of  
Medicine and Pharmacy****Description  
EN**

MIS-C (systemic multi-inflammatory syndrome associated with SARS-COV2 infection in children) is a new pathology, which associates a higher degree of mortality than previously thought, with a prevalence difficult to appreciate in the context of the lack of unanimously accepted diagnostic criteria. Moreover, from our experience, it appears that patients with a history of SARS-COV2 infection tend to present with organ damage that does not comply with the paraclinical criteria established by the CDC and WHO. In

this context, we bring our contribution by presenting a case with non-canonical manifestations of MIS-C in order to improve the degree of correct diagnosis and treatment of these patients.

**RO.133.****Title EN****MEDICAL MANAGEMENT DIFFICULTIES IN THE COVID ERA****Authors**

Alina Costina Luca, Ioana Alexandra Pădureț

**Institution**

**Faculty of Medicine, Grigore T. Popa University of Medicine and Pharmacy**

**Description  
EN**

During the SARS-COV2 pandemic, the management of patients with congenital heart anomalies was hampered by the measures to combat the pandemic and the low or delayed addressability of cases. We evaluated the impact of SARS-COV2 infection on children with cardiac malformations both in the preoperative and postoperative stages, identifying unfavorable prognostic factors and therapeutic interventions aimed at improving the course of these patients.

**RO.134.****Title EN****Diagnostic surprise in a restrictive cardiomyopathy in the pediatric age****Authors**

Heidrun Adumitrăchioaiei, Alina - Costina Luca (Scientific Coordinator)

**Institution**

“St. Mary” Children Hospital Iasi -Cardiology Department, Iasi, Romania

“Gr.T.Popa” University of Medicine and Pharmacy, Iasi, Romania

**Description  
EN**

Maroteaux-Lamy syndrome lysosomal storage disorder with autosomal recessive transmission, chromosome 5 (5q13 - 5q14) is responsible, being the place where mutations occur in the arylsulfatase B (ARSB) gene with multisystemic damage over time and intracellular glycosaminoglycans, dermatan sulfate accumulate and chondroitin 4-sulfate. incidence ranging from 1:1.5 million to 1:43,000 live births. We present to you the case of a 16-year-old patient who

arrived at our Pediatric Cardiology department at the St. Mary's Children's Emergency Hospital in Iași complaining of fatigue, dyspnea and pain in the right hypochondrium with slow progression of symptoms. Echocardiography establishes the diagnosis of restrictive cardiomyopathy, mitral regurgitation I-II, tricuspid regurgitation gr I-II, Pulmonary regurgitation gr I-II. Based on the clinical and paraclinical examination, the diagnosis of idiopathic restrictive cardiomyopathy with onset of pulmonary arterial hypertension is made. Treatment with diuretics was instituted, with fluctuating evolution.

Restrictive cardiomyopathy is the least common cardiomyopathy among the pediatric population, 2.5-3% of all cardiomyopathies diagnosed in children, with the most unfavorable prognosis. Low compliance with treatment is responsible for high mortality rates.

Effective management of cardiac pathologies, knowledge of rare pathologies, multidisciplinary collaboration along with the introduction of echocardiography as a screening method are essential components for reducing pediatric morbidity and mortality

### RO.135.

**Title EN** **Obesity pandemic - independent risk factor for cardiovascular pathologies**

**Authors** Alina - Costina Luca, Heidrun Adumitrăchioaiei  
 “St. Mary” Children Hospital Iasi - Cardiology Department, Iasi, Romania

**Institution** “Gr.T.Popa” University of Medicine and Pharmacy, Iasi, Romania

**Description EN** Obesity has become a global health problem, with multiple chronic implications that affect quality of life, work capacity, and cause enormous costs due to multiple hospitalizations and treatment of associated conditions. We conducted a retrospective descriptive study conducted over a 14-year period, based on the total number of patients hospitalized in the Cardiology Department of “St. Maria” Children's Hospital of Iasi. Therefore, 1165 children included in the



study, were hospitalized here between 1st January 2006 and 1st January 2020. We measured epicardial fat thickness in all patients and found higher values in those with moderate and severe obesity (64.97%) and in those included in the 10+ age group (77.93%). 15.36% had hypertension, and 47.48% of these needed to medication together with diet and exercise. Excess weight is an independent risk factor for the cardiovascular system. They are closely related to endothelial dysfunction, abnormal geometry of the left ventricle, left ventricular systolic and diastolic dysfunction, increased arterial stiffness, left atrium dilation, atrial fibrillation and generally heart failure

Prevention of obesity is an important factor for the prevention of cardiovascular pathologies, and this prevention should start from preconception by educating women who wish to remain pregnant, continued during pregnancy and postnatally

**RO.136.**

<b>Title EN</b>	<b>The road from Bland-White-Garland Syndrome to Gangliosidosis</b>
<b>Authors</b>	<b>Heidrun Adumitrăchioaiei, Alina - Costina Luca</b> (Scientific Coordinator)
<b>Institution</b>	“St. Mary” Children Hospital Iasi - Cardiology Department, Iasi, Romania “Gr.T.Popa” University of Medicine and Pharmacy, Iasi, Romania
<b>Description EN</b>	Gangliosidoses is a rare autosomal recessive lysosomal storage disorder which occur due to inherited deficiency of human beta-galaktosidase and is part of sphingolipidosis. The disorder is caused by mutations in the GLB1 gene (3p22.3). an altered general condition to the cardiology department of the St. Maria Iasi Children's Hospital, and following the echocardiography, the suspicion of Bland-White-Garland Syndrome was raised due to the aberrant origin of left coronary artery from the pulmonary artery. We collected the enzymatic assay of GLB1 using dried blood spot (DBS) test (Sanofy-Genzyme). Alfa-Iduronidase was tested, Iduronate-2-sulfatase, Arylsulfatase B and Beta-

galactosidase, the latter having significantly reduced values, which led to the diagnosis of infantile type GM1 gangliosidosis, the most severe form.

The anatomopathological cardiac examination shows, macroscopically - cardiomegaly with hypertrophied left ventricle, the common origin of the brachiocephalic trunk with the primitive carotid artery and microscopically interstitial myocarditis with lymphocytes.

. Cardiovascular damage is often found in these storage pathologies, in some cases being the main factor leading to death, for this reason we consider it useful to introduce cardiovascular screening to all newborns

**“Carol Davila” University of Medicine and Pharmacy,  
Bucharest, Romania**

<b>RO.137.</b>	
<b>Title EN</b>	<b>HYALURONIC BASED MICROEMULSIONS FOR ACNE TREATMENT</b>
<b>Authors</b>	<b>Cristina Elena DINU-PÎRVU, Lăcrămioara POPA, Mihaela Violeta GHICA, Valentina ANUȚA, Răzvan-Mihai PRISADA, Bruno Ștefan VELESCU, Marina-Theodora TALIANU</b>
<b>Institution</b>	<b>„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA</b>
<b>Patent</b>	
<b>Description EN</b>	Acne it is a wide spread dermatological condition, with negative impact on the patient quality of life. The purpose of the invention is the obtaining of new hyaluronic based topical dosage forms (microemulsions with salicylic acid) for acne treatment. The invention advantage is based on the topical dosage form formulation process. The manufacturing method for a product with enhanced biocompatibility is unexpensive.

<b>RO.138.</b>	
<b>Title EN</b>	<b>NEW OXEPINES WITH ANTIMICROBIAL PROPERTIES</b>
<b>Authors</b>	<b>Vlad Ilinca Margareta, Limban Carmen, Nuță Diana Camelia, Chiriță Cornel, Marineci Dana Cristina, Ștefănescu Emil, Căproiu Miron Teodor, Drăghici Constantin, Dumitrașcu Florea, Chifiriuc Mariana Carmen, Măruțescu Luminița<sup>3</sup>, Avram Speranța, Dinu-Pîrvu Cristina Elena, Missir Alexandru Vasile</b>
<b>Institution</b>	<b>„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA</b>
<b>Patent</b>	
<b>Description EN</b>	The invention refers to a new oxepine derivatives that exert antimicrobial activity against bacterial strains (Staphylococcus aureus, Bacillus subtilis, Escherichia coli and fungal strain (Candida albicans). The compounds present potential for development of new antimicrobial drugs with minimal side effects on the human cells and tissues as antipathogenic strategy.

<b>RO.139.</b>	
<b>Title EN</b>	<b>Optimizing the institutional mechanisms for correlating the educational offer with the labour market demand for a successful career in the Health field - (GenResCom II)</b>
<b>Authors</b>	Bruno Stefan VELESCU
<b>Institution</b>	„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA
<b>Description EN</b>	<b>CNFIS-FDI-2023-F-0720</b>  The aim of the project is to support UMFCF Strategic Development Plan and strengthen the Institutional capacity to generate highly competent human resources by optimizing the institutional mechanisms to correlate the educational offer with the labour market.
<b>RO.140.</b>	
<b>Title EN</b>	<b>Developing the institutional capacity of UMFCF for transdisciplinary research and innovation in the field of innovative therapies- (INTERMED-III)</b>
<b>Authors</b>	Cristina Elena DINU-PÎRVU
<b>Institution</b>	„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA
<b>Description EN</b>	<b>CNFIS-FDI-2023-F-0708</b>  The project aims to develop the institutional research capacity, increase the performance, results and visibility of UMFCF in the field of innovative therapies by optimizing the research infrastructure, perfecting the human resource, coagulation of some research cores, as well as facilitating access and integration of students/masters/doctors in the activity of research.

<b>RO.141.</b>	
<b>Title EN</b>	<b>Development of entrepreneurial thinking through innovation and creativity in response to technological and digital transformations in health - DigiMed</b>
<b>Authors</b>	Silviu-Mirel PIȚURU
<b>Institution</b>	„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA
<b>Description EN</b>	<b>CNFIS-FDI-2023-F-0601</b>  The project aims to raise awareness of the importance of entrepreneurship education, by applying techniques specific to creativity and innovation, strengthening the skills and abilities of young students and graduates of the first three years of UMFC, which will lead to a better quality of life and better management of resources.
<b>RO.142.</b>	
<b>Title EN</b>	<b>SUPPORTING RDI EXCELLENCE IN HEALTH AND INCREASING THE COMPETITIVENESS OF "CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY TO ACHIEVE THE STATUS OF A EUROPEAN REGIONAL LEADER (EURO-MEDX)</b>
<b>Authors</b>	Cristina Elena DINU-PÎRVU
<b>Institution</b>	„CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY, BUCHAREST ROMANIA
<b>Description EN</b>	<b>33PFE/2021</b>  The goal pursued by this project is represented by the support of RDI excellence in the field of Health and the increase of „Carol Davila” University of Medicine and Pharmacy competitiveness in order to achieve the status of a European regional leader. The project is integrated into the institutional development strategy and involves the achievement of the following objectives: OP1. Support and development of RDI infrastructure OP2. Development of RDI skills of human resources OP3. Optimizing the administrative capacity in capitalizing on RDI results

## University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca

<b>RO.143.</b>	
<b>Title EN</b>	<p>„Composition of dental bleaching gel based on natural products.</p> <p>Moldovan Marioara*, Prejmerean Cristina*, Prodan Doina*, Silaghi-Dumitrescu Laura*, Saroși Codruța* , Cuc Stanca*, Dudea Diana**</p>
<b>Authors</b>	<p>*Universitatea Babeș-Bolyai, Institutul de cercetări în Chimie Raluca Ripan Cluj-Napoca</p> <p>**Universitatea de Medicină și Farmacie “Iuliu Hațieganu” Cluj-Napoca</p>
<b>Institution</b>	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca
<b>Patent</b>	131614/29.01.2021
<b>Description EN</b>	<p>The treatment of dental discoloration is mainly based on oxidative mechanisms and is currently done with peroxide-based substances. These are included in different concentrations in gels or rinsing solutions, which explains the varied treatment protocols associated with whitening treatments.</p> <p>The object of the present invention is the technological flow of obtaining a range of new products intended for teeth whitening based on organic acids from natural extracts from fruits and vegetables enriched with nanopowders. Using fruit and vegetable extracts concentrated by lyophilization allowed the structural diversification of cosmetic dental products. The nanopowder manufacturing technology is based on a mixture of hydroxylapatite (HA) and hydroxylapatite with oxides and fluor (HA-ZnO, HA-TiO<sub>2</sub>, HA-SiO<sub>2</sub>, HA-F), ensuring remineralization of the teeth,</p> <p>The gels have the following characteristics: appropriate consistency can be maintained on the dental arches in individualized trays, increased biocompatibility due to active compounds from natural sources, water solubility, easy to remove by washing from the tooth surface, efficiency in whitening teeth in case of extrinsic discoloration, the possibility of remineralization of hard dental tissues, lower cost than the traditional peroxide-based whitening materials.</p> <p>The products were obtained via an interdisciplinary activity by a group of researchers from the University Babeș Bolyai - Institute of Chemistry Raluca Ripan and the University of Medicine and Pharmacy Iuliu Hatieganu, Cluj-Napoca</p>

<b>RO.144.</b>	
<b>Title EN</b>	<b>Procedure For Obtaining Functionalized Nanostructures With Applicability In Colon Cancer Treatment</b>
<b>Authors</b>	Mocan Teodora, Matea Cristian, Iancu Cornel, Agoston Vas Coldea Lucica, Tăbăran Flaviu, Mocan Lucian.
<b>Institution</b>	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca
<b>Patent</b>	<b>131845 / 2020</b>
<b>Description EN</b>	The invention relates to a process for preparing a product to be applied in targeting the neoplastic cells in colon cancer and rendering the photo-thermal effect selective. According to the invention, the process consists in preparing, in the first stage, gold nanoparticles stabilized with citrate, which is then replaced with thioctic acid, after which they are functionalized by covalent binding with anti-MUC-1 antibody, after which the so-functionalized nanoparticles are subjected to successive stages of centrifugation and redispersion by ultrasound treatment in double distilled water for removing secondary reaction products.
<b>RO.145.</b>	
<b>Title EN</b>	<b>Investigation method for the predisposition to enhanced inflammatory responses based on cytokine production during urate in vitro exposure</b>
<b>Authors</b>	Joosten Leonardus Antonius Bernardus, Crișan Tania-Octavia, Popp Radu Anghel, Rednic Simona
<b>Institution</b>	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca
<b>Patent</b>	Patent application No. A/00547/2020
<b>Description EN</b>	The invention refers to a further investigation of the predisposition for the development of an accentuated inflammatory response based on the production of cytokines, following exposure to uric acid, in vitro, with applicability in the stratification of patients with hyperuricemia. The method, according to the invention, consists in applying a protocol for the stimulation of peripheral mononuclear cells, by pre-exposing the cells to uric acid for 24 h, followed by washing out the uric acid and restimulating the cells with lipopolysaccharide for cytokine induction, after which it is interpreted. Tracking the magnitude of inflammatory cytokine production relative to anti-inflammatory cytokines, such that an almost 2-fold increase in IL-1beta production in response to the addition of 50mg/dl uric acid versus negative control in hyperuricemic patients , compared to normouricemic controls, includes the patient with hyperuricemia in the suspected group with predisposition to inflammatory syndrome.

**“Alexandru Ioan Cuza” University of Iasi**

<b>RO.146.</b>	
<b>Title EN</b>	<b>Fraud Risk Analysis and Assessment in Financial Auditing under the Covid-19 Influence</b>
<b>Authors</b>	Georgiana BURLACU <sup>1</sup> , Ioan-Bogdan ROBU <sup>1</sup> , Ionuț Viorel HERGHILIGIU <sup>2</sup> , Adrian VÎLCU <sup>2</sup>
<b>Institution</b>	<sup>1</sup> <b>Alexandru Ioan Cuza University of Iasi</b> <sup>2</sup> <b>Gheorhe Asachi Technical University of Iași</b>
<b>Description EN</b>	<p>Financial fraud is an issue with far reaching consequences in many industries, corporate sectors and for ordinary consumers. In the context of the Covid-19 pandemic, financial fraud is becoming more and more present in most fields of activity. The COVID-19 pandemics, which caused a strong shock to the economic environment and not only, had the consequence of finding new solutions to carry out economic and financial activities under as normal conditions as possible. One of these is represented by the acceleration in using digitalization in financial services, increasing the risk of being vulnerable to financial fraud, which has determined new challenges in their effective detection. The purpose of this study is to highlight the main aspects of the specialized literature on the subject of fraud risk, for its analysis and assessment. The objectives proposed in this study aim to present the concepts of financial fraud and fraud risk, and to develop a new risk assessment methodology. For a sample of entities listed on the Bucharest Stock Exchange regulated market in the period 2016-2021, this study aims to obtain a financial profile for the entities that could be subjects to financial reporting fraud or asset misappropriation, using advanced statistical methods.</p>



**RO.147.****Title EN**

**The Relationship Between Nurses' Employment Welfare Conditions and Their Job Satisfaction in Israel**

**Authors**

Milana Mazal Mazor, Florin-Alexandru Luca

**Institution**

**University Alexandru Ioan Cuza, Doctoral School / Gheorge Asachi Technical University Iasi**

**Description  
EN**

Developing a model of an optimal welfare system for nursing staff in a hospital.

The study was carried out in 3 government hospitals in Israel and characterized the welfare system for employees. The research also examines the nurses' satisfaction levels today and the relationship between employee well-being and the level of satisfaction at work. The study also examined which are the most important factors of well-being for nurses.

## Transilvania University of Brasov

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**RO.148.**
**Title EN**

**Merging Arts and Innovation When Designing City Branding Strategies**

**Authors**

Elena-Lavinia Pătrașcu (Ciuculescu), Florin-Alexandru Luca

**Institution**

Transilvania University of Brașov

Innovative art is an aspect of innovation that deals with creation of new forms of materials, techniques and overall artistic expression. It enriches the cultural fabric of cities and can play an important role in branding a city through culture. This poster is the result of a research on European Culture Bidbooks, submitted for the 2022-2027-time frame. The originality of the study lies in the analysis of European Culture Bidbooks as city branding documents. The cultural program submitted by each city was carefully analyzed in order to identify types of innovative art projects which can be scaled at city level and employed as city branding strategies.

**Description  
EN**

Some of the findings of this qualitative research include VR artistic travel tours that integrate pre-recorded artistic performances. This idea, implemented in various places of the city, or in some of its neighborhoods, can make a place known for its innovative way of integrating performance in tourism experiences, therefore making the city known for innovative art.

Other findings include 3D video projections on iconic buildings, real-size holograms of iconic buildings or interactive sound installations. When implemented, each of these types of art projects can have an impact on the overall perception of a city, in other words, they can brand a city through culture and innovation.

## University "Valahia" from Târgoviște

<b>RO.149.</b>	
<b>Title EN</b>	<b>Nanohybrid ternary formulation for relative humidity chemoresistive sensing devices</b>
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest
<b>Patent</b>	Valahia University of Targoviste <b>A00312, RO, OSIM, 08.06.2022</b>
<b>Description EN</b>	<p>The invention refers to new ternary nanohybrid formulations suitable for applications as sensing layers in chemoresistive devices for monitoring relative humidity. The ternary nanocomposites contain oxidated onion-type nanocarbons (ox-CNOs), sodium chloride (NaCl) and polyvinyl alcohol (PVA).</p> <p>Advantages:</p> <ul style="list-style-type: none"> <li>▪ ternary nanocomposites formulation of ox-CNO / NaCl / PVA offer notable advantages in RH resistive detection;</li> <li>▪ ox-CNOs offer high specific surface / volume ratio, affinity for water molecules, and notable resistance variation of sensitive layers at contact with water molecules throught the RH range;</li> <li>▪ polyvinyl alcohol is a hydrophilic polymer exhibiting low hysteresis;</li> <li>▪ the presence of sodium cations Na<sup>+</sup> (hard acids according to HSAB theory) gives the ternary nanohybrid an increased sensitivity, by increasing the number of active sites available for an interaction with water molecules;</li> <li>▪ detection at room temperature.</li> </ul> <p>The ternary nanohybrid can be deposited by the drop casting method on linear or interdigitated electrodes made of Kapton or poly-ethylene-terephthalat.</p> <p>Monitoring and control of the relative humidity (RH) in spaces and/or containers for storage of fruits and vegetables may ensure prolonging the products quality shelf-life and market value, and implicitly reducing the food waste generation. Thus, the two metabolic processes of fresh products, respiration and transpiration, may be carefully limited while not-stopped.</p>

<b>RO.150.</b>	
<b>Title EN</b>	<b>Ammonia Chemiresistive Sensor</b>
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest Valahia University of Targoviste
<b>Patent</b>	<b>A00314, RO, OSIM, 08.06.2022</b>
	<p>The invention describes new resistive sensors for monitoring ammonia concentration, and the corresponding design and manufacturing method.</p> <p>Ammonia sensitive layers that ensure the functional role of the sensing device are binary nanocomposites containing oxy-fluorinated onion-type nanocarbon materials (ox-CNO-F) and polythiophene (PTh). These two components are p-type semiconductors, and when ad/absorption of NH<sub>3</sub> molecules occurs, the number of voids decreases, and therefore the resistance of these materials proportionally increases.</p> <p>Advantages:</p>
<b>Description EN</b>	<ul style="list-style-type: none"> <li>▪ ox-CNO-F offers high specific surface / volume ratio, polythiophene shows high affinity for ammonia molecules, and thus notable resistance variation of the sensitive layer at contact with NH<sub>3</sub> molecules is ensured;</li> <li>▪ due to electron-attracting effect, fluorine atoms increase the surface polarity of the nanocarbon material, creating temporary dipoles facilitating the interaction with NH<sub>3</sub> molecules</li> <li>▪ wide temperature range operation, chemical and thermal stability;</li> <li>▪ quick response of the sensor to variations in the ammonia concentration value;</li> </ul> <p>reversibility and superior mechanical properties.</p> <p>Food waste is produced throughout the whole food supply chain, from agricultural production down to household consumption. Considering the environmental issues, composting is considered a reliable food waste treatment technology, however it relates to various gaseous mixture emissions, with ammonia being the main component. Ammonia, is a smelling, irritant and toxic gas. The NH<sub>3</sub> short term exposure limit for a concentration as low as 35 ppm, is 15 minutes, while severe nose and throat irritation occurs at 500 ppm, and higher NH<sub>3</sub> concentrations may cause</p>

failure of the respiratory tract. Monitoring the ammonia concentration in both industrial and ambient premises is of a notable importance.

**RO.151.****Title EN****Ammonia Resistive Sensor****Authors**

Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Mihaela Nicolescu

**Institution**

National Institute for Research and Development in Microtechnologies - IMT Bucharest  
Valahia University of Targoviste

**Patent**

**A00313, RO, OSIM, 08.06.2022**

This invention refers to new resistive sensors for monitoring ammonia concentration, with the sensitive layers consisting of binary nanocomposites containing oxyfluorinated carbon nanohorns (ox-CNH-F) and doped polyaniline. Both components are p-type semiconductors, and thus the detection principle resides in variation of the layers resistance when in contact with environments with different ammonia concentration values.

Advantages:

**Advantages:****Description  
EN**

- the use of binary nanocomposites of ox-CNHs-F/ polyaniline has significant advantages in the resistive detection of  $\text{NH}_3$
- functionalization of nanocarbon nanohorns in  $\text{F}_2\text{-N}_2$  and  $\text{Ar-O}_2$  plasma in the conditions of this invention, ensure an optimal C:F:O atomic ratio;
- fluorine atoms increase the number of carriers in the carbon nanohorns due to inductive electron-attracting effect; as the conduction is achieved through holes (p-type carriers), the device's sensitivity to ammonia molecules increases; also, presence of fluorine atoms reduces the hysteresis through their hydrophobic effect;
- chemical and thermal stability and superior mechanical properties;

due to the  $\pi$ - $\pi$  interactions between polyaniline and the nanohorn material, the de-doping process is less likely

<b>RO.152.</b>	
<b>Title EN</b>	<b>Ozone Resistive Sensor</b>
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Cristina Mihaela
	Nicolescu, Cristiana Rădulescu
<b>Institution</b>	National Institute for Research and Development in
	Microtechnologies - IMT Bucharest
	Valahia University of Targoviste
<b>Patent</b>	<b>A00416, RO, OSIM, 19.07.2021</b>
	<p>The invention describes an ozone resistive sensor using new nanocomposite sensitive layers containing halogenated perovskites (<math>\text{CH}_3\text{NH}_3\text{PbI}_3</math> / <math>\text{CH}_3\text{NH}_3\text{PbI}_{3-x}\text{Cl}_x</math> or a mixture of these two) and fluorinated nanocarbon materials (carbon nanohorns CNHs-F or onion-like carbon nanomaterials CNOs-F). Functionalization of the nanocarbon materials is achieved by <math>\text{F}_2\text{-N}_2</math> plasma treatment. <math>\text{O}_3</math> is a molecule with electron-attracting properties, and thus its ad/absorption process is associated with an electron-transfer process from the nanocarbon structure, as both CNHs-F and CNOs-F are p-type semiconductors. By reducing the number of electrons, the holes concentration rises, leading to a proportional decrease of the electrical resistance. Also, once the ozone molecules are ad/absorbed, the unpaired <math>\text{Pb}^{2+}</math> cations are passivated, the corresponding decrease of the resistance is proportional to the gas concentration to which the sensitive layer is exposed.</p>
	<b>Advantages:</b>
	<ul style="list-style-type: none"> <li>▪ The sensor design by using the sensitive layer with halogenated perovskite nanocomposite / fluorinated nanocarbon materials shows important advantages:</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>▪ both nanocarbon materials CNHs-F and CNOs-F offer a high specific surface / volume ratio, and variation of sensitive layer resistance upon contact with ozone molecules;</li> </ul>
<b>EN</b>	<ul style="list-style-type: none"> <li>▪ halogenated perovskite shows an increased affinity for ozone molecules, and variation of sensitive layer resistance upon contact with <math>\text{O}_3</math>;</li> </ul>
	<ul style="list-style-type: none"> <li>▪ due to their increased electronegativity, the fluorine atoms increase the polarity of the surface of the nanocarbon material, creating temporary dipoles that facilitate the interaction with ozone molecules;</li> </ul>
	<ul style="list-style-type: none"> <li>▪ functionalization of nanocarbon materials in fluorine-nitrogen plasma (at various values of power and exposure time) ensure an optimal C:F ratio, an appropriate sensitivity, and a reduced hysteresis;</li> </ul>
	<ul style="list-style-type: none"> <li>▪ reversibility and quick response of the sensor to variations in the ozone concentration value;</li> </ul>
	chemical and thermal stability, superior mechanical properties,
	detection over a wide temperature range.

## Dunarea de Jos University of Galati

<b>RO.153.</b>	<b>PROCEDURE FOR OBTAINING MULTI-ELEMENT ALLOYS FROM THE AlCrFeNi SYSTEM</b>
<b>Title EN</b>	Elena SCUTELNICU <sup>1</sup> , George SIMION <sup>1</sup> , Octavian
<b>Authors</b>	MIRCEA <sup>1</sup> , Carmen-Cătălina RUSU <sup>1</sup> , Luigi-Renato MISTODIE <sup>1</sup> , Marius-Corneliu GHEONEA <sup>1</sup> , Victor GEANTĂ <sup>2</sup> , Ionelia VOICULESCU <sup>2</sup>
<b>Institution</b>	<sup>1</sup> "Dunarea de Jos" University of Galati <sup>2</sup> Politehnica University of Bucharest
<b>Patent</b>	Patent application No. A100210/21.04.2022
<b>Description EN</b>	<p>The invention is an innovative method for achieving multi-element alloys from the AlCrFeNi system, by melting a bundle of rods through Tungsten Inert Gas (TIG) welding deposition on a common steel substrate. The novelty of the patent application resides in controlling the chemical composition and the layer thickness of the multi-element alloy, by using rods with different chemical compositions and identical or different wires diameters. The welding deposition technology should be designed so that a uniform distribution of the alloying elements should be obtained in the deposited layer. The multi-element alloy, achieved by this innovative technique, is characterised by high hardness, compressive strength, resistance to wear, oxidation, corrosion, and to impact. The entire process is carried out in an inert protective gas (Ar) atmosphere. To ensure a complete covering of the base metal surface with a uniform layer of multi-element alloy, the weld beads partially overlap on 30-60% of their width. Another novelty of the invention is the longitudinal, transversal and combined remelting, by TIG welding, without filler metal, of the deposited layer, aiming to obtain higher level of chemical homogenization, refinement of grains and, finally, better mechanical properties and aspect of the layer surface. To avoid the development of defects, generated through hot and cold cracking mechanisms, it is recommended to maintain, during the welding deposition and remelting process, an interpass temperature of 250°C up to 350°C. These alloys are suitable to be used in the chemical, petrochemical, military, naval, energy production, machine building, mining, and transport industry.</p>

<b>RO.154.</b>	
<b>Title EN</b>	<b>Multi-axial compression staple for orthopedic surgery with nanometric structure made of gum alloy</b>
<b>Authors</b>	Gheorghe Gurau, Dan Ioan, Anisoara Cimpean, Marlen Carmela Gurau, Dan Catalin Birsan, Valentina Mitran
<b>Institution</b>	"Dunarea de Jos,, University of Galati
<b>Patent</b>	Patent application No. A 2020 00046
<b>Description EN</b>	The osteosynthesis staple is made of a gum alloy with nanometric structure and provides multi-axial compression on two or three directions using some pins joined to one another by a central bridge. The mechanical energy is stored before implantation by prestressing. The new compression staples enables stable bone fixation thanks to a multidirectional gripping that allows to the surgeon to fix several bone fragments with a single implant. This shortens the implant surgery time, respectively less time to remove the implant after healing. In addition, the shape of the central bridge of the implant allows for stable fixation considering the torsional stresses that can occur at certain fractures. The constant compressive load prevents non-union and reduce healing time, with benefits in terms of quality of life of the patient.
<b>RO.155.</b>	
<b>Title EN</b>	<b>Algorithm for detection of dangerous situations in traffic based on deep learning</b>
<b>Authors</b>	Marin Florin , Gurau Gheorghe, Buruiana Daniela, Marin Mihaela,
<b>Institution</b>	„Dunarea de Jos” University of Galati
<b>Patent</b>	/2020
<b>Description EN</b>	Dangerous situations such as reckless driving approaching from the rear or high speed motorcycle are detected by the driver too many times too late. Also, situations when the driver is followed by vehicles at close distance, fog is detected need to be detected. The intention of the reckless behavior in traffic can be predicted to alert the driver to take defensive driving actions to reduce the dangers. The algorithm using data from cameras are used to identify dangerous situations. Deep learning is the solution to develop the algorithm to detect complex situations in traffic and to predict behavior of other traffic participant.



<b>RO.156.</b>	
<b>Title EN</b>	<b>Pedestrian Detection equipment for the blind spot</b>
<b>Authors</b>	Marin Florin , Gurau Gheorghe, Buruiana Daniela, Marin Mihaela
<b>Institution Patent</b>	„Dunarea de Jos” University of Galati
<b>Description EN</b>	<p>Inadvertent collisions with pedestrians at relative low speed due to blind spot are causing important amount of injured seriously persons or even death. Our system is composed of 360 degrees camera mounted at the front of a vehicle and the computer vision algorithm for detecting persons or cars that cannot be seen by the driver because of the pillars blocking the view of the driver. The movement information of detected objects identified as obstacles obtained cameras are used to predict trajectory that will lead to a dangerous situation. There are several real traffic scenarios when the driver cannot notice presence of people or cars due to blind spot. The most dangerous situations is when is attention is focused on specific action.</p>
<b>RO.157.</b>	
<b>Title EN</b>	<b>Peel Test Fixture for Two-Component Polymeric Specimens</b>
<b>Authors</b>	Catalin FETEAU, Felicia STAN, Nicoleta-Violeta CRISTEA
<b>Institution</b>	“Dunarea de Jos” University of Galati, Center of Excellence
<b>Patent</b>	Polymer Processing RO 133005 B1
<b>Description EN</b>	<p>The invention refers to a peel fixture that clamps and holds two-component specimens in the horizontal position during the peel tests in order to measure the adhesion strength between two similar or dissimilar polymers.</p> <p>The peel test fixture consists of a transmission system of racks and spur gears with different modules that moves on vertical direction as the crosshead moves in the tension direction and a box with rollers that holds and guides the specimen in the horizontal position during the test. To initiate a test, the specimen is secured to the fixture that is, in turn, inserted into the testing machine grips.</p> <p>The peel test fixture according to the invention presents the following advantages and benefits: (1) The test specimen is maintained in the horizontal position during the test while both peel arms are pulled apart at the interface the adhesion to be measured at constant displacement with respect to the grips; (2) It does not require any other device attached to the universal testing machine to clamp the peel arms of the two-component specimens during the peel test; (3) The peel force is recorded by the load cell of the</p>

testing machine as the peel front moves through the interface, providing a direct assessment of the adhesion strength; (4) The fixture can be easily attached to any universal testing machine with a single movable grip adding to any testing machine capabilities for peel testing.

**RO.158.****Title EN****RECYCLING OF SURGICAL MASKS IN HOT ASPHALT MIXTURES****Authors**

Daniela Laura BURUIANA, Puiu Lucian GEORGESCU, Gabriel Bogdan CARP, Viorica GHISMAN and Tatiana MARDARE

**Institution  
Patent**

**Dunarea de Jos University of Galati**  
Patent application No. A 2021 00468

**Description  
EN**

The invention relates to the technological innovation of introducing used surgical masks in the recipe of the hot asphalt mixture base layer type AB 31.5 bringing enormous environmental benefits by reducing the disasters caused by the COVID-19 pandemic. The hot asphalt mixture of the base layer type AB 31.5, according to the invention, consists, in mass percentages, of 40.8% natural aggregate chipboard with a size of more than 4.0 mm, 50% of crushing sand with a granulometry between 0.0 and 4.0 mm, 5% sorted limestone filler with a particle size of 0.063 and 0.100 mm, 3.9% road bitumen type 50/70 and 0.3% used surgical masks.

**RO.159.****Title EN****CO<sub>2</sub> SEQUESTRATION METHOD BY USING THE MIXTURE FORMED OF WHITE SLAG AND CALCIUM CARBIDE SLUDGE****Authors**

Puiu Lucian GEORGESCU, Daniela Laura BURUIANA, Gabriel Bogdan CARP and Viorica GHISMAN

**Institution  
Patent**

**Dunarea de Jos University of Galati**  
Patent application No. A 2021 00613

**Description  
EN**

The invention relates to a mixture based on white slag resulting from the production of steel and calcium carbide sludge resulting from the process of acetylene preparation, the mixture being used to sequester carbon from flue gases, thus reducing the concentration of carbon dioxide CO<sub>2</sub> discharged into atmosphere. According to the invention, the mixture consists of the following components expressed as a percentage by weight: 50% white slag resulting as a by-product of the steelmaking process, with a grain size between 71 and 315 µm, having a pH = 12.1 and 50% calcium carbide sludge resulting from acetylene preparation, with a liquid/solid mass ratio = 1: 1 and pH = 12.2.

**RO.160.****Title EN**

**Selection procedure of specimens with high production yield, from the Mirror Carp (*Cyprinus carpio specularis*) and Naked Carp (*Cyprinus carpio nudus*) breeds, by inducing water, thermal and lack of oxygen stress factors on the fingerlings**

**Authors**

**Mihaela MUNTEANU (PILA); Silvius STANCIU**

**Institution**

**"Dunărea de Jos" University of Galați, Romania**

**Patent**

Patent application No. **A/00229/29.04.2020**

**Description  
EN**

The invention refers to industrial fish farming and can be widely used in breeders of fish species of the Cyprinidae family, to obtain specimens that show increased productive qualities, vitality and resistance to unfavourable growing conditions.

The method proposed for patenting allows the reduction of the selection time and the selection of the most resistant specimens, by experimentally inducing stress in the reproduction batches and eliminating the less resistant specimens. The fingerlings were exposed to a complex of aggressive factors (low temperature, lack of oxygen, lack of water and immobilization).

he selection of specimens in the first stages of development (fingerlings) allows the preservation of groups of fish with stable developmental indicators and with an increased survival rate against repeated exposure to stress factors.

The research carried out to obtain the patent included testing fingerlings samples of mirror carp (*Cyprinus carpio specularis*) and naked carp (*Cyprinus carpio nudus*) juveniles, over a period of 24-36 hours, up to the stage of active swimming and natural feeding.

The method is simple to implement, does not require special equipment, significant materials or additional costs for fish farmers. The application of the patent in cyprinid farms can lead to important benefits for fish farmers.

This work was supported by the project "DINAMIC", Contract no. 12PFE/2021.

This work of was supported by the Project "PROINVENT", Contract no.62487/03.06.2022 - POCU/993/6/13 - Code 153299, financed by The Human Capital Operational Programme 2014-2020 (POCU), Romania.

**RO.161.****Title EN**

**Composition and process of obtaining suckling tablets with multiple therapeutic activities**

**Authors**

**Kamel Earar<sup>1</sup>, Olimpia Dumitriu Buzia<sup>1</sup>, Claudia Simona Stefan<sup>1</sup>, Monica Dinu<sup>1\*</sup>, Gabi Topor<sup>1</sup>, Alin Laurențiu Tatu <sup>2</sup>, Ion Sandu<sup>3\*</sup>, Irina Cristina Pasvantu<sup>4</sup>, Emil Ceban<sup>5</sup>, Oleg Solomon<sup>5</sup>, Dorin Ioan Cocoș**

NATIONAL

<b>Institution</b>	1 Dunarea de Jos University, Faculty of Medicine and Pharmacy, Center of Medicine and Pharmacy, Galati, Romania
	2 Dunarea de Jos University, Faculty of Medicine and Pharmacy, Department of Clinical Medicine, Galati, Romania.
	3 Alexandru Ioan Cuza University Iasi,
	4 Academy of Scientists from Romania, <sup>5</sup> Nicolae Testemitanu State University of Medicine and Pharmacy, Republica Moldova
<b>Patent</b>	<b>Pending</b>
<b>Description</b> <b>EN</b>	The invention refers to a composition and process of obtaining multiple activities of suckling tablets (antiseptic, antiviral, antimicrobial, fungal, and/or bactericidal). The purpose of the invention is to make semi-solid or semi-solid pharmaceutical forms based on bee pastures, embedded in ointments, mucilages, or troches, which by dissolving in the mouth allow the treatment of viral, fungal, and/or microbial diseases.
	The technical problem solved by the invention concerns the compositional formulation of a mixture of fine powder of bee pastures, with chlorhexidine or hexetidine powders and sugar, dispersed in a sufficient amount of distilled water to obtain a consistent paste, Which is then pressed into the form of tablets for oral administration, which have previously been subjected to surface film conditioning with a mixture of lactose, maltodextrin, cardamom, and ginger based powders to achieve thermal, climatic and photochemical stabilization, but also to improve solubility and conceivability under normal storage conditions.

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<b>RO.162.</b>	
<b>Title EN</b>	<b>Method of decontamination and sterilization of the endodontic or periodontal space from pathogenic microorganisms</b>
<b>Authors</b>	Kamel EARAR, Anamaria ZAHARESCU, Oleg SOLOMON, Gabi TOPOR
<b>Institution</b>	<b>Dunarea de Jos University of Galati</b>
<b>Patent</b>	<b>MD Pending</b>
<b>Description</b> <b>EN</b>	The invention refers to a procedure for the decontamination of the endodontic space and that with pathogenic periodontal microorganisms, which uses the coexistence of two non-conventional treatment systems: injection of 5% oxygenated water, chemically stabilized and activated with cetylpyridinium chloride 0.02%, for 25...30 sec, assisted by antimicrobial photodynamic therapy CW-2W continuously, or Pulse-1.5 W alternatively, in the circumferential corona-apical direction (with DENMAT - SOL type laser), for 5...8 min , the procedure repeating consecutively three times, at 30 sec intervals.

**RO.163.****Title EN****Dental spring with extended mechanical and biological functionality and procedure of use****Authors**

Kamel EARAR, Alina-Ramona DIMOFTE, Meda-Lavinia NEGRUȚIU, Cosmin SINESCU, Oleg SOLOMON

**Institution  
Patent****Dunarea de Jos University of Galati  
Pending****Description  
EN**

The invention relates to a facial arch with extended mechanical and biological functionality and to a method of use for the three-dimensional transfer of the position of the upper dental arch in the articulator and which is used in the field of dentistry, in the prosthetic rehabilitation algorithm for different types of edentulousness. The facial arch according to the invention consists of a unitary assembly (A) called an "eye line finder", an articulated support (B), having a double-sided transfer spoon and radial extension, an articulation assembly (C) for supporting a transfer spoons, a universal transfer stand (D) for mounting the upper and lower model in the articulator, and a device (E) for controlling the parallelism of the prepared teeth, before the impression and transfer. The method according to the invention consists in orienting and mounting the transfer facial arch, on a patient's head, by means of the assembly (A) "eye line finder", after which the transverse position of the transfer facial arch is analyzed and oriented on the patient's head, anchored in the posterior area by means of two ear ball arms, in the ear canal, then the assembly is placed in the anterior area on the base of the nose, by means of a support (F) elastic and adjustable in height, in a milled channel (G) intended fixing the transfer joint, mount the articulated support (B) for the laser module with linear projection and orient a sleigh, in sagittal direction after the palatine raft, by transverse sliding, insert the assembly (A) "eye line finder" in some uprights of on the two arms (F and G) of the transfer facial arch and follow the bipupillary line in relation to the lines engraved on the assembly (A) "eye line finder".

**RO.164.**

<b>Title EN</b>	<b>Dietary supplement for the prevention and treatment of diabetes</b>
<b>Authors</b>	Kamel EARAR, Aurel NECHITA, Diana-Andreea CIORTEA, Emil CEBAN, Simona PÂRVU
<b>Institution</b>	<b>Dunarea de Jos University of Galati</b>
<b>Patent</b>	<b>Pending</b>
<b>Description EN</b>	The invention relates to a dietary supplement for the prevention and treatment of diabetes, which is used in the field of nutrition and medicine. It is developed on the basis of phytocomplexes contained in vegetables, fruits and medicinal plants, which develop hypoglycemic, lipid-lowering, antiradical effects.

## University of Agronomic Sciences and Veterinary Medicine of Bucharest

<b>RO.165.</b>	
<b>Title EN</b>	<p><b>Potential application of natural antioxidants in laying hens' diets and their effect on eggs' nutrients oxidative stability (PHYTOFEED)</b></p>
<b>Authors</b>	<p><b>Nicoleta Corina PREDESCU</b>, Georgeta STEFAN, Gheorghe Valentin GORAN, Marian VELCEA, Mihaela SARACILA, Alexandru VLAICU, Arabela Elena UNTEA</p>
<b>Institution</b>	<p><b>University of Agronomic Sciences and Veterinary Medicine of Bucharest</b>  <b>Grant no. 631PED/2022, Cod PN-III-P2-2.1-PED2021-2001</b></p>
<b>Description EN</b>	<p>Eggs are considered one of nature's perfect foods being a rich source of both nutritive and non-nutritive compounds important to human health. Many research studies have demonstrated that through dietary manipulation, bioactive feed compounds may be transferred from the hens' feed into the yolk.</p>
	<p>The <b>aim</b> of this project is to develop feeding strategies based on functional feed ingredients (co-products of the food industry), which ensure the enhanced oxidative status of animal-origin products with the effect of delaying oxidation reactions and increasing the shelf stability of lipophilic antioxidants.</p> <p><b>Utility:</b></p> <p>(1) The poultry farm is taking additional steps to keep its flocks healthy;          (!! ) Consumers will benefit from higher-quality eggs;          (!!! ) Circular economy, using by-products of the food industry to reduce pollution.</p> <p>The project activities are planned for 23 months, and organized in three phases; the partners involved in project implementation are IBNA Balotesti, USAMVB and Avicola Lumina SA.</p>

<b>RO.166.</b>	
<b>Title EN</b>	<b>"Composite food product and technology for manufacturing the composite food product consisting of microplants (sprouts/microgreens) and substrate for food use"</b>
<b>Authors</b>	Livadariu Oana, Băbeanu Narcisa Elena, Barbu Lavinia-Diana-Nicoleta, Boiu-Sicuia Oana-Alina, Peticilă Adrian George, Constantin Carmen Gabriela, Dobrin Aurora, Ion Violeta-Alexandra, Venat Cosmina Oana Arabela, Nicolae Ioana Cătălina, Lagunovschi-Luchian Viorica, Badea Monica Luminița
<b>Institution</b>	University of Agronomic Sciences and Veterinary Medicine of Bucharest
<b>Patent</b>	Patent application No. A / 00039 on 30.01.2023 registered at OSIM in Bucharest, Romania
<b>Description EN</b>	The Project with title "Production technology of aromatic microplants in an innovative cultivation system (MICROLED)", was funded by the University of Agronomic Sciences and Veterinary Medicine of Bucharest through Project no. 1067/15.06.2022.
	The MICROLED project aims to test technology for the production of aromatic microplants of sorrel or basil in an innovative eco-system of cultivation which, by asepticization, has the potential to reduce/eliminate contamination with biotic factors in obtaining and marketing them. The novelty of the project stems from a concept that uses an ecosystem able to comply with food safety conditions for the production of sprouts established by ESSA ( <a href="http://sproutedseeds.eu/list-of-members/">http://sproutedseeds.eu/list-of-members/</a> ). Thus, the proposed solution aims at the production and consumption model of the Circular Economy recommended by the EU for the quality of life.
	As a result, within this project, we filed a Patent Application, registered with OSIM in Bucharest, Romania: "Composite food product and technology for manufacturing the composite food product consisting of micro-plants (sprouts/microgreens) and substrate for food use".
	This Patent inaugurates a new class of products for human use, both for ordinary consumers and for those in need of a personalized diet. Such a diet should be able to support the physiological needs of the human body and keep it functioning even when it is the site of a battle with an extreme medical diagnosis (e.g. cancer). It should also facilitate the patients' desire to restore their vitality and return to their previous lifestyle.
	There is on going research on manufacturing products according to the patent.



<b>RO.167.</b>	
<b>Title EN</b>	<b>Abanos, Jerry L, Virginia, Indiana, James C, and Katim are the new five Diospyros virginiana and Diospyros kaki homologated at the Faculty of Horticulture from Bucharest</b>
<b>Authors</b>	Stănică Florin, Lehman Jerry, Mihai Cosmin Alexandru, Butcaru Ana Cornelia, Asănică Constantin Adrian, Peticilă George Adrian, Hoza Dorel, Teodorescu Răzvan Ionuț
<b>Institution</b>	Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest 1.82 03 103, 2.82 03 104, 3.82 03 105, 4.82 03 106, 5.82 03 107, 6.82 03 108
<b>Description EN</b>	Diospyros virginiana new cultivars can be cultivated in Romania in specific areas with very good results reflected in the fruit qualities. A new cultivar from Diospyros kaki L. was homologated for more protective areas. Romania can diversify the fruit conveyer and germplasm collections with these new cultivars with high nutraceutical properties. Nurseries worldwide have six new Diospyros cultivars suitable for orchards established in Romania.
<b>RO.168.</b>	
<b>Title EN</b>	<b>Tri Kule, Ada Kaleh, and Nectar - the newest Romanian fig cultivars homologated at the Faculty of Horticulture in Bucharest</b>
<b>Authors</b>	Stănică Florin, Curici Nicolaie, Peev Otiman Paula Diana, Dobrescu Vera, Butcaru Ana Cornelia, Ancuța (Moisescu) Emilia, Mihai Cosmin Alexandru, Velcea Nicolae Marian
<b>Institution</b>	Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest 1. 89 03 019, 2.89 03 020, 3.89 03 021
<b>Description EN</b>	Tri Kule, Ada Kaleh, and Nectar are the newest Romanian fig cultivars homologated at the Faculty of Horticulture in Bucharest. Tri Kule and Nectar have yellow fruit skin with exquisite aroma and taste, while Ada Kaleh fruits are dark brown. They are suitable for fresh consumption or processing. Nurseries worldwide have these three new fig (Ficus carica L.) cultivars suitable for new orchards or small gardens established in Romania with very good results in yield and fruit quality.

<b>RO.169.</b>	
<b>Title EN</b>	<b>Asirius, Artemis, and Asteria - new asimina (<i>Asimina triloba</i> (L.) Dunal) cultivars homologated at the Faculty of Horticulture in Bucharest</b>
<b>Authors</b>	Stănică Florin, Lehman Jerry, Tabacu Andrei Florin, Butcaru Ana Cornelia, Mihai Cosmin Alexandru, Iliescu Lavinia Mihaela
<b>Institution</b>	Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest 1. 87 03 102, 2.87 03 103, 3.87 03 104
<b>Description EN</b>	Asimina or paw-paw is a new fruit species for Romania, studied in the last 25 years at the Faculty of Horticulture in Bucharest with very good results regarding yield, fruit quality, and pest and disease tolerance/resistance. Asirius, Artemis, and Asteria are the best varieties from the whole collection, homologated in April 2023. They are suitable for fresh consumption or processing in different forms (ice cream, liqueurs, vinegar etc) . Nurseries worldwide have these three new paw-paw cultivars suitable for orchards or small gardens established in Romania.
<b>RO.170.</b>	
<b>Title EN</b>	<b>Kisweet, Kiball, Kigiant, Kiflor, Ariana, and Andros - new kiwi (<i>Actinidia</i> sp.) cultivars homologated at the Faculty of Horticulture in Bucharest</b>
<b>Authors</b>	Inventor collective from the Faculty of Horticulture in Bucharest Lavinia Mihaela UDREA (ILIESCU), Giuseppe ZUCCHERELLI, Cosmin Alexandru MIHAI, George Adrian PETICILĂ, Constantin Adrian ASĂNICĂ, Dorel HOZA, Liliana Aurelia BĂDULESCU, Constantin PĂUN, Florin STĂNICĂ
<b>Institution</b>	1.85 03 104, 2.85 03 105, 3.85 03 106, 4.85 03 107, 5.85 03 108, 6.85 03 109
<b>Description EN</b>	Kiwi plants can be cultivated in the peach areas in Romania with very good results. After more than 25 years of research, the Faculty of Horticulture in Bucharest homologated six new kiwi cultivars. Four cultivars from <i>Actinidia deliciosa</i> (three female and one

male) and two from *Actinidia arguta* species (one female and one male) are available now for propagation for new orchards establishment.

Their excellent fruit quality remained constant through the years, becoming a better alternative to the import varieties found in the market.

<b>RO.171.</b>	<b>Ziprim - an earlier cultivar for jujube (<i>Ziziphus jujuba</i> L.) homologated at the Faculty of Horticulture in Bucharest</b>
<b>Title EN</b>	
<b>Authors</b>	Asănică Constantin Adrian, Stănică Florin, Mihai Cosmin Alexandru, Peticilă George Adrian
<b>Institution</b>	Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine of Bucharest 3.81 03 107
<b>Description EN</b>	<p>Jujube (<i>Ziziphus jujuba</i> L.) is a new fruit species for Romania with a high potential for valorizing areas exposed to desertification or salinization. At the same time, it is well known globally for its exceptional nutraceutical properties (for centuries, it has been used as a medicinal plant).</p> <p>Ziprim is the newest cultivar homologated by the Faculty of Horticulture in Bucharest, being one of the earliest in harvesting.</p> <p>The plants can be cultivated in the plum areas in Romania, with excellent results regarding yield and fruit qualities.</p> <p>Romanian consumers have a new option regarding fruit diversity in the yearly period.</p>
<b>RO.172.</b>	<b>Romania involvement in BioSecure project - Enhanced and cost-effective biosecurity in livestock production</b>
<b>Title EN</b>	
<b>Authors</b>	Stelian BĂRĂITĂREANU, Livia VIDU, Florica BĂRBUCEANU, Florin Ciprian FURNARIS, Gheorghe GORAN, Nicoleta CIOCÎRLIE, Maria Rodica GURĂU, Oana-Mărgărita GHIMPEȚEANU, Nicolae Tiberiu CONSTANTIN, Valentin Alexandru DUȚULESCU, Teodor IONESCU, Gina FÎNTÎNERU
<b>Institution</b>	<b>University of Agronomic Sciences and Veterinary Medicine of Bucharest</b> Project number: 101083923 / Project name: Enhanced and cost-effective biosecurity in livestock production

**Description**  
**EN**

Starting with 1 January 2023, a team of 12 researchers from the University of Agronomic Sciences and Veterinary Medicine of Bucharest are involved in a four-year project supported by the European Union with a budget of 5 million euros and 19 participating partners, from 12 European countries, coordinated by Ghent University. The main objective is to enable decision-makers in livestock farming to understand, prioritise and implement evidence-based, cost-effective, and sustainable biosecurity management systems. This will be carried out through various work packages and tasks that include: 1. reviewing the current understanding of biosecurity throughout the livestock production chain; 2. quantifying the impact of biosecurity practices on the prevention of infection and spread of disease; 3. enhancing current biosecurity measures, as well as expanding on these by carrying out field studies and performing experiments.

Socio-economic impact of the BIOSECURE project in Romania will be assessed and stakeholder engagement will be facilitated to support knowledge transfer and implementation of key exploitable results in Romanian farms. The new or enhanced biosecurity management systems developed in the BIOSECURE project will help Romanian farmers of various animal species (pigs, poultry, cattle, small ruminants) and of different production types (indoor-outdoor) to keep animals healthy in Romania. BIOSECURE has received funding from the European Union's Horizon Research and Innovation Actions under grant agreement No 101083923 (Topic: HORIZON-CL6-2022-FARM2FORK-01-03).

**University of Life Science  
"King Mihai I" from Timisoara**

**RO.173.****Title EN**

**QUALITATIVE EVALUATION OF AGRICULTURAL  
LAND BY METHODS BASED ON GIS TECHNIQUES**

**Authors**

Radu Bertici, Daniel Dicu, Mihai Herbei, Florin Sala

**Institution**

University of Life Science "King Mihai I" from Timisoara

**Description  
EN**

This research project assessed the quality of agricultural land in the area of Lenaueim, Timis County, Romania.

The maps in the analogue format (1:10.000 scale) were processed with GIS techniques (e.g. vectorization, digitization. In relation to the 6 indicators taken into account, the area considered for study was characterized through standard indicators. Study area was characterized by follow indicators: Indicator 4C - Classes of average annual precipitation corrected in relation to the slope and permeability, 2 classes were found (0575 and 0650); Indicator 14 - Degrees of soil gleic status, 5 classes were found with high value for class 2 - low soil gleic level, 37.52%; Indicator 23A - Soil textural classes, 5 textural classes were found, between sand - clay and clay, with a high share of the medium clay class (42 - clay sand-clay, 92.01%); Indicator 39 - Depth classes of the groundwater level, 5 classes of groundwater were found (class 2 - shallow depth 2.01-3.00 m, 49.54%); Indicator 44 - Classes of the degree of soil compaction, 4 classes of compaction level were found (class +5 - low compacted (1-10 %), 75.51%); Indicator 144 - humus reserve class (in layer 0-50 cm), 6 classes were found (class 225 - very high humus reserve 201-250 t/ha, 81.60%).

The GIS technology used facilitated the creation of specific databases based on indicators and framing values and the creation of thematic maps based on them.

The proposed GIS technique compared to the classical approach facilitates a series of advantages such as: information integration in complex databases, interoperability, accessibility for multiple users.

<b>RO.174.</b>	
<b>Title EN</b>	<b>G-U-G (GOLD - UMAMI - GREENS) BY AKADEMIKAFOOD</b>
<b>Authors</b>	<p>Despina - Maria Bordean, Tiberiu Iancu, Adrian Riviş, Nicoleta Gabriela Hadaruga, Ducu Sandu Ştef, Delia - Gabriela Dumbravă, Corina Dana Mişcă, Camelia Moldovan, Diana - Nicoleta Raba, Viorica - Mirela Popa, Liana Maria Alda, Aurica - Breica Boroza, Mariana - Atena Poiană, Bogdan Petru Rădoi, Simion Alda, Laura Rădulescu, Luminița Pîrvulescu, Diana Moigrădean</p>
<b>Institution</b>	<p><b>University of Life Sciences "King Mihai I" from Timisoara</b> <b>Registered Trademark: M2023/003082</b></p>
<b>Description EN</b>	<p>The invention "G-U-G (GOLD - UMAMI - GREENS) by AKADEMIKAFOOD" refers to innovative formulas of green sauces obtained by mixing lovage leaves, celery, parsley, dill and sorrel with olive oil and lemon. The innovative character is given by the recipe, as well as by the complex "umami" type taste.</p> <p>The variety of colors and flavors of the sauces is given by the different mass proportions of greens and spices. These sauces are intended for general consumption, being suitable, including those following a ketogenic diet. The range of sauces is recommended for their versatile taste, low carbohydrates, but also for its high vitamin and mineral contents.</p>
<b>RO.175.</b>	
<b>Title EN</b>	<b>FINGERPRINTS BASED ON XRF HEAVY METALS ANALYSIS OF SOILS</b>
<b>Authors</b>	<p>Despina-Maria Bordean, Luminita Pirvulescu, Mariana- Atena Poiana, Ersilia Alexa, Diana Nicoleta Raba, Liana Alda, Aurica Breica Boroza, Corina Dana Misca, Narcis Gheorghe Baghina, Ioan Ladislau Caba, Delia – Gabriela Dumbrava, Camelia Moldovan, Diana Obistioiu, Simion Alda</p>
<b>Institution</b>	<p><b>University of Life Sciences "King Mihai I" from Timisoara</b></p>
<b>Description EN</b>	<p>Heavy metals contamination of soils is a major environmental and economic problem, due to the decline of soil quality, pollution levels of the surrounding areas and the</p>

adverse effect on human's health. The focus of this study is to identify soil fingerprints based on the anthropic contamination with heavy metals using X-MET8000 - X-Ray Fluorescence Analyzer. The fingerprints are created based on the medium values of the soil's heavy metals concentrations and different mathematical models using MVSP and PAST programs. The method permits to identify specific patterns of the contamination levels and the origin of contamination sources.

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**RO.176.**
**Title EN**

**ANTIMICROBIAL EVALUATION OF THE SPECIES *PORTULACA OLERACEA* L., WITH APPLICATION POTENTIAL IN AGRO-FOOD, COSMETIC AND PHARMACEUTICAL FIELDS**

**Authors**

Borozan Aurica Breica, Moldovan Camelia, Bordean Despina, Popescu Sorina, Dumbravă Delia-Gabriela, Miscă Corina-Dana, Popa Mirela-Viorica, Raba Diana Nicoleta

**Institution**

**University of Life Sciences "King Mihai I" from Timisoara**

**Description  
EN**

Even if the information related to this species is limited and it seems a trivial and worthless species, phytochemical studies have shown that *Portulaca oleracea* L. is a plant rich in bioactive substances with high antioxidant potential, which can ensure the protection and support of cell activity. The presence of the complex of metabolites that potentiate or change the activity of some basic compounds, recommends it as a promising plant for the agro-food, pharmaceutical and cosmetic fields. This complex includes over 40 compounds, starting with flavonoids, diterpenes, terpenoids, steroids, esters, tocopherols, aldehydes, alkaloids, organic acids, minerals and vitamins (especially vitamin E), compounds present in the plant's organs taken as a whole. The valorization of the plant in the three fields, however, involves antimicrobial tests, this representing the objective of this evaluation. Gram positive (*Staphylococcus aureus*, *Staphylococcus epidermidis*) and Gram negative (*Escherichia coli*, *Pseudomonas aeruginosa*) bacterial strains were used for the antimicrobial tests. The results were compared with the controls represented by antibiotics and solvent. The effect of the plant extract on the four bacteria

varied depending on the bacterial species. Following the evaluation of the biological activity of the extract obtained from the three components of the plant, it was concluded that the plant had better activity on Gram negative bacteria, which can contaminate agro-food products, aquatic environments, other terrestrial ecosystems, but can also cause health problems. As a result, the compounds from the extract of this plant can be used for the protection of agro-food products and human health, either by being present in pharmacological formulas or in cosmetic products.

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**RO.177.**
**Title EN**

**BIOLOGICAL ACTIVITY OF CENTAUREA CYANUS L EXTRACT AND POSSIBILITIES OF USE IN THE MEDICAL AND FOOD FIELDS**

**Authors**

Borozan Aurica Breica, Moldovan Camelia, Bordean Despina, Popescu Sorina, Dumbravă Delia-Gabriela, Mîscă Corina-Dana, Popa Mirela-Viorica, Raba Diana Nicoleta

**Institution**

**University of Life Sciences "King Mihai I" from Timisoara**

**Description  
EN**

The chemical analysis of different parts of *Centaurea cyanus* L. proved that the plant contains a wide range of secondary metabolites, which can be used in the pharmaceutical, pesticide, food and perfume industry. The pharmacological effects are diverse. Among them we list the anti-inflammatory, gastro-protective, diuretic, curative effects, being of interest in eye and skin diseases, but also for improving the functions of some internal organs, including the nervous system. These beneficial effects are the result of compounds present in different parts of the plant, especially in the aerial part (leaves, flowers) and seeds. Among the compounds, flavonoids, alkaloids, aromatic and phenylcarboxylic acids, sugars and minerals are especially mentioned. The antioxidant capacity of the plant is quite high, and can be comparable to that of other plants. Since the use of plants in the pharmacological, food and agricultural industries is aimed at combating various pathogens, in this work the evaluation of the effect of *Centaurea cyanus* L. extract on some bacterial species that can create problems in the food and medical industry (*Staphylococcus aureus*,



*Staphylococcus epidermidis*, *Escherichia coli* and *Pseudomonas aeruginosa* was followed. In order to highlight the effect of the extract on bacteria, in parallel, tests were carried out on antibiotics and solvent. The results showed that the *Centaurea cyanus* L. extract has an inhibitory effect on three of the tested bacteria. The bacterium *Pseudomonas aeruginosa* is resistant to the extract obtained from this plant.

<b>RO.178.</b>	<p><b>ACUPUNCTURE - COMPLEMENTARY THERAPY PROTOCOL IN DOGS AFTER SURGERY FOR INTERVERTEBRAL DISC DISEASE</b></p> <p>Liliana CĂRPINIȘAN, Gabriel RADBEA, Denisa SORESCU, Romeo Teodor CRISTINA, Narcisa MEDERLE, Adrian STANCU, Alina GHIȘE, Călin-Alexandru CIREȘAN, Ioan Ladislau CABA, Cristian ZAHA</p> <p><b>University of Life Sciences "King Mihai I" from Timisoara</b></p>
<b>Title EN</b>	
<b>Authors</b>	
<b>Institution</b>	
<b>Description EN</b>	<p>Intervertebral disc disease is a spinal cord disorder that occurs as a result of the degeneration of intervertebral disc structures and subsequent herniation of disc material in the spinal canal. The syndrome of spinal cord compression, in dogs, is accompanied by symptoms ranging from local thoracolumbar hyperesthesia to back limbs paralysis and/ or urinary dysfunction. Classical medicine is often not enough to cure the patient, which is why alternative methods are recommended, including acupuncture. In order to better manage the post-surgical recovery, it was designed an acupuncture therapy protocol specifying the frequency and the duration of the sessions, as well as the recommended acupuncture points.</p>

<b>RO.179.</b>	<p><b>BISCUAGLU BY AKADEMIKAFOOD</b></p> <p>Dumbravă Delia-Gabriela, Bordean Despina Maria, Borozan Aurica-Breica, Drugă Mărioara, Hădărugă Nicoleta-Gabriela, Mișcă Corina Dana, Moldovan Camelia, Poiana Mariana-Atena, Popa Viorica Mirela, Raba Diana-Nicoleta, Rădoi Bogdan Petru, Rinovetz Alexandru -Erne, Riviș Adrian, Ștef Ducu Sandu</p>
<b>Title EN</b>	
<b>Authors</b>	

<b>Institution</b>	<b>University of Life Sciences "King Mihai I" from Timisoara</b>
	<b>Registered Trademark M2023/002557</b>
<b>Description</b> <b>EN</b>	Since more and more people in modern society have developed gluten intolerance, the market demand for gluten-free pastries is increasing. The invention AGLUBISCU by AKADEMICAFOOD refers to gluten-free biscuits obtained from coconut flour, respectively walnut flour, without added sugar, sweetened with Stevia rebaudiana, in different varieties depending on the manufacturing recipe. The products stand out both for superior sensory qualities and for a balanced nutritional composition, also having a high total polyphenols content and a good antioxidant and free-radical scavenging activity. The very low sugar level of gluten-free biscuits from this invention, primarily those made from walnut flour, makes them suitable for a low-sugar diet recommended especially for diabetics.

**RO.180.**

<b>Title EN</b>	<b>PASTA&amp;FRUTTA BY AKADEMIKAFOOD</b>
<b>Authors</b>	Nicoleta Gabriela Hădărugă, Delia Gabriela Dumbravă, Camelia Moldovan, Mărioara Drugă, Cristina Liliana Mitroi, Simelda Elena Zippenfening, Viorica Mirela Popa, Corina Iuliana Megyesi, Daniel Ioan Hădărugă, Iordănescu Olimpia Alina, Dascălu Ionuț, Despina-Maria Bordean, Ariana Bianca Velciov, Adrian Riviș
<b>Institution</b>	<b>University of Life Sciences "King Mihai I" from Timisoara</b>
	<b>Registered Trademark M2023/003084</b>
<b>Description</b> <b>EN</b>	The importance of the food consumption in relation to human health has increased consumer attention on nutraceutical components, especially for fruits and vegetables. Bioactive compounds in berries have potent antioxidant, anticancer, antimutagenic, antimicrobial, anti-inflammatory and anti-neurodegenerative properties, both in vitro and in vivo. The PASTA&FRUTTA invention from AKADEMICAFOOD refers to the production of various types of flour pasta from different flour types (durum wheat, spelta, rye, rice, buckwheat, chickpea, konjac, common beans, etc.) functionalized with fruits (blueberries, sea buckthorn, blackberries, raspberries, blackberries, rose hips, etc.). Flour pasta functionalized with fruit stands out for its superior nutritional and sensory qualities, with a high content of anthocyanins and other antioxidant compounds.

<b>RO.181.</b>	
<b>Title EN</b>	<b>DEMOSICAM – KIT FOR TREATMENT OF CANINE DEMODICOSIS</b>
<b>Authors</b>	Mederle Narcisa, Dărăbuș Gheorghe, Mederle Ovidiu, Morariu Sorin, Pătrașcu Mariana, Kumbakisaka Sorin, Albu Kaya Mădălina
<b>Institution</b>	<b>University of Life Science "King Michael I" from Timisoara</b> <b>Project PN-III-P2-2.1-CI-2017- 0446</b>
<b>Description EN</b>	<p>The project contributed to the encouragement of the economic agent (S.C. Primosal S.R.L.) to invest in research and development activities for the launch on the market of innovative products and services based on the already existing technologies and for the realization of a high-performance manufacturing line in order to obtain the Demosimcan kit - shampoo and gel used in veterinary medicine (clinics and veterinary offices), as well as the development of sustainable and sustainable partnerships between the economic agent and USV Timisoara.</p> <p>I highlight just a few of the important aspects of the impact that the project results had in the field of research:</p> <ul style="list-style-type: none"> <li>» Development of organic products, based on plant extracts - as antiparasitic ingredients and collagen - as an eco-friendly ingredient of regeneration of already parasitized skin, with rapid skin absorption, effective in the remission of demodectic lesions and without irritating effect on the skin</li> <li>» Making a new, environmentally friendly product, an active biological complex of absolute novelty worldwide and with export potential (increasing the quality of life by stimulating economic growth), demosimcan kit (shampoo and gel)</li> </ul>
<b>RO.182.</b>	
<b>Title EN</b>	<b>CHARACTERIZATION OF HYPOGLYCEMIC COOKIES OBTAINED FROM GLUTEN-FREE FLOURS</b>
<b>Authors</b>	Camelia Moldovan, Maria Laura Szasz-Toma, Ancuța Maria Popa, Cristina Toța, Viorica-Mirela Popa, Diana-Nicoleta Raba, Aurica-Breica Borozean, Corina-Dana Mișcă, Despina-Maria Bordean, Mariana-Atena Poiana, Delia-Gabriela Dumbravă

**Institution** University of Life Sciences "King Mihai I" from Timisoara

**Description**  
**EN** In this work, the possibility of using coconut and almond flour was studied in order to obtain hypoglycemic cookies intended for people with special nutritional needs. Three types of cookies were obtained: control (with wheat flour), with almond flour and with coconut flour. The sensory evaluation showed a very good acceptability of the products, and the physico-chemical analysis highlighted the reduction of moisture, and acidity, respectively the increase in ash content, the improvement of antioxidant activity and higher caloric value in products obtained from coconut or almond flour.

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**RO.183.**

**Title EN** **DEVELOPMENT AND INTRODUCTION ON THE MARKET OF A RANGE OF INNOVATIVE FOOD SUPPLEMENTS WITH SUPERIOR BIOAVAILABILITY BASED ON BEE PRODUCTS AND ESSENTIAL OILS**

**Authors** Raba Diana Nicoleta, Dumbrava Delia Gabriela, Alexa Ersilia Calina, Poiana Mariana Atena, Cocan Ileana, Obistioiu Diana Monica, Ciucur Radu Ioan, Stoia Sorin

**Institution** University of Life Science "King Michael I" from Timisoara/Technology Transfer Centre

**PROJECT POR/824/1/1/** Promotion of investments in R&I, development of links and synergies between enterprises, research and development centres and higher education, Operation C - Investments for SMEs for the implementation of a research-innovation result

**Description**  
**EN** The project aims to develop and introduce on the market a range of innovative food supplements with superior bioavailability based on bee products and essential oils. Through collaboration with the USVT Technology Transfer Centre, a new range of honey-based foods will be developed and the technical skills for their production will be created. A technology will also be developed with optimized operating conditions and preparation mode of the basic matrix, ensuring functionality and bioavailability of the active principles in the ingredients used and long shelf life of the product without requiring chemical or physical preservation

processes.

<b>RO.184.</b>	<b>IMPLEMENTATION OF TECHNOLOGY TRANSFER TO ACHIEVE INNOVATIVE FUNCTIONAL FOODS ENRICHED IN BIOACTIVE COMPOUNDS -CTTU 2020 SMIS 140030</b>
<b>Title EN</b>	Radulov Isidora, Alexa Ersilia Calina, Poiana Mariana Atena, Raba Diana Nicoleta, Misca Corina Dana, Cocan Ileana, Negrea Monica, Gaspar Sorin, Suster Gabriel Adrian, Dragomir Christine, Dossa Sylvestre
<b>Authors</b>	<b>University of Life Science "King Michael I" from Timisoara/Technology Transfer Centre</b>
<b>Institution</b>	<b>PROJECT POR/824/1/1/Increasing innovation in firms by supporting innovation and technology transfer entities in domains of smart specialisation, Code SMIS 140030</b> The project aims to develop continuous links and synergies between academia and the private sector in the field of technology research, technology transfer and eco-innovation. In this sense, through the Technology Transfer Centre (TTC) of USAMVBT, scientific, logistic and informational support is provided for the development and implementation of technologies to obtain functional flour premixes with added fruits, rich in active principles, usable as vegetable matrices in bakery, farinaceous food, pastry and confectionery technology. The research results expressed in optimized solutions for obtaining functional premixes with multiple food uses will be transferred to the economic environment, agricultural raw material processing units, for production and marketing on the food market or HORECA.
<b>Description EN</b>	

<b>RO.185.</b>	<b>KIT AND METHOD FOR THE RAPID DIAGNOSIS OF PIG REPRODUCTIVE RESPIRATORY SYNDROME</b>
<b>Title EN</b>	STANCU ADRIAN, CATANA NICOLAE, LUCA IASMINA, TULCAN CAMELIA, MIRCU CALIN, LUNGU BIANCA-CORNELIA, HUTU IOAN, PASCA SORIN-AURELIAN
<b>Authors</b>	<b>UNIVERSITY OF THE LIFE SCIENCE "MICHAEL KING I" FROM TIMISOARA,</b>
<b>Institution</b>	

**A 100627**

The kit for rapid diagnosis of PRRS syndrome characterized by the fact that it consists of: a. A suitcase (bag) made of durable material with a compartmentalized interior, with the possibility of cooling and heating some compartments at the car power outlet. b. A cold compartment in which a container of anti-PRRS monoclonal antibodies is kept; c. A compartment for the sampling and transport systems in liquid environment of the oronasal jet in which a sterile stick is transported in a sterile test tube and some sterile containers for tissue samples in the case of sampling, tissue samples of lymph nodes from dead bodies, which if not executed on the spot can be inserted into the cooled compartment of the kit; d. A compartment for some glassware, compartment intended for storage of slides and glass slides for smear/microscope, a beaker and pipettes; e. A compartment for some 1-100 µl and 100-1000 µl micropipettes; f. A compartment for some liquid containers of maximum 100 ml for: 1. double-distilled water, 2. PBS solution, 3. Blue Evans solution, 4. ethyl alcohol and 5. acetone; g. A compartment for an ultraviolet light microscope - 20X objective; h. A warm compartment for short-term microincubation – usually one hour at a temperature of 37°C; i. A pocket-like compartment for some absorbent paper/filter paper; j. A pocket compartment for some documents and observation / necropsy examination sheets.

2. The method for rapid diagnosis of PRRS syndrome, characterized by the fact that it is carried out in the following stages: - degreasing the glass slides with ethyl alcohol; - displaying the samples from the jetage (a drop) or from the lymph nodes by fingerprinting on the slides; - drying the slides with the displayed pathological material; - fixing the slides with the pathological material in acetone for 15 minutes; - drying the blades; - washing slides with PBS-Blue Evans solution; - final drying of the blades; - deposition of the conjugate with fluorescein on dry slides (0.1 µl); - incubation of the slides for one hour at a temperature of 37°C; - examination of the slides under the microscope with ultraviolet light; - interpretation and analysis of the results.

3. The method for rapid diagnosis of PRRS syndrome according to claim 2, characterized in that the interpretation of the results is done in the following way: - In the case of positive samples, in the microscopic field, o lymphocytes of different sizes are observed, which can be interpreted as small, medium, large lymphocytes and plasma cells, whose cytoplasm is intensely fluorescent due to the fact that viral antigens are coupled with fluorescein-labeled antibodies, o the size of lymphocytes with fluorescent cytoplasm is appreciated by the obvious cell outline, the well-individualized nuclei, and the ratio between nucleus and cytoplasm was approximately equal (small and medium lymphocytes), large lymphocytes have a similar appearance, plasma cells have an elongated shape with an oval nucleus, with the

**Description**  
**EN**

cytoplasm dominant relative to the nucleus, and the cytoplasm of PRRS virus-infected cells has a bright yellow-green appearance. - In the case of a negative sample (in the absence of the virus), no lymphocytes with fluorescent cytoplasm are observed.

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**RO.186.**
**Title EN**

**MINERAL PREMIX USED FOR LAYING HENS  
REARED IN ECOLOGICAL SYSTEM**

**Authors**

Ștef Lavinia, Julean Călin, Simiz Eliza, Peț Ioan

**Institution**

**University of Life Sciences "King Mihai I" from  
Timisoara  
RO 132411 B1/29.01.2021**

The invention refers to the design and testing of a mineral premix structure dedicated for laying hens reared in ~~an~~ ecological systems, producing eggs ~~are used~~ for human consumption.

The original formulation of structure of mineral premix specific for laying hens, according to this patent is based on:  
-establishing through laboratory analyzes the content of microelements of main feeds used in the feed of laying hens maintained in an ecological system. The micromineral content values of the basic feed were established at 60 ppm Fe, 20 ppm Mn, 28 ppm Zn, 7 ppm Cu, 0.12 ppm Co, 0.06 ppm I and 0.26 ppm Se, which indicates a satisfaction of the mineral requirements in a proportion of 70-100% and the need to supplement them through premixes.

**Description  
EN**

-through direct experiments, a mathematical equation was established with a high coefficient of multiple determination for each of the 7 microelements studied, resulting in the following values of micromineral supplementation: 10 ppm Fe, 20 ppm Mn, 20 ppm Zn, 1.5 ppm Cu, 0.125 ppm Co, 0.2 ppm I and 0.10 ppm Se.

-the structure of the specific mineral premix for laying hens maintained in an ecological system was developed, consisting of: 22.398% iron carbonate, 44.795% manganese carbonate, 26.451% zinc oxide heptahydrate, 5.567% basic copper carbonate, monohydrate 0.235% basic cobalt carbonate, monohydrate, 0.331% calcium iodate, anhydrous and 0.224% sodium selenate which is incorporated into a calcium carbonate support. The premix is introduced in a proportion of 0.5% in the structure of the concentrate mixture that is administered to this category of poultry.

**RO.187.****Title EN**

**RENEWABLE ENERGY SOURCES AND CIRCULAR ECONOMY APPLIED IN AN ACADEMIC COMMUNITY AS AN EXAMPLE FOR SMART SUSTAINABLE DEVELOPMENT**

**Authors**

Vintilă Teodor<sup>1</sup>, Popescu Cosmin Alin<sup>1</sup>, Radulov Isidora<sup>1</sup>, Horablaga Adina<sup>1</sup>, Marco Di Stanislao<sup>2</sup>

**Institution**

<sup>1</sup>University of Life Sciences "Regele Mihai I" from Timișoara; <sup>2</sup>STRATA SpA Roma Italia, Sucursala Timișoara

**PROJECT 2020/554215**

**Description  
EN**

The project consists of a dispatchable energy system formed of combined heat and power cogeneration biogas plant (88 kW) and PV roof-top solar (150 kW) plant on the premises of the ULS Timisoara. The project will utilize available bio resources, currently being wasted, and vacant roof-top space on university buildings. The biogas plant will use as feedstock by-products derived from university campus, including animal waste from university farm, food residues from canteen, crops by-products and other organic residual materials available in the proximity of the campus. The constant energy production from the biogas plant will represent the base load energy production and self-consumption by the campus, (both for electric and thermal energy), while, the roof-top solar photovoltaic system installed at the campus buildings, will cover increased demand of energy consumption during the daylight campus hours. The main goal of the project is to introduce the concept of circular economy in order to create sustainable self-sufficient energy production and consumption from renewable resources. Moreover, the sustainability analysis concluding the cost benefit analysis show that, upon completion, the value of energy produced is sufficient to both cover cost of production and also generate a financial surplus for ULS Timișoara compared to continuing to be fossil energy fuelled as it is today. Total savings of CO<sub>2</sub> equivalents: 2400 tons per year. The project is financially, socially and environmental sustainable.



**National Research and Development Institute for Laser,  
Plasma and Radiation Physics – INFLPR**

**RO.188.**

<b>Title</b>	<b>Physical immobilization procedure for AChE enzyme within Polyethyleneimine polymeric membrane for enhanced active elements within chemical/gas sensors applications</b>
<b>Authors</b>	Dinca V., Viespe C., Scarisoreanu N.D., Brajnicov S., Bonciu A., Ion V., Dinescu M
<b>Institution</b>	<b>National Institute for Laser, Plasma and Radiation Physics</b>
<b>Patent no.</b>	A/00817 14.10.2018
<b>Description</b>	The invention relates to a physical immobilization process of the Acetylcholinesterase-AChE enzyme in a polyethyleneimine-PEI polymer layer for obtaining an composite membrane with improved response to the Dimethyl methylphosphonate-DMMP. The enzyme immobilization process consists in using laser evaporation and an ACHE-PEI double target system, where the laser beam is scanned on the surface of the target to evaporate the two compounds within the same deposit. PEI-AChE composite membranes deposited on SAW sensors and DMMP-tested were obtained. The process can be applied for the immobilization of biologically active compounds in polymeric membranes with applications in tissue engineering, biosensors, chemical sensors.

**RO.189.**

<b>Title</b>	<b>Discriminative detection method of analytes using surface acoustic wave sensors in a tunable oscillatory circuit.</b>
<b>Authors</b>	Nicolae Ionut, Marcu Aurelian, Viespe Cristian, Miu Dana
<b>Institution</b>	<b>National Institute for Laser, Plasma and Radiation Physics</b>
<b>Patent no.</b>	A/00337/15.06.2021
<b>Description</b>	The invention refers to a method of analytes discrimination based on the frequency deviation measurement of a tunable oscillatory circuit, having a surface acoustic wave sensor (SAW) connected in its positive reaction loop. The fundamental operating frequency is controlled by adjusting

the value of an adjustable resistance placed within the oscillator amplifier feedback loop. The control of the gas composition in the SAW sensor chamber is achieved by introducing a known quantity of the analyte in the synthetic air atmosphere. Thus, in the presence of an analyte, the oscillator circuit frequency will change from its fundamental frequency, depending on the quantity and type of analyte, but also depending on the chosen fundamental frequency of oscillation.

**RO.190.**

**Title** **New microstructured polymeric surfaces used as biointerfaces of silicone capsules in breast implants**

**Authors** Dinca Valentina, Nistorescu Simona, Bonciu Anca, Dumitrescu Nicoleta, Rusen Laurentiu

**Institution** **National Institute for Laser, Plasma and Radiation Physics**

**Patent no.** **A16704/25.11.2022**

**Description**

The invention refers to the obtaining by replication of new polymer platforms based on polydimethylsiloxane, which have as their main characteristic a microstructure with the specific shape of hexagonal matrices, used both to inhibit the growth of fibroblasts and to activate monocytes, with direct applications in silicone surfaces used as membrane/encapsulation biointerfaces in breast implants. The design of these structures was based on the effect of topography on two cell lines involved in the interaction of the breast implant with the host organism. The problem that the present invention solves is obtaining new microstructured polymeric surfaces that can induce a different cellular response of fibroblasts and macrophages, so that they can be used as interfaces in breast implants. More precisely, the microstructuring of the surface leads to the inhibition of fibroblast adhesion known to reduce the collagen synthesis of fibroblasts, but allows the adhesion of macrophages to the surface.

It is noteworthy that the morphological phenotype of the adhered cells is not that corresponding to macrophages stimulated with bacterial endotoxins (M1), which indicates the absence of an inflammatory potential.

**RO.191.**

<b>Title</b>	<b>Procedure for obtaining Ge-Si nanoparticles as active materials for anodes for Li ion rechargeable batteries</b>
<b>Authors</b>	Claudiu. Fleaca, Florian Dumitrache, Lavinia Gavrilă-Florescu, Marius Dumitru, Evghenii Goncareenco, Monica Scarisoreanu, Mihaela-Ramona BUGA, Giorgian Cosmin UNGUREANU
<b>Institution</b>	<b>National Institute for Lasers, Plasma and Radiation Physics; National Research And Development Institute For Cryogenic And Isotopic Technologies</b>
<b>Patent no.</b>	A/00455/25.10.2022
<b>Description</b>	This invention describes a procedure for obtaining nanoparticles based of Ge-Si for the purpose of applying them as active materials for energy storage in anodes for Li ion rechargeable batteries. Using a mix of gas state precursors – SiH <sub>4</sub> and the vapours from the volatile liquid – GeCl <sub>4</sub> and being entrained by an inert carrier gas (Ar), spherical nanoparticles have been synthesized through laser pyrolysis. These have dimension under 120 nm which mainly contained crystalline phases of Ge-Si alloy in which Ge and GeO <sub>2</sub> is predominant, with a reduced content of SiO <sub>2</sub> as a minority phase. Ge-Si nanoparticles were used for obtaining anodes for Li ion batteries by adding conducting and binding agents that were tested by repeatedly charging and discharging on semi-cells with Li cathode and LiPF <sub>6</sub> electrolytes, mixed with organic carbonate; these anodes preserved at C/5 after 5 cycles and 1C after 200 cycles, a discharge capacity of 774 mAh/g and a coulombic efficiency of 100%.

**RO.192.**

<b>Title</b>	<b>Transparent conductive oxides from doped and undoped vanadate-borate-phosphate systems for photonic devices</b>
<b>Authors</b>	Ana Violeta FILIP, Valentin CRACIUN
<b>Institution</b>	<b>National Institute for Laser, Plasma and Radiation Physics</b>
<b>Patent no.</b>	PD 42/ 2022 / PN-III-P1-1.1-PD-2021-0682
<b>Description</b>	The aim is to obtain, through the conventional melt-quenching technique and the sol-gel method, TCO in doped and undoped vanadate-boron-phosphate systems. The system

compositions will be created by varying the molar percentage of VO<sub>2</sub> and of the two dopants to optimize the properties of these materials. All samples will be characterized structurally, morphologically, thermally, optically, electrically, and mechanically. The chemical stability will also be analyzed. The obtained vanadate systems will have better electrical conductivity in the conditions of enhanced chemical and thermal stability.

**RO.193.**

<b>Title</b>	<b>Process for the production of membrane-electrode-gas diffusion layer assemblies based on plasma-assisted graphene nanowalls for high performance fuel cells</b>
<b>Authors</b>	Trefilov Alexandra Maria Isabel, Vizireanu Sorin, Biță Bogdan Ionuț, Stamatini Ioan, Dinescu Gheorghe
<b>Institution</b>	<b>National Institute for Laser, Plasma and Radiation Physics</b>
<b>Patent no.</b>	Patent application No. A 00635/2020
<b>Description</b>	The invention relates to a process for producing membrane-electrode-microporous layer (MEA) assemblies based on graphene nanowalls thin films with optimised key properties: specific area, hydrophobicity, electrical conductivity, stability and gas permeability. The process proposed in this patent application aims to produce an MEA assembly that eliminates the drawbacks of current preparation methods and incorporates materials with favourable microporous layer properties. To this end, a low temperature and low pressure TLC heat transfer process is proposed to obtain MEA-MPL. It is characterised by the addition of a high-frequency plasma deposition step of a superhydrophobic microporous layer (made of a graphene nanowall film) directly on the sacrificial substrate. Assemblies prepared by this process, using undeteriorated graphene nanowalls films as components, exhibit improved performance over conventional assemblies.

## National Institute of Materials Physics

### RO.194.

**Title** **Binder-free vanadium dioxide VO<sub>2</sub>(B) thin films directly grown on aluminum foil by pulsed laser deposition as battery cathode and preparation method thereof**

**Authors** Teddy TITE, Mihaela Buga

**Institution** **National Institute of Materials Physics, Romania**

**Patent no.** Patent application No. A00665/2022

**Description** Binder-free vanadium dioxide thin films with B polymorph phase (VO<sub>2</sub>(B)) deposited on aluminium as advanced cathodes for battery are provided; a method for their preparation by pulsed laser deposition and their characterization by electrochemistry. Laboratory design working electrode for the investigation of electrochemical properties using three-electrodes configuration in different electrolytes. The said designed working electrode holder aimed to compare with an accurate similar working area different working electrode. Exploratory development of CR2032 coin cells devices for lithium-ion battery energy storage comprising the integration of the vanadium oxide active material as cathode, a Li plate as anode, LiPF<sub>6</sub> in ethylene carbonate: dimethyl carbonate, as electrolyte; glass Microfiber filters were used as separator ort description of your invention.

### RO.195.

**Title** **Hybrid perovskite-based mini-solar module and corresponding encapsulation method**

**Authors** Lucia Nicoleta Leonat, Andrei-Gabriel Tomulescu, Gabriel Dobrescu, Adelina Ighigeanu, Marian Lazăr, Viorica Stancu, Vasilica Toma

**Institution** **National Institute of Materials Physics, Magurele, ROMANIA**

**Patent no.** Patent application No. A/ 00625/ 12.10.2022

**Description** The present invention relates to a solar photovoltaic mini module, operating under direct solar radiation and to a specific design of the top electrodes with a specific geometry and the mini-module encapsulation. The solar photovoltaic module consists of several solar cells based on hybrid perovskite thin films, manufactured simultaneously on a

single glass substrate by physical and chemical deposition methods, which is finally encapsulated using a specifically adapted process so that, by encapsulation to avoid the damage of the component materials of the solar cells.

**RO.196.**

**Title** **Novel silicate vitroceramic phosphor with  $\text{CaF}_2\text{-Eu}^{2+}$  nanocrystals homogenously dispersed and remarkable fluorescence and transparency properties**

**Authors** Mihail Secu, Corina Secu

**Institution** **National Institute of Materials Physics, Magurele, ROMANIA**

**Patent no.** Patent application No. A100129/16.03.2022

**Description** We produced a novel silicate vitroceramic phosphor with  $\text{CaF}_2\text{-Eu}^{2+}$  nanocrystals homogenously dispersed within a silica glass matrix, by using sol-gel chemistry method. The vitroceramic phosphor, shows remarkable properties: blue fluorescence with high efficiency ( $\cong 76\%$ ) under ultraviolet irradiation due to the  $\text{Eu}^{2+}$  ions and good optical transparency ( $\cong 70\%$ ) due to the nanocrystals smallness. The remarkable fluorescence properties of the nanophosphors doped with  $\text{Eu}^{2+}$  ions are widely applied in various fields: lighting and display areas, scintillator detectors, X-ray storage phosphors for digital imaging applications, and persistent phosphors.

**RO.197.**

**Title** **Diode type multilayer organic device, transparent and flexible based on electrospun polymeric fibers and organometallic compounds and its manufacturing process**

**Authors** Iulia Corina Ciobotaru, Constantin Claudiu Ciobotaru, Alexandru Evanghelidis, Silviu Polosan, Ionut Enculescu, Angela Casarica.

**Institution** **National Institute of Materials Physics, Magurele, ROMANIA**

**Patent no.** -----

**Description** The present invention describes a multilayer organic device, together with the manufacturing process, consisting of a polymer fiber network covered with a metal layer acting as an anode, a hole carrier layer based on conductive polymers, an emissive layer based on organometallic compounds, a

buffer layer based on lithium fluoride and a metal layer acting as a cathode. All layers adjacent to the polymer fiber network have a well-defined geometric configuration to avoid short-circuiting in the final device. Integrating the structure into a transparent and flexible multilayer organic device and applying a voltage allows obtaining a diode characteristic, an aspect that is fundamental in a wide range of applications using electronic display technology.

**RO.198.**

**Title** **Copper and Gallium co-substituted phosphate-based bioactive glass coated endo-osseous implants with extended antimicrobial activity, conditioned in intensity and duration by the thickness of the bioresorbable coating layer**

**Authors** George STAN, Adrian-Claudiu POPA, Cristina BEȘLEAGĂ  
**Institution** National Institute of Materials Physics, Magurele, ROMANIA

**Patent no.** Patent No. RO 134819 B1 (published in BOPI No. 9/2022)

**Description** The invention refers to a bio-functionalisation protocol of a metallic, orthopaedic or dental endosseous, implants, with phosphate-based bioactive glass (PBG) thin-films, deposited by the radio-frequency magnetron sputtering (RF-MS) technique, possessing extensive antimicrobial activity, which can be conditioned as intensity and duration by the thickness of the sacrificial bioresorbable layer of PBG. The process according to the invention consists in the deposition on the outer surface of a metal endo-osseous implant of a PBG layer by RF-MS from a cathode target of mild-pressed glass powder with a predefined composition (i.e.,  $P_2O_5$ -CaO- $Na_2O$ - $Fe_2O_3$  with additives of CuO and  $Ga_2O_3$  in the range of 2...4 mol%), at a working argon gas pressures in the range 0.2...1.0 Pa (which allows the control over the composition of the PBG films), a target-to-substrate separation distance of 35 mm and a deposition temperature  $<100^\circ C$ ; the resulting deposited thin PBG layers are continuous, porous, uniform, and well-adhered to the metallic substrate. The engineered thickness modification of the PBG implant-type coatings (in the range of min. 100 nm – max. 1500 nm) enables a strong antibacterial activity (against the *Staphylococcus aureus* and/or *Escherichia coli* strains) which can be tailored as intensity and duration, fostering the path towards a reduced incidence of post-surgery infections.

**RO.199.****Title**

**Energy efficient memristor based on orthorhombic tin selenide flakes and method of making the same**

**Authors**

Angel-Theodor Buruiana, Amelia Elena Bocirnea, Andrei Kuncser, Teddy Tite, Elena Matei, Claudia Mihai, Aurelian Cătălin Gâlcă, Alin Velea

**Institution**

National Institute of Materials Physics, Magurele, ROMANIA

**Patent no.**

Patent application No. A/0776/2022

**Description**

This patent application claims an energy-efficient memristor based on orthorhombic tin selenide flakes and the method of obtaining it. The energy-efficient memristor consists, in one variant, from a nanometric thin crystalline tin selenide plate, which has a lateral size between 20  $\mu\text{m}$  and 100  $\mu\text{m}$  and a thickness of less than 100 nm, transferred between two metallic contacts. The elemental composition of the orthorhombic plate is formed of Sn with a concentration between 45% and 55% and Se with a concentration between 45% and 55%. The threshold voltage for switching from a high electrical resistance state to a low electrical resistance state is 3 V with an operating current of  $10^{-4}$  A. The switching mechanism between these two states is migration of charged defects towards grain boundaries or local phase change in the TMD channel. The method for producing memristors from tin selenide is a simple one consisting of two steps: obtaining nanometric orthorhombic tin selenide flakes on a substrate, which can be Si/SiO<sub>2</sub>, quartz, or sapphire, by physical vapor transport at atmospheric pressure and transferring them between two metallic contacts using a dry method involving the use of an adhesive material, which can be PDMS or GelPak. The tin selenide flakes are obtained at a temperature between 600°C and 800°C from high-purity SnSe powder. During the synthesis, which takes between 10 and 30 minutes, the gas flow, which can be N<sub>2</sub>, Ar, or a mixture of H<sub>2</sub> and Ar, transports the vapors of SnSe, formed by sublimation of the powder, in a manner that favors their condensation on the substrate in the form of monocrystalline orthorhombic flakes. It can be implemented in neuromorphic computing systems as it can mimic a synapse in the neural network of the human brain. or it can be used as a storage cell in memory devices.



**RO.200.**

**Title** **Laminated composites based on recycled plastic foils from packaging**

**Authors** BADICĂ Petre, BURDUŞEL Mihail, GRIGOROŞCUŢĂ Mihai Alexandru, COSTESCU Ruxandra

**Institution** National Institute of Materials Physics, Magurele, ROMANIA

**Patent no.** Patent application No. A100516/2508.2022

**Description** The present invention refers to the recycling of plastic (example: PET) by the SPS electric field assisted sintering method, for the manufacture of layered composite materials formed from plastic foils cut from packaging, between which are inserted intermediate layers of reinforcement which can be foils, fibers or powders from organic or inorganic materials.

The invention solves the problem of direct 'gluing' of some polymers from packaging with the formation of chemical bonds on various material surfaces, at the interface between the layers, without using adhesives and without melting the component materials. The patent offers new possibilities in the realization of composites with matrixes of polymer foils, multilayered.

**RO.201.**

**Title** **VIS-SWIR photosensitive nanocrystalline SiGeSn thin film and fabrication method**

**Authors** Magdalena Lidia Ciurea, Ionel Stavarache, Ana-Maria Lepadatu, Sorina Lazanu, Toma Stoica

**Institution** National Institute of Materials Physics, Magurele, ROMANIA

**Patent no.** RO134049-B1

**Description** Thin films of semiconductor group IV alloy SiGeSn NCs with photosensitivity in the range of 0.6 – 1.35  $\mu\text{m}$  from VIS-SWIR are fabricated. The films play the role of photoactive components in optoelectronic devices such as VIS-SWIR optical sensors. The films fabrication is complementary metal oxide silicon (CMOS)- compatible, and the magnetron sputtering technology used for the films deposition is cost-effective, versatile and suitable for

industry, providing high quality and uniform films under much more relaxed growth / deposition conditions than CVD and MBE. The fabrication steps are: 1) standard processing of Si wafers in cleanroom for cleaning and removal of native  $\text{SiO}_2$ ; 2) deposition of  $\text{Si}_x\text{Ge}_{1-x-y}\text{Sn}_y$  films ( $\approx 9\%$  Sn in the alloy) by magnetron co-sputtering from separate targets of SiGe and Sn; 3) rapid thermal annealing in RTP processor for films nanostructuring, i.e. formation of SiGeSn NCs. The spectral photoresponsivity measurements performed on photosensors based on SiGeSn NCs films with top ITO transparent electrode and bottom Al contact evidenced their high performance in a broad spectral range from  $0.6\ \mu\text{m}$  in visible to  $1.35\ \mu\text{m}$  in short-wave infrared.

Thus, the proposed films have **applications** in Si optoelectronics/photonics to be used as VIS-NIR-SWIR photoactive components in cheap market photosensor/photodetector devices instead of the toxic and expensive InGaAs, HgCdTe, PbS and PbSe-based devices. Applications: monitoring of slippery (wet, icy) road conditions for traffic safety, internet of things, biomedical applications.

## National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest

**RO.202.**

<b>Title</b>	<b>Hydrophobic coating with self-cleaning and antimicrobial properties for artificial elements of vernacular constructions and method of obtaining it</b>
<b>Authors</b>	Radu Claudiu Fierascu, Toma Fistos, Irina Fierascu, Alina Melinescu, Anton Fikai, Denisa Fikai, Lia Mara Ditu, Carmen Curutiu
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest/ University POLITEHNICA of Bucharest/ University of Bucharest</b>
<b>Patent no.</b>	Patent application No. A00773/2022
<b>Description</b>	<p>The present invention relates to a nanocomposite coating material with self-cleaning, photodegradation and antimicrobial properties, which provides protection (strengthening) for artificial building elements in the composition of vernacular constructions (materials with high silica content), based on modified polymeric hydrophobic nanocomposites with amorphous silica (having a consolidating and self-cleaning role), a photocatalytic component (in order to reduce the accumulation of pollutants, biofilm and particles on these surfaces), to which is added a component with an antimicrobial effect, dispersed in an alcoholic solution.</p>

Acknowledgements. This work was supported by a grant of the Ministry of Research, Innovation, and Digitization, CCCDI-UEFISCDI, project number PN-III-P2-2.1-PED-2021-0627, contract 591PED/2022, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

**RO.203.**

**Title** **Composite material based on glass ionomer cement and phytosynthesized metallic nanoparticles with improved antimicrobial properties and procedure for obtaining**

**Authors** Radu Claudiu Fierascu, Roxana Ioana Matei (Brazdis), Anda Maria Baroi, Toma Fistos, Irina Fierascu, Lia Mara Ditu

**Institution** **National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest**

**Patent no.** Patent application No. A00104/2023

**Description** The present invention refers to a composite material with improved antimicrobial properties, without negatively affecting the physical and mechanical properties, intended for use in dental applications, consisting of aluminofluorosilicate glass with a particle size below 45  $\mu\text{m}$ , the liquid component of the glass ionomer cement and a solution of phytosynthesized metallic nanoparticles in extracts of plants from the Lamiaceae family with crystallite size below 25 nm, the process of obtaining the composite material consisting of three stages, the phytosynthesis of metallic nanoparticles, followed by mixing with aluminofluorosilicate glass until complete homogenization, and in that of in the third stage, the liquid component of the glass ionomer cement is added.

Acknowledgements. This work was supported by a grant of the Ministry of Research, Innovation, and Digitization, CCCDI-UEFISCDI, project number PN-III-P4-PCE-2021-0292, contract 92PCE/2022, within PNCDI III. It is also acknowledged the support of Ministry of Research, Innovation and Digitization through Program 1 - Development of the national research-development system, Subprogram 1.2-Institutional performance- Projects to finance excellence in RDI, Contract no. 15PFE/2021.

**RO.204.**

**Title** **Sensitive hybrid films molecularly imprinted with thiodiglycol coating screen printed carbon electrodes, and process for manufacturing them**

**Authors** Ana Mihaela Gavrilă, Tanța Verona Iordache, Andrei Sârbu, Ana Lorena Ciurlică, Anamaria Zaharia, Anita Laura Chiriac, Teodor Sandu, Elena Bianca Stoica, Steluța Apostol

**Institution** **National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest**

<b>Patent no.</b>	Patent application No. RO135012A2/2021
<b>Description</b>	The invention relates to a process for manufacturing sensitive hybrid films, using the molecular imprinting technique, with application in the electrochemical detection of thiodiglycol (TGD), the simulant of blister agent mustard gas, from aqueous solutions.

**RO.205.**

<b>Title</b>	<b>Liposomes with germinated seed extracts for use in the food industry and process for preparing the same</b>
<b>Authors</b>	Diana Georgiana Pasarin, Andra-Ionela Ghizdareanu
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest</b>
<b>Patent no.</b>	Patent application No. A00070/2023
<b>Description</b>	The invention relates to a liposome-based composition containing germinated seed extracts rich in biologically active compounds with high encapsulation efficiency for use in the food industry and the process of preparing the same. The liposomes in the form of freeze-dried powder contain extracts of germinated seeds of amaranth or red clover as functional components and help to increase the efficiency of the bioactive compounds of the extracts, improving their bioavailability and stability to degradation in vivo. According to the invention the liposomal composition consists of the following components: 1.5...10% soy lecithin powder, 1.5...10% egg lecithin powder, 0.5...5% cholesterol, 0.5...5% amaranth or red clover germinated seed extract, 7.5...22% trehalose, 50...88% distilled water. The encapsulation of extracts from germinated amaranth or red clover seeds in liposomes increases the bioavailability of the encapsulated bioactive substances; enhances intestinal absorption; ensures protection and controlled release of sensitive active ingredients; the extracts from germinated seeds encapsulated in liposomes have prolonged shelf-life.

**RO.206.**

<b>Title</b>	<b>Process and equipment for continuously harvesting microalgal biomass by electrocoagulation-flocculation processes</b>
<b>Authors</b>	Sanda Velea, Ana-Maria Galan, Anca Paulenco, Alin Cristian Nicolae Vintila
<b>Institution</b>	<b>National Institute for Research &amp; Development in</b>

<b>Patent no.</b>	<b>Chemistry and Petrochemistry – ICECHIM Bucharest</b> Patent application RO135018A2/2019
<b>Description</b>	<p>The invention relates to a process and to an equipment for continuously harvesting microalgal biomass by electrocoagulation/flocculation processes, having a high yield of 300 liters of algal suspension/24 hours, a recovery efficiency of 90%, at an electric current intensity of 90 mA/cm<sup>2</sup>, with a down time of 30 seconds and a sedimentation time of 5 minutes. The invention uses <i>Nannochloris</i> sp. 424 - 1 for preparing the inoculum in Erlenmeyer flasks, for 8-10 days at 25 ±2°C, until the exponential growth phase is reached, then the inoculum is transferred to an open cultivation basin, at a volumetric ratio of 1/9 (v/v) inoculum to Zarrouk nutrient medium. Up to 300 liters of microalgal suspension are harvested daily and processed by concentration in the sedimentation system, consisting of an Al enclosure (working volume 100 ml) and a sacrificial Al electrode (surface area 24,55 cm<sup>2</sup>) supplied with current from a MPS 6003 source (intensity 3.22A), the coagulated microalgal suspension being continuously discharged into a separating basin wherefrom 85% supernatant containing 10% of the algal biomass is separated and the concentrated algal biomass of 20 g/l, with a concentration factor 5, being collected at the bottom of the separating vessel, to be subsequently subjected to the centrifugation operation, and the recovered algal suspension, with a concentration of 0.2 g/l Al is used in a new cultivation stage. The claimed equipment consists of: electrocoagulation reactor, source, basin with microalgal suspension, basin with coagulated microalgal suspension and pumps for recycling the suspension.</p>

<b>RO.207.</b>	
<b>Title</b>	<b>Procedure for manufacturing of a miniaturized electrochemical sensor for the determination of nitrite in soil</b>
<b>Authors</b>	Ana-Maria Gurban, Mihaela Doni, Lucian-Gabriel Zamfir, Maria Luiza Jecu, Iuliana Răut, Mariana Constantin
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest</b>
<b>Patent no.</b>	<b>Patent application No. A00743/2022</b>
<b>Description</b>	The invention describes the process for obtaining a

miniaturized and flexible electrochemical sensor based on an electrosensitive material for the selective determination of nitrites in the soil. The electrosensitive layer consists in the simple deposition onto the active surface of a carbon paste screen-printed electrode, realized on the flexible PVC support, of a mixture obtained through the incorporation of the multi-walled carbon nanotubes (MWCNT) into a low molecular weight chitosan (CS) film.

The analytical method according to the invention consists in placing the miniaturized electrochemical sensor in the soil solution and quantifying the nitrite by amperometry. The present flexible electrosensitive sensor of the invention and the analytical method can be used for the determination of nitrite content in different soil samples with a sensitivity as high as  $204.4 \text{ mA} \cdot \text{M}^{-1} \cdot \text{cm}^{-2}$  and a detection limit of  $2.3 \text{ } \mu\text{M}$  nitrite ( $\text{S/N} = 3$ ), being operated at low values of applied potentials, such as  $0.58 \text{ V}$  vs  $\text{Ag/AgCl}$ , decreasing in this way the influence of the potential interfering compounds.

The determination of nitrite content from the soil solution is simple, rapid and efficient, the flexible sensors being easily integrated with a portable detector used in the field, which can gather and transmit the data by wireless connection from multiple sampling points in an agriculture field, thus representing a promising tool for nitrite monitoring in food crops.

The present invention is a result of ERANET-MANUNET NITRISENS 216/2020 project – **Manufacturing of a portable system for nitrite monitoring in soil based on an innovative sensor.**

#### RO.208.

<b>Title</b>	<b>Biomaterials with silver nanoparticles and Ganoderma lucidum metabolites and procedure for their obtaining</b>
<b>Authors</b>	Mariana Constantin, Iuliana Răut, Raluca Suica-Bunghez, Ana-Maria Gurban, Cristina Firincă, Lucian-Gabriel Zamfir, Gelu Vasilescu, Nicoleta Radu, Maria-Luiza Jecu
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest</b>
<b>Patent no.</b>	<b>Patent application No. A00123/14.03.2023</b>
<b>Description</b>	This invention is related to the “green synthesis” of metallic nanoparticles (NPs) that presents many advantages over conventional chemical and physical methods, being safe and

nontoxic for environment. The biosynthesis occurs using *Ganoderma lucidum*, a commonly used medicinal Basidiomycete with distinctive biological properties such as antibacterial, antifungal, anticandidal, antioxidant, anti-inflammatory, anticancer etc. *Ganoderma* secretes extracellular enzymatic systems, proteins, polysaccharides, and secondary metabolites with diverse functions which facilitate the synthesis of NPs. The patent application claims the cultivation of *Ganoderma lucidum* on suitable culture medium, preparation of aqueous mycelium extract, and biosynthesis of AgNPs in presence of silver precursor. The procedure is simple, efficient, ecological, cheap and does not include preparation/purification stages of the raw material and reaction products. The potential impact of AgNPs on health safety and control was proved by the antimicrobial activity expressed against representative pathogenic bacteria, such as *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

This work was carried out through the PN 23.06 Core Program - ChemNewDeal within the National Plan for Research, Development and Innovation 2022-2027, developed with the support of Ministry of Research, Innovation, and Digitization, project no. PN 23.06.01.01-AQUAMAT. This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CCCDI - UEFISCDI, project number PN-III-P2-2.1-PED-2021-1942, within PNCDI III.

#### RO.209.

<b>Title</b>	<b>Compositions and process for obtaining composite hydrogels based on natural polysaccharides and their application in the three-dimensional printing process</b>
<b>Authors</b>	Raluca Ianchiș, Minodora Maria-Marin, Rebeca Leu Alexa, Cătălina Ioana Gîfu, Claudia Mihaela Ninciuleanu, Elvira Alexandrescu, Cristina Scamoroscenco, Sabina Georgiana Burlacu, Cătălin Ionuț Mihăescu, Cristina Lavinia Nistor, Cristian Petcu, Horia Iovu
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest/ University POLITEHNICA of Bucharest</b>
<b>Patent no.</b>	Patent application A00127/2022
<b>Description</b>	The invention relates to the compositions and the method



of obtaining bicomponent hydrogels containing polysaccharides (alginate and salecan). The paste-like hydrogel-hydrogel composites are then employed as inks in the additive manufacturing process to design crosslinked 3D structures highly recommended for use in customized regenerative therapy. This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2019-4216, within PNCDI III.

**RO.210.**

<b>Title</b>	<b>Process for functionalization of natural cellulosic fibers with antimicrobial compositions with selenium nanoparticles</b>
<b>Authors</b>	Florentina Monica Raduly, Valentin Rădițoiu, Alina Rădițoiu, Violeta Purcar, Andreea-Mălina Bivolaru, Iuliana Răut, Mariana Constantin
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest</b>
<b>Patent no.</b>	Patent application No. A2022-00645/18.10.2022
<b>Description</b>	The invention relates to the compositions and the method of The invention refers to a process for functionalizing natural cellulosic fabrics with eco-friendly compositions with antimicrobial activity, consisting in the fact that natural textile materials are subjected to printing with a composition containing a polymeric binder of natural origin, an organic-inorganic hybrid of - a natural extract of phytocomponents obtained from plants of the Ginger family and selenium nanoparticles generated in situ, which can be used as antimicrobial textiles for common clothing or in the medical field.

**RO.211.**

<b>Title</b>	<b>Hybrid materials based on silanized montmorillonite and mesalamine and process of obtaining thereof</b>
<b>Authors</b>	Teodor Sandu, Andrei Sârbu, Marinela Victoria Dumitru, Adi Ghebaur, Horia Iovu, Tanța Verona Iordache, Anita Laura Chiriac, Ana Mihaela Gavrilă, Anamaria Zaharia
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest</b>
<b>Patent no.</b>	RO135062 B1/2022-05-30
<b>Description</b>	The invention refers to hybrid materials based on silanized

montmorillonite and mesalamine, with applications in the treatment of inflammatory bowel diseases, such as Crohn's disease, and to a process for obtaining thereof. The method according to the invention has the advantage of using mesalamine in encapsulated form, which allows its release to be carried out under a controlled manner. Thus, unlike the case of simply ingesting mesalamine, an appropriate release profile is ensured, without the risk of not providing the required amount of medicine at a certain moment.

**RO.212.****Title**

**Cleaning compositions of painted surfaces and procedure for their use**

**Authors**

Rodica Mariana Ion<sup>1</sup>, Mircea Horia Tiorean<sup>2</sup>, Catalin Croitoru<sup>2</sup>, Daniel Munteanu<sup>2</sup>, Lorena Iancu<sup>1</sup>, Ramona Marina Grigorescu<sup>1</sup>, Nelu Ion<sup>1</sup>

**Institution**

<sup>1</sup>National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest / <sup>2</sup>University "Transilvania", Brasov

**Patent no.**

Patent application No. A 2022- 00744 /18.11.2022

**Description**

This invention refers to cleaning compositions for painted surfaces, and the procedure of their use. The cleaning compositions include an ionic liquid based on phosphonium or ammonium salts or imidazolium or piperidinium, in the presence of hydroxy cellulose, and an amount of distilled water.

**RO.213.****Title**

**Development of new materials for the integrated approach of water resources protection: from detection to depollution - AquaMat**

**Authors**

Radu Claudiu Fierascu, Ana Maria Gurban, Irina Fierascu, Teodor Sandu, Valentin Raditoiu, Cristina Enascuta, Irina Elena Chican, Mihaela Doni

**Institution**

**National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest**

**Patent no.**

Project number PN 23.06.01.01, ICECHIM Core program PN 23.06 - ChemNewDeal

**Description**

The aim of the project is to develop monitoring systems, innovative nanomaterials and depollution technologies, through multi- and trans-disciplinary research, at the border between chemistry and other fields, such as environmental protection,

chemical engineering, materials science, etc., with applications in the integrated management of the environment and its monitoring, respecting the concept of eco-innovation.

This work was carried out through the PN 23.06 Core Program - ChemNewDeal within the National Plan for Research, Development and Innovation 2022-2027, developed with the support of Ministry of Research, Innovation, and Digitization, project no. PN 23.06.01.01, AQUAMAT. The support provided by the Ministry of Research, Innovation and Digitization through Program 1-Development of the national research and development system, Subprogram 1.2-Institutional performance-Projects to finance excellence in RDI, Contract no. 15PFE/2021 is also gratefully acknowledged.

#### RO.214.

**Title** Screening and designing biostimulants using electrochemical sensors and fluorescent bioassay: filling the gap between industry and science

**Authors** Ioana Silvia Hosu

**Institution** National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest

**Patent no.** Project number PN-III-P1-1.1-PD-2021-0798, financing contract 116PD/2022

The lack of a strategy in the design of biostimulants must be considered by the scientific community. Biochemical priming is one of the proposed mechanisms in the mode of action of biostimulants and involves increasing tolerance to reactive oxygen / nitrogen species (such as peroxynitrite) under conditions of abiotic stress. Studying and screening different plant mixtures to scavenge these species will lead to faster and more efficient development of biostimulants.

**Description** This project proposes the use of peroxynitrite selective biosensors for the screening and the selection between different statistically designed biostimulant formulations, as well as the validation (mainly fluorescent) and the confirmation of the selected compositions with plant bioassays (studying the resistance to salts, accumulation of biomass/ secondary metabolites).

This work was supported by grants of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-PD-2021-0798, within PNCDI III.

**RO.215.**

<b>Title</b>	<b>Eco-friendly nanocomposites based on bio-PA and bio-fillers for injected auto parts - ECONANO4AUTO</b>
<b>Authors</b>	Zina Vuluga, Ioan Turcu
<b>Institution</b>	<b>National Institute for Research &amp; Development in Chemistry and Petrochemistry – ICECHIM Bucharest/ University POLITEHNICA of Bucharest</b>
<b>Patent no.</b>	Project number PN-III-P2-2.1-PED-2021-0795, financing contract 701PED/2022
<b>Description</b>	<p><b>The scope of the project is the obtaining of bio-polymer nanocomposites with improved properties, recyclable, reusable and bio-integrable at the end-of-life cycle, based on bio-PA and keratin from chicken feathers.</b> Starting from high-performances bio-PA10,10 and a natural waste (chicken feathers) the project will provide at the end a <b>new and innovative technology</b> for obtaining new polymer bio-nanocomposites, lightweight and with improved thermal and mechanical properties for injection moulding of automotive parts. At the same time, the technology developed within the project will provide a <b>viable, low cost and eco-friendly solution</b> for effective using of chicken feathers and reducing of impact on environmental pollution.</p> <p><b>The novelty</b> consists in the <b>development of new polymeric materials, with low impact on the environment</b>, through combination of two key solutions, from nanotechnology and advanced materials fields. The project offers an innovative and efficient solution for the field of smart specialization - Energy, environment and climate changes, namely reducing the CO<sub>2</sub> footprint and accumulations of polymeric waste, by developing and processing of new polymeric materials, lightweight and with improved properties, which allow obtaining sustainable and reusable / recyclable products. This solution will contribute to the implementation of the "smart city" concept, by increasing the quality of life and environmental protection. <b>The originality elements of the project consist in the original experimental models developed, and the laboratory technology validated</b> in the final stage of the project, respectively.</p>

**RO.216.**

<b>Title</b>	<b>Design of new nanocellulose-based gas-carrier systems (CELGAS)</b>
<b>Authors</b>	Denis Mihaela Panaitescu, Adriana Nicoleta Frone
<b>Institution</b>	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest/
<b>Patent no.</b>	Project number PN-III-P4-PCE-2021-0435, financing contract PCE77/2022 The goal of the CELGAS project is to develop innovative oxygen carrier systems capable of delivering oxygen in a controlled manner to the injured tissue.
<b>Description</b>	Severe oxygen deprivation can cause significant problems in chronic wounds, during implantation, or in cases of trauma. Oxygen prevents wound infection and increases cell viability after implantation. Currently, there is no viable solution to deliver oxygen to the grafts or chronic wounds during the healing period. The innovative oxygen-carrier systems developed within CELGAS project will be characterized by high stability, biodegradability, and lack of cytotoxicity and will ensure the controlled release of oxygen. These oxygen-carrying systems will be designed from nanocellulose modified with a biopolymer, representing a “safe” substrate derived from renewable resources, and oxygen-generating species. The biopolymers used to modify nanocellulose are selected from poly (3-hydroxybutyrate), medium chain length polyhydroxyalkanoates and poly(lactic acid). The new oxygen carrying systems designed in the CELGAS project represent efficient gas-releasing nanomaterials for therapeutic applications which will ensure successful healing and reduced hospitalization in case of injured wounds.

## National Institute for Research and Development in Electrical Engineering ICPE CA Bucharest

### RO.217.

<b>Title</b>	<b>Equipment for continuous adjustment of liquid flow, with direct electric drive of the element which performs the modification of the flow section</b>
<b>Authors</b>	Chiriță Ionel, Ovezea Dragoș, Tănase Nicolae, Ilie Cristinel Ioan, Popa Marius
<b>Institution</b>	<b>INCDIE ICPE-CA</b>
<b>Patent no.</b>	Patent Application no. A/00694/2020 The device can be used as both flow and pressure regulator in hydraulic systems and was designed in order to be part of a larger system used for the characterization of particle accelerator electromagnets (FAIR project). The patent request covers only the solution for the flow regulation device.
<b>Description</b>	It allows for extremely fine regulation of the flow section by means of a screw-nut assembly driven by a micro-stepping motor. Thus, a high-resolution measurement can be made on cooled electromagnets, helping in the process of automated cooling by describing part of the model. Flow or pressure regulation, it has already been utilized in a dedicated test stand for particle accelerator electromagnets (FAIR project).

### RO.218.

<b>Title</b>	<b>Process for obtaining a biodegradable Mg-based metal alloy for orthopedic implants</b>
<b>Authors</b>	<b>Tsakiris Violeta, Tâlpeanu Dorinel, Iordoc Mihai Nicolae, Lungu Magdalena-Valentina, Manta Eugen</b>
<b>Institution</b>	National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)
<b>Patent no.</b>	Patent application no. A/00712/2020 The invention relates to a new process for obtaining biodegradable magnesium-based metal alloys, Mg-5%Zn and Mg-5%Zn-0.3%Mn (mass %), by mechanical alloying - spark plasma sintering, from mechanical mixtures of elemental Mg powders of min. 99.8% purity, Zn of min. 99.9% purity and Mn of min. 99.95% purity. Biodegradable magnesium-based metal alloys are produced in cylindrical
<b>Description</b>	

form, with a diameter of  $20.03 \pm 0.1$  mm and a height of  $5.09 \pm 0.1$  mm and are intended for orthopaedic implants as metal accessories such as screws, plates or rods.

Applications: Medicine - Orthopedic Implants.

#### RO.219.

<b>Title</b>	<b>Low-temperature electrolysis module with solid oxide - based separator</b>
<b>Authors</b>	Rîmbu Gimi Aurelian, Petre Valentina Andreea, Iordoc Mihai Nicolae, Teişanu Aristofan Alexandru
<b>Institution</b>	INCDIE ICPE-CA
<b>Patent no.</b>	Patent application no. A/00793/2020
<b>Description</b>	The invention relates to a low-temperature electrolysis module with solid oxide-based separator for hydrogen production. The module contains OL316 electrodes with a separator based on polypropylene containing $\text{SiO}_2$ , which can be used in an alkaline electrolyte environment based on KOH. The advantages of the invention are the following: (1) increased value of the current density as a consequence of boost wettability of the separator surface; (2) enhanced hydrogen production efficiency as a consequence of the increase in current density and the decrease in internal electric resistance and (3) improved thermal stability. Technical characteristics: Electrolyte - KOH (max 30%); Maximum hydrogen production – 5 NL/h; Admissible module voltage – max 12 V (max. 2.4V/cell); Working pressure – 1 bar; Working temperature - $20^\circ\text{C}$ ; System efficiency - 64%.

#### RO.220.

<b>Title</b>	<b>Elastomer with ultra high magnetic permeability with applications in the field of electromagnetic sealing gaskets at low frequencies and flexible magnetic circuits</b>
<b>Authors</b>	Teişanu Aristofan Alexandru, Iordoc Mihai Nicolae, Caramitu Alina Ruxandra, Culcea Andreea Lucica, Ion Ioana

<b>Institution</b>	National Institute for R&D in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)
<b>Patent no.</b>	A/00032/2021
<b>Description</b>	The invention refers to an elastomer type polymer material with ultra high magnetic permeability for using in the construction of electromagnetic sealing gaskets at low frequencies and flexible magnetic circuits. The proposed material which is made of two-component: polysiloxane elastomers and metallic fillers with high permeability, has a maximum elongation of 140% and can be processed by mold extrusion or mold pressing. The material has the appearance and mechanical properties of a compression rubber, with a relative magnetic permeability $\mu_r = 8000 - 22000$ at the frequency of 50Hz. The material keeps these properties in a temperature range between -20 and 140°C.

**RO.221.**

<b>Title</b>	<b>Static converter for supplying five-phase induction motors and command method for the phase fault operation</b>
<b>Authors</b>	Vasile Ionuț, Sburulan Ion-Cătălin, Tudor Emil, Constantin Alexandru-Ionel, Dumitru Constantin
<b>Institution</b>	<b>National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)</b>
<b>Patent no.</b>	Patent application no. A/00254/2021
<b>Description</b>	This converter can be used in several applications, such as: electric traction drives, hoisting equipment, overhead cranes and elevators, electric boats, electric planes, practically any application in which an increased safety in the operation of the equipment is required. The technical problem that this invention solves is to power supply of a five-phase induction motor both under normal operating conditions and in case of a phase failure. In a faulty operating case, the control block of the converter will automatically detect the fault and will make the necessary correction to the control signals of the converter so that the equipment can operate with reduced output power.



**RO.222.**

<b>Title</b>	<b>Five phase induction motor and AC current supply method</b>
<b>Authors</b>	Dumitru Constantin, Vasile Ionuț, Tudor Emil, Constantin Alexandru-Ionel, Sburlan Ion-Cătălin
<b>Institution</b>	<b>National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)</b>
<b>Patent no.</b>	Patent application no. A/00255/2021
<b>Description</b>	There are critical systems that requires continuous operating of the motors, like cooling fluid recirculation pump of a system or in certain glass factories where the performances of the production can slow down but can't be easily interrupted. Also, in transport, it is necessary to reach the destination of a vehicle even in conditions of some failures of the electric motor. The five-phase asynchronous motor with symmetrically distributed windings has the particularity of being able to operate even if one of the supply voltages applied to the motor is accidentally interrupted. In normal operating conditions, the five phase motor presents reduced pulsations of the mechanical torque, reduced values of phase current. In the faulty operation, the motor can provide a reduced output power, for a limited period of time until the possibility of stopping the equipment and fixing the defect.

**RO.223.**

<b>Title</b>	<b>Method for preventing critical deformations in industrial constructions and technological devices based on sensors from ferromagnetic microwires</b>
<b>Authors</b>	Manta Eugen, Pătroi Eros-Alexandru, Iorga Alexandru, Midoni Valentin, Petrushevschi Vitalie, Galca Gheorghe
<b>Institution</b>	<b>National Institute for Research and Development in Electrical Engineering ICPE-CA Bucharest (INCDIE ICPE-CA)</b>
<b>Patent no.</b>	Patent application no. A/00587 / 2021
<b>Description</b>	The invention refers to a method of preventing deformations for industrial and technological infrastructures. The proposed method is applied to prevent disasters, breakdowns, accidents and other unforeseen cases that may occur as a result of irreversible deformations of the above-mentioned objects. The method is based on a ferromagnetic microwires

sensor, which change its magnetic properties under mechanical loads. The sensor sends signals to a detector which emits infrastructure early warning. This method prevents situations in which the deformations of industrial and technological infrastructure exceed the permissible resistance limits, leading to accidents and disasters. The aim of this method is to take necessary measures for preventing critical situations.

## National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Rm. Valcea

**RO.224.**

<b>Title</b>	Metal catalysts on support with bimodal distribution of pores, method of obtaining and uses.
<b>Authors</b>	E.David, A. Armeanu
<b>Institution</b>	National Institute for Research and Development for Cryogenic and Isotopic Technologies
<b>Patent no.</b>	CBI A/00464/29.07.2020/ BOPI nr.2/2021, p. 21
	The invention refers to catalysts formed from an amorphous alumino-silica support that has a bimodal pore size distribution and one or more transition metals as the active component. The support is obtained by a method of co-precipitation by mixing of two alumino-silica gels, prepared so that they have two different sizes of mesopores. The catalysts have the advantage that both the dispersion of the active metal on the support and the diffusion of the products in the pores are optimized. In addition, the catalysts have improved performance in processes of thermocatalytic conversion of the compounds from biomass composition to obtain biofuels and chemical compounds.
	<b>Novelty elements</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>- the use of a new method of preparation of the catalyst;</li> <li>- the bimodal character of the pores of the support that ensures a high distribution of the catalytically active metal on the surface of the support;</li> <li>- the use of a support with a bimodal distribution of the pores (in the range of 4 to 9 nm and 10 to 20 nm, respectively) allows a much larger number of metal crystallites to be fixed on the surface and provides the catalyst with a high catalytic activity for improving the thermochemical conversion reactions of biomass and obtaining fuels and chemical compounds with improved properties;</li> </ul>
	<b>Applications:</b> Production of renewable energy from biomass; environmental protection; waste recycling; production of selective materials; gas separation and purification technologies;

**RO.225.**

<b>Title</b>	<b>CONTROL METHOD AND START-UP SEQUENCE OF A TWO-FUEL CELL HYBRID ELECTRIC VEHICLE TO INCREASE ENERGY EFFICIENCY</b>
<b>Authors</b>	Mircea Răceanu, Adriana Teodora Marinoiu, Elena Carcadea, Mihai Varlam
<b>Institution</b>	National Research and Development Institute for Cryogenic and Isotopic Technologies – ICSI Rm Valcea
<b>Patent no.</b>	CBI nr A/00762/09.12.2021 BOPI 5/2022
<b>Description</b>	The invention relates to a control method and starting sequence of a hybrid electric vehicle powered by a fuel cell system and a lithium/ion battery system. The fuel cell system consists of two independent fuel cell assemblies electrically coupled to a unidirectional power converter through a programmable device so that, depending on the vehicle's operating mode, they are connected in series or independently one at a time. This way of coupling ensures the increase of energy efficiency due to running the vehicle in the zone of maximum efficiency and the increase of the fuel cell's expected life.

**RO.226.**

<b>Title</b>	<b>Process for obtaining the gas diffusion layer, based on carbon fibers, for fuel cells</b>
<b>Authors</b>	Marinoiu Adriana, Raceanu Mircea, Borta Simona, Schitea Dorin, Carcadea Elena, Varlam Mihai
<b>Institution</b>	<b>National Research and Development Institute for Cryogenic and Isotopic Technologies – ICSI Rm Valcea</b>
<b>Patent no.</b>	Patent application No. A/00569/2020
<b>Description</b>	<p>The present invention refers to a process for obtaining an innovative gas diffusion layer (GDL) for PEM fuel cells. The process, according to the invention, presents an original approach: an efficient method for preparing diffusion layers, starting from electrospun polymer fibers (obtained from polyacrylonitrile precursor), calcined at high temperatures, then mixed with various carbon materials and PTFE, homogenized and pressed.</p> <p>The advantages of this invention are:</p> <ol style="list-style-type: none"> <li>1. the procedure for obtaining the GDL layer is simple; it does not present any technological preparation difficulties (it</li> </ol>

is done by pressing some carbonaceous materials in a simple laboratory press).

2. operation, exploitation and control activities are easy to execute during the stages of the entire process.

3. the process is economical, and the reagents and materials used are easily accessible and cheap (polyacrylonitrile polymer, graphite, PTFE), compared to the current methods of preparing gas diffusion layers.

4. the process has a great potential to be optimized and improved, so as to allow obtaining on a commercial scale gas diffusion layers with high electrical conductivity, using a cheap and efficient protocol.

#### RO.227.

##### Title

**Cryostat for determining the mechanical resistance of metallic materials at liquid nitrogen temperature - 77 K**

##### Authors

Brad Sebastian Davides, Lazăr Alin, Vijulie Mihai, Bogdan Maria Claudia, Sirosh Oleksandr, Brill Cătălin, Daneş Matei, Drăcea Gheorghe

##### Institution

National Research and Development Institute for Cryogenics and Isotopic Technologies – ICSI Rm. Valcea

##### Patent no.

RO135081 (A0) – 2021-06-30

##### Description

The present invention is related to a traction cryostat with applicability in the technical field of cryogenic temperatures, intended for carrying out tests to determine the mechanical strength for metal samples up to -196°C in accordance with requirements or conditions related to the test temperature with  $\pm 5^\circ\text{C}$  deviations, using a tensile/compression machine up to 300kN.

The equipment confers increased adaptability and shape flexibility of the samples and the materials to be tested due to the construction represented by the elements of the assembly, respectively the thermal conditions required for testing.

The invention is unique at the national level and complies with ASME and ASTM A370-08a standards.

#### RO.228.

##### Title

**Platinum on carbon and Teflon hydrophobic catalyst (pt/C/PTFE) and method for preparation**

##### Authors

Gheorghe Ionita, Felicia Vasut, Nicolae Sofilca, Ionut Spiridon and Adrian Dinca

##### Institution

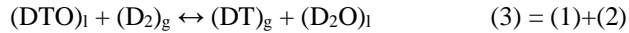
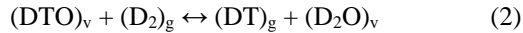
National Research and Development Institute for Cryogenics

**Patent no.** and Isotopic Technologies – ICSI Rm. Valcea  
Patent Request No: 202100769/ 09/ 12 /2021

The heavy water detritiation process needs combination of two processes:

- 1) water conventional distillation (1)
- 2) an isotope exchange process between deuterium gas (D<sub>2</sub>)<sub>g</sub> and tritiated water vapors (DTO)<sub>v</sub> (2), which requires a

**hydrophobic catalyst:**



**Main Characteristics :**

**Description**

- Shape : Cylindrical pellets ; Rahig Rings
- Sizes : diameter – 3,25-3,4 mm; height:10 -14 mm
- Platinum Content – 1,85 – 1,95 %;
- Contact Angle-: >120
- BET Specific surface : > 80 m<sup>2</sup>/g;
- Bulk density:0.47- 0.57;
- Platinum particle size: < 55nm;
- Dispersia Platinum dispersion : > 30 %
- Platinum metallic specific surface: > 90 m<sup>2</sup>/g;
- Thermal stability : 250 C;

**Application:** The Pt/ C/ PTFE hydrophobic catalyst has been selected and proposed to be used **for heavy water detritiation** at CANDU reactors from Cernavoda NPP.

## National Institute for Research and Development in Microtechnologies - IMT Bucharest

**RO.229.**

<b>Title</b>	<b>Ternary nanohybrid for resistive relative humidity monitoring</b>
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest
<b>Patent no.</b>	<b>A100355, RO, OSIM, 22 06.2022</b> This patent application refers to the development of resistive relative humidity (RH) sensor, employing a sensing layer based on a ternary nanocomposite comprising oxidized carbon nanohorns (CNHox)/KCl/ polyvinylpyrrolidone (PVP) in the following ratios: CNHox/KCl/PVP=7/1/2, CNHox/KCl/PVP=6.5/1.5/2, CNHox/KCl/PVP=6/2/2, mass ratios (w/w/w/w).
<b>Description</b>	<p>The RH sensor includes a silicon (470 microns) substrate coated with SiO<sub>2</sub> (1 micron), interdigitated electrodes, and a sensing layer obtained via the drop casting. The electrodes were connected by the successive deposition of Cr (10 nm) and Au (100 nm). The width of the electrodes is about 200 microns, with a separation of 6 mm between them. They can be linear or have an interdigitated configuration. The RH monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the RH level at which the sensing layer was exposed. The new synthesized sensing layer used in the manufacturing of resistive humidity sensor has several significant advantages:</p> <ul style="list-style-type: none"> <li>-the IDT sensing structure presented in this work exhibits a linear response and good RH sensitivity when varying RH from 0% up to 90% in humid N<sub>2</sub> environment.</li> <li>-the sensor response time and stability are comparable to that exhibited by a commercially available Honeywell RH sensor.</li> <li>-detection at room temperature;</li> </ul>

**RO.230.**

<b>Title</b>	Matrix nanocomposite for chemoresistive oxygen sensor
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu, Cristiana Radulescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest
<b>Patent no.</b>	<b>A100548, RO, OSIM, 9 08.2022</b>
<b>Description</b>	<p>Oxygen concentration monitoring is a process of paramount importance in various fields of industrial and domestic activity such as indoor air quality control (air conditioning and ventilation systems), combustion optimizing in industrial boilers, pollution control through automobile engine management, food processing plants. This invention includes the design and manufacturing processes for a new resistive, room temperature oxygen sensor, employing consisting of perovskite <math>\text{SrTi}_{0.6}\text{Fe}_{0.4}\text{O}_3</math> (STFO40) / oxidized carbon nanohorns nanocomposite as sensing layer. The oxygen sensor includes a <math>\text{Si}/\text{SiO}_2</math> substrate, interdigitated electrodes and a sensing layer obtained via drop casting method. The oxygen monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the oxygen concentration at which the sensing layer was exposed. The resistance of the sensitive layer varies with the oxygen concentration. The new synthesized sensing layer used in the manufacturing of resistive oxygen sensor has several significant advantages:</p> <ul style="list-style-type: none"> <li>• the presence of CNHs-ox ensures a high specific surface area / volume ratio as well as a substantial affinity for oxygen molecules;</li> <li>• detection at room temperature; <ul style="list-style-type: none"> <li>• rapid response of the sensor to variations in the value of oxygen concentration.</li> </ul> </li> </ul>

**RO.231.**

<b>Title</b>	Resistive oxygen sensor and its manufacturing method
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest



<b>Patent no.</b>	A100547, RO, OSIM, , 9 08.2022
<b>Description</b>	<p>Oxygen concentration monitoring is a process of paramount importance in various fields of industrial and domestic activity, such as indoor air quality control (air conditioning and ventilation systems), combustion optimization in industrial boilers, pollution control through automobile engine management, and food processing plants. This invention includes the design and manufacturing processes for a new resistive, room-temperature oxygen sensor, employing perovskite STFO60 / oxidized carbon nano-onions nanocomposite as a sensing layer. The oxygen sensor includes a Si/SiO<sub>2</sub> substrate, interdigitated electrodes, and a sensing layer obtained via drop casting. The oxygen monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the oxygen concentration at which the sensing layer was exposed. The resistance of the sensitive layer varies with the oxygen concentration. The new synthesized sensing layer used in the manufacturing of resistive oxygen sensor has several significant advantages:</p> <ul style="list-style-type: none"> <li>• the presence of oxidized carbonic nano-onions ensures a high specific surface area / volume ratio as well as a substantial affinity for oxygen molecules.</li> <li>• reduced drift</li> <li>• rapid response of the sensor to variations in the value of oxygen concentration.</li> </ul>

**RO.232.**

<b>Title</b>	Method and system for diamond-based oxygen sensor
<b>Authors</b>	Mihai Brezeanu, Bogdan-Catalin Serban, Viorel Georgel Dumitru, Octavian Buiu
<b>Institution</b>	Honeywell International Inc. Morris Plains, NJ (US)
<b>Patent no.</b>	<b>US 9,759,680 B2 - September 12, 2017 – US Granted Patent</b>
<b>Description</b>	<p>There is an increased need for oxygen sensors operating at extreme conditions, such as highly corrosive environments or high temperatures.</p> <p>Due to its outstanding physical and chemical properties and its 2D hole gas (2DHG)-effect occurring when is H-passivated, single crystal (SC) diamond is a suitable</p>

candidate for high-temperature oxygen sensors operating in harsh environments.

The invention claims an oxygen sensor based on a diamond field effect transistor using a gateless field effect transistor. The gateless field effect transistor includes a synthetic, quasi-intrinsic diamond layer exhibiting a 2-dimension hole gas effect. The quasi-intrinsic diamond layer is monocrystalline (e.g., single-crystal) and is grown using chemical vapor deposition (CVD). Two highly-doped p-type regions may be created within the quasi-intrinsic diamond layer. The oxygen sensor may include an ohmic substrate contact, an ohmic source contact, and an ohmic drain contact. The yttrium-stabilized zirconia (YSZ) sensing layer may be deposited onto the surface of the quasi-intrinsic diamond layer between two ohmic contacts, such as between an ohmic source contact and an ohmic drain contact. The oxygen sensors of the present disclosure may have a high oxygen sensitivity, low power consumption, and limited cross-sensitivity.

#### RO.233.

##### Title

CO<sub>2</sub> sensor based on a diamond field effect transistor

##### Authors

Mihai Brezeanu, Bogdan-Catalin Serban,  
Viorel Georgel Dumitru, Octavian Buiu

##### Institution

Honeywell International Inc. Morris Plains, US

##### Patent no.

**US 9,291,594 B2 - March 22, 2016 - US Granted Patent**

##### Description

The present invention relates to a CO<sub>2</sub> sensor able to function in harsh environment conditions. The CO<sub>2</sub> sensor comprises a synthetic, quasi-intrinsic, hydrogen-passivated, single-crystal diamond layer exhibiting a 2-dimension hole gas (2DHG) effect, and a sensing layer comprising both a polymer (polyallylamine, N-substituted polyallylamine, polyvinylamine) and a hygroscopic material (cyclodextrines ( $\alpha$ ,  $\beta$ ,  $\gamma$ , or mixtures thereof), xylitol, maltitol, polydextrose) deposited onto a surface of the gate-less field effect transistor (FET). The quasi-intrinsic diamond layer can be grown by chemical vapor deposition (CVD). A 2-dimension (2D) conductive channel can form along the surface of the quasi-intrinsic diamond layer. The 2D conductive channel can consist of holes (2DHG effect). The sensing layer is deposited onto a surface of the gate-less FET that is above the 2D conductive channel. The CO<sub>2</sub> sensor includes an ohmic substrate contact, an ohmic source contact, and an ohmic drain contact. The sensing layer can be deposited

onto the surface via spin coating, spray coating, dip coating, or direct printing. The ohmic drain contact and the ohmic source contact can collect the current flowing through the 2D conductive channel. When CO<sub>2</sub> concentration varies, the potential at the surface of the gate-less FET changes, leading to variation of 2D conductive channel carrier concentration, resulting in a change of the drain-source current.

**RO.234.**

<b>Title</b>	Anti-static compositions
<b>Authors</b>	Bogdan-Catalin Serban, Cornel P. Cobianu, Octavian Buiu, Mihai Brezeanu, Alisa Stratulat, Viorel Georgel Dumitru, Andrea Piesker, Christiane Saunier, Eric Farin
<b>Institution</b>	Honeywell International Inc. Morris Plains, NJ (US)
<b>Patent no.</b>	EP 3,202,820 B1 - 06-04-2022 Granted patent
<b>Description</b>	<p>Polymer formulation with antistatic properties for glove manufacturing can be made in different ways, such as by using conductive polymers like poly(3,4-ethylenedioxythiophene)-poly(styrenesulfonate) (PEDOT-PSS) or compounds such as long chain ethoxylated aliphatic amines and amides. Antistatic doping agents can be used with certain polymers; however, doping agents often separate from the product (e.g., "de-dope"), causing a loss of antistatic properties. The present invention discloses a water-soluble electrically conductive polyaniline and a method for production thereof and an antistatic agent using a water-soluble electrically-conductive polymer. Among the dopants which can be used to ensure antistatic properties of polyanilines are: p-sulfonatocalix[4]arene, p-sulfonatocalix[6]arene, p-sulfonatocalix[8]arene, alpha cyclodextrin sulfate, beta cyclodextrin sulfate, gamma cyclodextrin sulfate.</p> <p>The doped polyaniline claimed in this invention can have certain advantages over other antistatic compositions:</p> <ul style="list-style-type: none"> <li>• It can be easily and inexpensively synthesized;</li> <li>• Have electrical properties that are reversibly controlled through the type of dopant used;</li> <li>• Have a wide variety of conductivity levels that can be stable in a wide variety of environmental conditions;</li> <li>• Have high stability under high temperature conditions;</li> <li>• The doped polyaniline of the present invention can have antioxidant properties, increasing the lifetime of the polymer;</li> <li>• The doped polyaniline can suffer from less de-doping than other doped antistatic polymers, such as due to the large</li> </ul>

size of the dopant;

Even when the doped polyaniline does experience some de-doping, the dopants can advantageously provide anti-static properties in a de-doped state (e.g., due to hydrophilic properties of the dopant), allowing both the doped and de-doped polyaniline to have anti-static properties.

#### RO.235.

##### Title

Smart protective gloves with sealed colorimetric layer

##### Authors

Cobianu Cornel, Stratulat Alisa, Bogdan-Catalin Serban, Octavian Buiu, Andrea Piesker, Eric Farin

##### Institution

Honeywell International Inc. Morris Plains, NJ (US)

##### Patent no.

EP 3,375,309 B1- Granted Patent 16-06-2021

##### Description

The protective gloves for process industries (e.g., petrochemical, chemical, pharmaceutical food, beverage) have a robust design, able to assure people safety under extreme chemical, electrical and mechanical conditions. Use of gloves in the chemical industry is not always accompanied by evidence of the time of use during their lifetime, and so in many cases the gloves should be used for a much shorter time with respect to their anticipated lifetime.

The present invention provides gloves and methods for estimating the remaining time of glove operation before removing the glove, or what is termed "near-end of service life indication" (NESLI). The invention provides for these purposes a NESLI protective glove that very rapidly indicates the remaining service time by means of colorimetric principles based on the use of a "sealed" or protected colorimetric (indicator) layer with high water solubility. Such an indicator layer contains a pH indicator. The organic formulations that are used for the fabrication of gloves made of nitrile or latex, for instance, have a pH around 10. Thus, the protective layers insulate the indicator layer during glove manufacturing so as to prevent the leakage of the pH indicators in the organic solutions during the fabrication process. After a certain period of time of use in harsh chemicals, the outer surface of a completed glove shows rapidly color change with respect to its background color. Such an event can alert, for instance, that the remaining lifetime for operation is equal to about 10% of its entire life.

**RO.236.**

<b>Title</b>	A humidity sensor
<b>Authors</b>	Cornel Cobianu, Bogdan-Catalin Serban, Cazimir Bostan, Costea Stefan Dan, Octavian Buiu, Alisa Stratulat, Mihai Brezeanu
<b>Institution</b>	Honeywell International Inc. Morris Plains, NJ (US)
<b>Patent no.</b>	<b>EP 3,043,173 B1 – 06-09-2017 – Granted Patent</b>
<b>Description</b>	<p>This granted patent claims an ambient humidity sensor having a sensing component and a reference component. Each component may indicate humidity by using a metal oxide semiconductor field effect transistor (MOSFET) that has a stacked gate dielectric containing an upper layer with a dielectric constant which varies according to exposure to a change of moisture. The sensing component may have its dielectric exposed to an ambient environment. Suitable hydrophobic dielectric polymers may be selected from among many polyimides and polysulfones and may incorporate aromatic polyimides and polysulfones and/or cross-linked polyimides and polysulfones. Cross-linking may be accomplished by esterification with pendant carboxylic acid groups of the polyimides or polysulfones. The reference component may have the same stacked gate dielectric layer, but no exposure to any environment. Dielectric constant outputs from the components may be processed with differential electronics to provide an output to indicate humidity in the ambient environment. The metal layers of the FET gates may form output contacts for the respective reference and sensing FETs. External humidity may change the gate capacitance and thus the threshold voltage of the sensing FET, while the threshold voltage for the reference FET may remain unchanged. Differential processing may reflect an output having a high common mode rejection ratio. The present humidity sensor may have good drift behavior due to a use of differential sensing.</p>

**RO.237.**

<b>Title</b>	<b>REAmmonia resistive sensor</b>
<b>Authors</b>	Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu
<b>Institution</b>	National Institute for Research and Development in Microtechnologies - IMT Bucharest
<b>Patent no.</b>	<b>Patent Application A100313, RO, OSIM, 8 06.2022</b>

The present invention claims a new resistive ammonia sensor using a fluorinated nanocarbonic materials – based matrix nanocomposites.

The sensitive layers described in this invention are binary nanocomposites consisting of fluorinated nanohorns (CNHs-F) / polypyrrole (PPy), fluorinated onion-type nanocarbon materials (CNOs-F)/ PPy as well as CNHs-F/ CNOs-F/PPy ternary nanocomposites. Functionalization of carbon nanohorns as well as onion-like carbon nanomaterials is achieved by F<sub>2</sub>-N<sub>2</sub> plasma treatment. Polypyrrole can be used as a 5% aqueous dispersion (commercial product) or it can be synthesized in situ by a chemical polymerization reaction using pyrrole (monomer), FeCl<sub>3</sub> (oxidizing agent) and sodium p-toluenesulfonate (doping agent). By ad/absorbing ammonia molecules, electrons are transferred to the nanocarbon structure. Both CNHs-F and CNOs-F are p-type semiconductors, the number of voids decreases, therefore the resistance of the nanocarbon material also increases proportionally. Polypyrrole is also a p-type semiconductor and by ad/absorption of ammonia molecules, the number of voids decreases, therefore the resistance of the polymer increases proportionally. Functional carbon nanohorn and onion-type nanocarbon materials in F<sub>2</sub>-N<sub>2</sub>/ plasma has the advantage (through the variety of exposure time as well as its power) that it can ensure an optimal C:F ratio, for a better sensitivity a sensitivity as well as a reduction of hysteresis.

## Description

### RO.238.

#### Title

**Resistive sensor for relative humidity monitoring**

#### Authors

Bogdan-Cătălin Șerban, Octavian Buiu, Marius Bumbac, Cristina Nicolescu

#### Institution

National Institute for Research and Development in Microtechnologies - IMT Bucharest

#### Patent no.

**A100356, RO, OSIM, 22 06.2022**

#### Description

This patent application refers to the development of resistive relative humidity (RH) sensor, employing a sensing layer based on a binary nanocomposite carbon nanohorns-polyvinylpyrrolidone in a 1:1 mass ratio. The RH sensor includes a silicon (470 microns) substrate coated with SiO<sub>2</sub> (1 micron), interdigitated electrodes and a sensing layer

obtained via drop casting method. The electrodes were connected by the successive deposition of Cr (10 nm) and Au (100 nm). The width of the electrodes is about 200 microns, with a separation of 6 mm between them. They can be linear or have an interdigitated configuration. The RH monitoring capability of the sensing layers was investigated by applying a current between the two electrodes and measuring the voltage at different values of the RH level at which the sensing layer was exposed.

The new synthesized sensing layer used in the manufacturing of resistive humidity sensor have several significant advantages:

- the IDT sensing structure presented in this work exhibits a linear response and good RH sensitivity when varying RH from 0% up to 90% in humid N<sub>2</sub> environment.
- the sensor response time and stability are comparable to that exhibited by a commercially available capacitive RH sensor.
- detection at room temperature.
- rapid response of the sensor to variations of RH level;

## National Institute for Research and Development in Environmental Protection - INCDPM

### RO.239.

<b>Title</b>	<b>ESTABLISH A NATIONAL SYSTEM, COLLECTION POINTS AND DIGITAL INFRASTRUCTURE FOR MONITORING COVID 19 AND ITS VARIANTS IN WASTEWATER</b>
<b>Authors</b>	DEÁK György, MATEI Monica, BOBOC Mădălina, HOLBAN Elena; PRANGATE Raluca; ROMAN Diana
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection</b> -
<b>Description</b>	This project will lay the foundations for a national wastewater monitoring system aimed at collecting data on SARS-CoV-2 and its variants, taking into account an appropriate methodology for the determination of SARS-CoV-2 and its variants in wastewater. It will be developed and harmonised with those developed at EU level.

### RO.240.

<b>Title</b>	<b>DALIA Danube Region Water Lighthouse Action</b>
<b>Authors</b>	TUDOR Georgeta; DEÁK György; MATEI Monica; BOBOC Mădălina; HOLBAN Elena; RAISCHI Marius; BURLACU Laurențiu
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection – INCDPM Bucharest</b> -
<b>Description</b>	Among other R&I Missions, the EU has designated the ‘Restore our Ocean, seas and waters by 2030’ Mission in order to provide a systemic approach for the restoration, protection and preservation of our ocean, seas, and freshwaters. DALIA project is implemented by a consortium of 22 expert organizations (universities, authorities, SMEs, NGOs) from 8 different Danube EU and Associated countries. DALIA innovation actions are supported by the 9 Demonstration Pilot Sites (DPS) in the 6 countries in the Danube River basin area. INCDPM is in charge of DPS 6 dedicated to sturgeon migration by-pass Iron Gates I and II and the proposed activities will provide a technical & scientific solution in order to ensure the connectivity of the



migration routes for the ultrasonic tagged sturgeon specimens to by-pass the two Hydropower Stations. The implementing methodology involves four main stages: measurement campaigns in order to determine the exact location for the INCDPM patented monitoring stations (DKMR-01T and DKTB); commissioning ultrasonic tagged sturgeon specimens detection gates (two located downstream the Iron Gates I and II and one downstream Bazias and more in the Serbia and Hungary Danube sectors); developing the best strategy to assist ultrasonic tagged sturgeon specimens to pass upstream and adopting the use of special solutions adapted for each hydropower station; continuous mobile monitoring using boat-mounted VR-100 reception stations for then tagged specimens and recording their behaviour and movements until Baziaş and further upstream for 700 fluvial km until Danube km 1780.

**RO.241.**

<b>Title</b>	<b>DEVICE FOR DIRECT DETERMINATION OF GAS FLUXES (especially those with greenhouse effect) IN SUBMERGED CHAMBER DRIED FROM THE SUBSTRATE OF AQUATIC ECOSYSTEMS (mud, sludge, sediments, etc.)</b>
<b>Authors</b>	LASLO Lucian, ENACHE Natalia, DEÁK György, MATEI Monica, BOBOC Madalina
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection Bucharest</b> Patent application No. A/00182 /2023
<b>Description</b>	The invention refers to a submerged device for determining gas fluxes from the aquatic substrate of ecosystems and atmosphere, named <b>DKLN-aQuA</b> type, which works based on the closed chamber method. The direct determination device has a circuit with a water discharge filter inside the closed chamber, connected to a pump whose vacuum acts a reverse valve that ensures the sealing of the air entering the chamber and thus forms a closed circuit with the connected reading system consisting of the analyzer and the computer. The device also offers the possibility of connecting to an Injection Kit, which is a static method that allows samples to be taken and the concentrations of cumulative gases in a predetermined time interval to be measured in the laboratory.

Also, together with a closed floating chamber forms an assembly that determines by difference the gas fluxes ratio between the water surface and the aquatic substrate. The device allows the prospecting of some gas resources inside the substratum of aquatic ecosystems, offering the possibility of accurately identifying the location of gas sinks that emit through the aquatic substratum (fresh and marine waters).

**RO.242.**

**Title** **MOBILE PILOT TECHNOLOGY TO IDENTIFY STURGEON REPRODUCTION HABITATS, BASED ON BIOSOUNDS**

**Authors** DEÁK GYÖRGY, BURLACU LAURENȚIU, SADÎCA ISABELA, RAISCHI MARIUS CONSTANTIN, MATACHE RĂZVAN

**Institution** **National Institute for Research and Development in Environmental Protection – INCDPM Bucharest**  
PATENT APPLICATION NO. A/00181/2023

**Description** The present invention aims to address an issue in the conservation of anadromous sturgeon species found in the Lower Danube River and relates to a technological prototype for recording, capturing and transmitting biosignals/infrasounds emitted by sturgeons during the breeding season, in order to identify their reproduction habitats. The **DK-MSB** mobile pilot system aims to enhance the database on the behaviour of wild anadromous sturgeons by obtaining crucial information on the location of potential breeding areas, based on sounds emitted during migration and spawning, as well as the identification of breeding habitats.

Compared to other existing systems, the technical problem that the invention solves is the ability to monitor in real time the breeding behaviour of wild sturgeons previously tagged with ultrasonic transmitters, by recording infrasound, regardless of external factors in the lower Danube. The mobile DK-MSB-type technology for biosound-based identification of reproduction habitats is also designed to filter and amplify the biosounds of interest, i.e. low-frequency infrasounds (between **1** and **25 Hz**), and to correct for ambient noise caused by the external environment or the level of water conductivity.

RO.243.

<b>Title</b>	<b>FIXED PILOT TECHNOLOGY TO VALIDATE STURGEON REPRODUCTION HABITATS, BASED ON BIOSOUNDS</b>
<b>Authors</b>	DEÁK György; BURLACU Laurențiu; SADÎCA Isabela; RAISCHI Marius Constantin; MATAACHE Răzvan;
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection – INCDPM Bucharest</b> PATENT APPLICATION NO. A/00180/2023 The present invention aims to address an issue in the conservation of anadromous sturgeon species found in the Lower Danube River and relates to a technological prototype for recording, capturing and transmitting biosignals/infrasounds emitted by sturgeons during the breeding season, in order to validate their reproduction habitats. The pilot <b>DKSB</b> reproduction habitat validation system aims to address the current data gap and strengthen the database on wild sturgeon behaviour by obtaining important information on their reproduction function, from pre- and in-process biosounds to validate the spawning habitats and their specific hydromorphological parameters.
<b>Description</b>	The technical problem that the invention solves, compared to other systems, relates to the possibility of monitoring in real time the reproductive behaviour of wild sturgeons previously tagged with ultrasonic transmitters, by recording infrasound, independently of meteorological or hydrodynamic factors. The intercorrelated data will be transmitted continuously and in real time via the resilient Lora-Net network to the INCDPM DataCenter, with the possibility of DataLogger storage and physical download of the data. With the improved anchoring system, the DKSB pilot system will ensure its vertical position regardless of water level variations, and the entire energy consumption will be covered by both an autonomous energy source (solar panel sized according to consumption) and a backup battery

RO.244.

<b>Title</b>	<b>Investigations regarding the presence of emerging pharmaceutical and microplastic contaminants in the wetlands and lakes of Bucharest and the identification of innovative technological solutions to prevent the pollution of aquatic ecosystems</b>
<b>Authors</b>	Mihaela ILIE, Cristina MARIA, DEÁK György, Gina GHITA, Alexandru-Anton IVANOV, Ioana SAVIN, Camelia ZAMFIR, Georgeta TUDOR, Gheorghe GRIGORE, Garbis VASILIGHEAN
<b>Institution</b>	National Institute for Research and Development in Environmental Protection (INCDPM) <p>The presence in the aquatic ecosystem of emerging pharmaceutical contaminants such as antibiotics, anti-inflammatories, analgesics, beta-blockers, benzodiazepines, statins, antidepressants, antiepileptics and specific microplastics represents a major threat to health and the environment, developing antibiotic resistance of pathogens and various functional anomalies the level of aquatic organisms as a result of their toxic potential. In the framework of this research study, the preliminary assessment of the contamination with emerging pharmaceutical micropollutants and microplastics of some wetlands and lakes in the Bucharest metropolitan area was carried out, as well as the investigation of antibiotic resistance of potentially pathogenic bacteria. An experimental biomass growth and selection facility (TRL4) was also developed on a laboratory scale for the degradation of emergent contaminants, which allows continuous monitoring of operating parameters, such as: pH, temperature, feed and exhaust flow rates, concentrations of nutrients and microelements necessary for cellular metabolism, oxygenation regime, biomass production, etc.</p> <p>The preliminary identification of active pharmaceutical ingredients (APIs) from Lakes Plumbuita, Carol, Morii, Alexandru Ioan Cuza (IOR), Herastrau and Tei highlighted the frequent presence of some products, such as paracetamol, tinidazole, carbamazepine, moxifloxacin, clarithromycin, and caffeine.</p>
<b>Description</b>	

**RO.245.**

<b>Title</b>	<b>Nature-based solutions for climate change adaptation of cities in different regions of Romania, in accordance with the objectives of the EU Mission</b>
<b>Authors</b>	Eng. DEÁK György Ph.D. Habil., Dr Eng. MATEI Monica, Dr. Ec. BOBOC Mădălina, Dr. ecol. HOLBAN Elena, Eng. ENACHE Natalia, Eng PUTIU Irina, Dr Eng. LASLO Lucian
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection Bucharest</b> -
<b>Description</b>	<p>The project proposes the creation of a reference framework that can be multiplied at the national level, with the aim of relating the pressures caused by climate hazards to the vulnerability of socio-economic systems and ecosystems. Through the objectives of quantifying the impact caused by climate change in the urban environment, concrete adaptation solutions will be offered and the implementation of nature-based measures and the replacement of fossil fuels will be promoted.</p> <p>Nature-based solutions offer the potential to contribute a third to the achievement of the Paris Agreement targets, set by 2030 (IUCN, 2022). Romania offers an invaluable and inexhaustible source of living laboratories (a term introduced in the EU Horizon Missions), recognized worldwide through sustainable communities where ecosystems are found in their natural state or in harmony with man. The activities proposed in the project respond to the needs of assessing the impact generated by the application of adaptation and mitigation measures based on the nature and by the use of hydrogen. These will aim at replicating and demonstrating relevant situations in the pilot areas: sensor calibration, differential exposure of soil, water and vegetation to climatic extremes and demonstrating the effects of nature-based measures and hydrogen production.</p>

RO.246.

<b>Title</b>	<b>Assessment of anthropogenic impact on migration routes and breeding habitats in order to develop complementary conservation measures and to expand the strictly protected areas boundaries for the sturgeon population monitored on the Danube according to the provisions of the EU Mission and the Biodiversity Strategy 2030 SturHabCons</b>
<b>Authors</b>	DEÁK György; RAISCHI Marius; BURLACU Laurențiu; TUDOR Georgeta; HOLBAN Elena; MATAACHE Răzvan; ARSENE Miruna; SADÎCA Isabela
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection – INCDPM Bucharest</b> -
<b>Description</b>	<p>SturHabCons aims to assess the anthropogenic impact on the monitored anadromous sturgeon population, to carry out numerical modelling to eliminate the risk of disruption of their migration routes and to identify their breeding habitats in order to develop complementary conservation measures and to expand the strictly protected areas boundaries, in line with the EU Mission “Restore our Ocean and Waters by 2030” and the EU Biodiversity Strategy 2030.</p> <p>The project starts with the spatial identification, through monitoring campaigns, of migration routes and breeding habitats used by anadromous sturgeons in the coastal area and 1500 km along the Danube, investigating for the first time in a unified project, the sturgeons situation in Romania.</p> <p>SturHabCons has as main objectives: integrated assessment of spawning habitats and behavior of ultrasonic tagged anadromous sturgeons and quantification of the anthropogenic impact on the specimens; development of 3D/2D/1D &amp; hybrid hydrodynamic and hydromorphological numerical models in order to identify solutions to mitigate the impact on migration routes and breeding habitats of sturgeon species; assessment of the size and population structure of anadromous sturgeons; development of complementary conservation measures for the sturgeon population and promotion for the breeding habitats as a strictly protected area.</p> <p>The project follows 3 complex multidisciplinary intertwined directions and substantiates the final solution</p>

consisting of a set of complementary measures to conserve sturgeon populations and to declare the identified breeding habitats as strictly protected areas for anadromous sturgeons with direct applicability through the promotion of legislative proposals.

**RO.247.**

<b>Title</b>	<b>PRECONCENTRATION SYSTEM USING QUALITATIVE FILTRATION OF WATER/WASTEWATER SAMPLES FOR IDENTIFICATION ESPECIALLY SARS-CoV-2, OR OTHER TYPES OF PATHOGENS</b>
<b>Authors</b>	DEÁK György, MATEI Monica, BOBOC Mădalina, HOLBAN Elena; PRANGATE Raluca; ROMAN Diana, SADÎCA Isabela
<b>Institution</b>	<b>National Institute for Research and Development in Environmental Protection</b> Patent application No. A 100184

**Description**

The invention relates to a system for the preconcentration by qualitative filtration of water/wastewater samples for the detection of nucleic acids, designed as a solution - Type DKR-DI, which contributes significantly to the avoidance of sample storage in the laboratory and to the yield of sample analysis, thereby increasing the probability of detecting nucleic acids of interest. It is cylindrical in shape and consists of 3 main components screwed together. The principle of concentration by filtration of samples is simple - gravitational. Immediately after sample collection, the volume of interest is entered into component C1, where coarse (qualitative) filtration takes place, gravitationally the purified water flows into component C2, equipped with a high efficiency filter, and the filtrate accumulates in component C3. All the bodies and elements of this system, except for the seals, are designed in stainless steel to facilitate sanitation and disinfection. The operating principle is based on the introduction of a volume of water/wastewater for qualitative filtration which is carried out through the two sieves (4) and (10), and the opening mode of the preconcentration system by qualitative filtration of the water/wastewater samples - Type DKR-DI is carried out from bottom to top, from C3- C1.

**RO.248.**

<b>Title</b>	<b>Innovative Technology for Microplastics Removing from Wastewater</b>
<b>Authors</b>	MARIA Cristina, DEÁK György, POP Cristian-Emilian, GHÎȚĂ Gina, ILIE Mihaela
<b>Institution</b>	DEÁK György National Institute for Research and Development in Environmental Protection
<b>Description</b>	Patent application No. A/00183/2023 The invention refers to a technology for removing micro plastics from urban wastewater previously treated by conventional processes: mechanical, chemical and biological. The technical problem solved by the invention is to achieve an additional treatment stage for finishing the quality of these wastewater categories before being evacuated in the receiving surface waters. The innovative technology consists of an oxidative module for the preliminary fragmentation of microplastics from wastewater under the action of ozone photocatalyzed with UV-C, followed by the retention of unreacted free radicals by passing through an adsorption column with activated carbon. Before being fed into the aerobic biological mode, the wastewater is collected and aerated in an intermediate storage tank in order to completely eliminate potential traces of free radicals that would inactivate the microbiological activity of the cultures in the biological reactor. The biological degradation of microplastics takes place in the presence of a specialized bacterial culture immobilized on natural, porous and biodegradable solid supports. Finally, the treated wastewater is discharged into the receiving surface waters and the sedimented immobilized biomass is recirculated in the aerobic biological reactor, or is reactivated in a special module in order to reuse.



## National institute for Research and Development URBAN-INCERC

RO.249.

**Title**                    **Urban traffic noise level - modeling to determine the influence of variable characteristic parameters of road cross-sections, bounded by building fronts**

**Authors**                Marta Cristina ZAHARIA

**Institution**            NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN CONSTRUCTIONS, URBANISM AND SUSTAINABLE SPATIAL DEVELOPMENT URBAN-INCERC

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In Building Physics the domain of **Urban Acoustics** is a special one, which gives solutions for designing an urban area such as to be with a good urban acoustical configuration and to help people to live in acoustically comfortable conditions inside that urban area.

I present the results of studies that were developed in my doctoral thesis and in research project named "Methods to combat urban noise. Analysis and resolution of multi-criterion acoustics of buildings and residential areas in urban and rural areas exposed to noise", PN 09-14.04.07, Phase 9, conducted in Building Acoustics Laboratory of R&DNI URBAN INCERC, INCERC Bucharest Branch.

**Description**            During the studies there were made calculation analyses on specific modelling of urban roads and specific extreme situations of urban road traffic configurations, considering some studied-street-profiles which were analyzed, to determine the influence of the variable characteristic parameters of roads cross-sections, bounded with fronts of buildings.

When there is necessary to calculate the traffic noise level in a point, A, located on a street profile, there are a lot of variable characteristic parameters, such as: distances between buildings delimiters from the two sides of the road, also the height of buildings delimiters, types of facades of the buildings, traffic regime, traffic components (numbers and types of cars, buses etc.), types of road surface materials, types of green spaces, etc., which are influencing the final value of noise level.

For example, a better acoustic absorption of noise can be obtained by finishing the facades of buildings with sound-absorbing materials made from agro-industrial subproducts.

The conclusion is that the variable characteristic parameters, in a good acoustical configuration of a road profile, can influenced the decrease of noise level,  $L_{ext}(f)$ , on the street in a measurement point "A", from 2 to 15 dB(A).

**RO.250.**

**Title** Climate resilient localities – from classic materials to traditional sustainable building materials

**Authors** Ioana-Mihaela ALEXE, Adrian-Alexandru CIOBANU, Aurelia BRADU, Alexandrina-Maria MUREȘANU

**Institution** National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development „URBAN - INCERC”, INCERC Bucharest and Iași Branches

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The present project aims to bring Romania closer to the global requirements regarding adaptation to climate change, by creating new products, using local resources, sustainable traditional materials to be used in construction and which can successfully replace classic materials used today .

Climate change is mainly caused by human intervention. Extreme temperatures, drought, floods, landslides have drawn people's attention to the need to adapt to these consequences of climate change, this means adapting housing/buildings, which entails significant costs.

In the last year the building and construction sector has made a major contribution to climate change, registering an all-time high. The "National Strategy on Education for the Environment and Climate Change 2023-2030" elaborated in January 2023 in Romania shows the need to adapt the inhabited/built space to these climate changes. This can be achieved through proper urban planning and development.

The construction materials specified in the design or used in the construction are generally the classic ones (concrete, brick, AAC etc.). To reduce costs, construction materials should be chosen, as far as possible, from those available locally.

The development and adaptation of the built environment means the development of new techniques and markets for materials, products and constructive systems for sustainable constructions that are resistant and adapted to the effects of climate change.

One of the research directions of this project aims to create new sustainable products using traditional materials that meet the requirements imposed by climate change in Romania.

**RO.251.**

**Title** **Dynamic modeling of vibro-compaction process on granular soils**

**Authors** **Cornelia-Florentina Dobrescu**

**Institution** National Institute for Research and Development in Constructions, Urbanism and Sustainable Spatial Development “URBAN-INCERC

**Description** -

The issue of dynamic compaction procedure using vibrations applied to granular soils is considered one of the most recent research topics in the stabilization technologies practice of mineral aggregates with clay. The experimental results obtained in laboratory and in situ conditions reveal that the mixture prepared in optimized gravimetric doses by mineral aggregates (sand, gravel, and crushed stone) with clay can be schematized by Voigt-Klein or Max-well rheological models. For this approach, the analysis of ground dynamic behaviour using vibrating roller in correlation with the increase of compaction degree requires both a dedicated and specific studies to acquire a parametric optimization

**RO.252.**

**Title** **The evolution over time of the thermal conductivity, an indicator of the durability of the coatings with mixed addition of vegetal and animal agro-industrial by-products / waste**

**Authors** Irina Popa, Cristian Petcu, Alexandina – Maria Mureşanu

**Institution** **National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development URBAN-INCERC**

**Description** -

In parallel with the challenge of reducing the energy impact that the construction sector generates on the environment, there is an ever-increasing demand regarding the creation of a healthier environment, aiming for the construction materials used, in most of them, to be non-toxic, reusable and recyclable.

The circular economy brings numerous benefits regarding both the quality of the environment and society as it contributes to reducing waste, increasing the productivity of resources, and even to a better valorization of agro/industrial

by-products within a modern and efficient economy.

Starting from the intrinsic properties of plant/animal waste and also of some natural agro-industrial by-products - sunflower seed husks, respectively low quality sheep's wool - in this research, three recipes of innovative composite materials were obtained. Considering their potential to be used as a finishing or/and as a multi-layer coating with heat-insulating characteristics, the paper present experimental research carried out to evaluate the durability of these coatings subjected to the action of an aggressive environment characterized by large temperature variations, between 23°C and (-20)°C. After exposing the coatings to the aggressive environment simulated under accelerated laboratory conditions, the results indicated real positive aspects regarding both the adhesion to the support and the evolution over time of the thermal conductivity of the innovative coatings.

#### RO.253.

##### Title

**Comparative analysis on pollution level in school environment from Bucharest, Romania**

##### Authors

Vasilica Vasile, Alina Dima, Mihaela Ion

##### Institution

Research and Development in Construction, Urban Planning and Sustainable Territorial Development National Institute "URBAN-INCERC"

##### Description

The school environment is the most important segment in terms of exposure to various indoor pollutants, due to the fact that vulnerable persons are children who spend the most of the day in these types of spaces.

The monitoring program was carried out in public educational institutions and consisted of four spaces from gymnasium schools and two spaces from kindergartens, this choice being made exclusively due to the exposure risk level of the target occupants, children between the ages of 4 and 9, who carry out their indoors activity, for approximately 7h/day.

At the end of the monitoring campaign, it was established that all the analysed spaces have a deficit of fresh air and generally present the same pattern of indoor emissions. From this point of view, it is necessary to implement a plan of remediation measures focused on an adequate ventilation of

the spaces and installing the air conditioning and purification systems with the retention of solid particles and chemical compounds.

**RO.254.**

**Title** **Comparative study regarding the estimation of lifetime costs for traditional and innovative materials in construction**

**Authors** Silviu LAMBRACHE

**Institution** **National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development „URBAN-INCERC”**

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**Description** The purpose of the study was the comparative analysis of the cost aspects for traditional and innovative construction materials (eco-materials), taking into account the entire duration of their use, thus determining the opportunity of using ecological materials in construction projects and implicitly their efficiency. Through this new approach, the substantiation of the investment decision is ensured by reducing the risk of investing less now and spending more in the future.

**RO.255.**

**Title** **Performance indicators regarding the fire behavior of earthen constructions**

**Authors** Stoica Daniela, Simion Adrian, Gruin Aurelian

**Institution** **NIRD URBAN-INCERC Bucharest and Timișoara Branch**

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**Description** In recent times, there has been a surge of interest in the use of clay-based construction materials, nationally and internationally. These materials, distinct from bricks or ceramic blocks, are being regarded as an eco-friendly solution for building construction. Clay-based building materials offer numerous advantages, including non-toxicity, low carbon footprint (except when kiln-fired), regulation of indoor air quality and humidity, resistance to fire and pests, high thermal mass, and sound insulation. The current trend in soil reinforcement involves the use of bio-composites. The priority requirement in the durability of a building is also to be fire resistant, in the case of using materials that are non-

combustible (fire reaction class A1) or hardly combustible (fire reaction class A2) in the construction of a building and at the same time mechanically sound.

Currently, in Romania, the fire performance for clay-based composite products (bricks, ceramic blocks, plaster, tiles, etc.) is defined by Euroclasses of reaction to fire. As part of the research project, an investigation will be conducted to examine the fire behavior of load-bearing elements constructed using clay-based materials such as poured or rammed earth.

#### RO.256.

<b>Title</b>	<b>INTERACTIVE MAPS RESULTING FROM THE AUTOMATION OF THE SEISMIC MONITORING SYSTEM AT INCD URBAN-INCERC</b>
<b>Authors</b>	Claudiu-Sorin DRAGOMIR, Iolanda-Gabriela CRAIFALEANU, Emil-Sever GEORGESCU, Daniela DOBRE
<b>Institution</b>	National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development URBAN-INCERC -
<b>Description</b>	In a broader context, the main outcome of the automation of the permanent seismic monitoring system at INCD URBAN-INCERC is achieving an improved efficacy, rapidity and thoroughness in the assessment of the structural response of buildings and of their damage potential under earthquakes and other vibration sources. The generation of maps displaying the real-time seismic stations in the INCD URBAN-INCERC network and the automatic monitoring of their operation, the advanced spatial analysis of the seismic data and the computation of various earthquake engineering parameters provide valuable information for informing any further studies on seismic hazard in Romania and seismic risk of the national building stock. The seismic monitoring system makes it possible to obtain data from free-field seismic stations and instrumented buildings, and to map them using specialized programs or the own system capabilities (Figs. 1 ...3). It can contribute as well to the in-depth analysis of the structural behavior and condition, based on dynamic indicators. In the future, the seismic monitoring system, recently implemented at INCD URBAN-INCERC, could also play an essential role in earthquake early warning (EEW).

**RO.257.****Title****NUMERICAL STUDY OF ANCHOR CHANNELS USED FOR FIXING UNITIZED FAÇADE ELEMENTS****Authors**

Tudor Panfil TOADER, Oana CIASCAIU, Călin G.R. MIRCEA, Carmen DICO, Andreea MIRCEA, Mihail CHIRA, Gabriela CĂLĂȚAN

**Institution****NIRD URBAN-INCERC, Cluj-Napoca Branch / Technical University of Cluj Napoca**

The present research focalises on the interface between the unitised facade elements and the main reinforced concrete structure, respectively the optimal configuration of the assembly, depending on factors such as panel configuration or concrete class.

The numerical evaluation of the stresses within the anchor channel set into a 20/25 Class C concrete element, the failure modes of the assembly, concurrently with the reduction of the strength capacity of the steel anchors in the specific vulnerable areas, reaching a value of 96%. The study highlights the areas in the interface between the assembly and concrete that are predisposed to failure under applied loads.

**Description**

Considering the analyzed failure modes, it has been highlighted that the reduction of the stress within the steel profile will improve the stress capacity of the concrete cone area predisposed to failure.

Withal, this research compares numerically, two identical anchor channel assemblies, cast inside concrete of identical mechanical characteristics, and subjected to the same tension loads applied to the T-headed screw. The one difference has been the addition of 40x40x4mm plates welded at the bottom of anchors for one assembly, whilst the other assembly keeps the generic anchor head. A 19% larger capacity has been obtained for the assembly having the plates added, compared to the generic anchor.

Through this study, it has been highlighted how the assembly interacts, respectively the relationship between the steel profile and concrete, and the modality in which the geometry of the anchor end influences the behavior and capacity of the assembly.

**RO.258.**

<b>Title</b>	<b>Manufacturing process and cladding elements from alkali-activated geopolymer microconcrete, without cement content</b>
<b>Authors</b>	Adrian-Victor LĂZĂRESCU, Brăduț Alexandru IONESCU, Vasilica VASILE, Andreea Cristina HEGYI
<b>Institution</b>	<b>NIRD URBAN-INCERC</b> A/00481 / 9.08.2022
<b>Description</b>	<p>The invention refers to a process for making the composite material and cladding elements from alkali-activated geopolymer microconcrete, without cement content, using as raw materials power plant ash, an alkaline activator based on sodium silicate and sodium hydroxide, aggregates natural river and dispersed reinforcement with metal fibers. Cladding elements made in this way are intended for use in finishing work / protection of walls or other inclined or vertical elements of constructions.</p> <p>The advantages of using this process are the possibility of reintroducing into the economic circuit a by-product/waste, a pollutant - thermal power plant ash and the possibility of making small precast elements (cladding elements) that can be used after 7 days after casting, thus reducing the storage time for maturation, which in the case of similar precast concrete elements is 28 days after casting. These precast elements have a smooth, crack-free surface with good aesthetic characteristics, low water absorption, resistance to abrasive agents or cleaning treatments. On the other hand, the process of producing elements from cement-free, alkali-activated geopolymer microconcrete contributes to reducing carbon emissions because it does not use cement - as the cement manufacturing industry is known to be a heavy polluter.</p>

**RO.259.**

<b>Title</b>	<b>Influence of the type of recycled waste introduced as a substitute for natural aggregates on the mechanical strengths of cementitious composites</b>
<b>Authors</b>	Carmen FLOREAN, Andreea HEGYI, Adrian-Victor LĂZĂRESCU, Elvira GREBENIȘAN, Horațiu VERMEȘAN, Gabriela CĂLĂȚAN
<b>Institution</b>	<b>NIRD URBAN-INCERC Cluj-Napoca Branch</b>



PN 23 35 05 01

This study presents the influence of natural aggregates, which are substituted with different recycled wastes.

**Description**

In order to obtain cementitious composites with performances similar with C20/25 class concrete, mechanical strength tests were carried out on various composites produced using recycled construction waste materials. Natural aggregates were substituted with 0/4 mm and 4/8 mm waste glass, recycled brick, blast furnace slag and textolite 0/2 mm granular class, tested at 2 days, 7 and 28 days. The results obtained highlight on the importance of reusing waste in an efficient way, and also its contribution to reducing the consumption of non-renewable resources. The addition of recyclable waste to the cement matrix has an important contribution to reducing the porosity of the cementitious composite by reducing water absorption, obtaining good workability and mechanical strengths close to those of C20/25 class masonry mortars.

A reutilisation of construction waste aligns with the principles of the Circular Economy which keeps the value of products, materials and resources as high as possible by returning them to the production cycle.

**RO.260.****Title**

**Study on the Possibilities of Developing Cementitious or Geopolymer Composite Materials with Specific Performances by Exploiting the Photocatalytic Properties of TiO<sub>2</sub> Nanoparticles**

**Authors**

Andreea HEGYI, Adrian-Victor LĂZĂRESCU, Adrian Alexandru CIOBANU, Brăduț Alexandru IONESCU, Elvira GREBENIȘAN, Mihail CHIRA, Carmen FLOREAN, Horațiu VERMEȘAN, Vlad STOIAN

**Institution**

**NIRD URBAN-INCERC**

PN 23 35 05 01

**Description**

Starting from the context of the principles of Sustainable Development and Circular Economy concepts, the paper presents a synthesis of research in the field of the development of materials of interest, such as cementitious composites or alkali-activated geopolymers. Based on the reviewed literature, the influence of compositional or technological factors on the physical-mechanical performance, self-healing capacity and biocidal capacity obtained was analyzed. The inclusion of TiO<sub>2</sub>

nanoparticles in the matrix increase the performance of cementitious composites, producing a self-cleaning capacity and an anti-microbial biocidal mechanism. As an alternative, the self-cleaning capacity can be achieved through geopolymerisation which provide a similar biocidal mechanism. The results of the research carried out indicate the real and growing interest for the development of these materials but also the existence of some elements still controversial or insufficiently analyzed, therefore concluding the need for further research in these areas.

**RO.261.****Title**

**Green Buildings: economic aspects and efficiency**

**Authors**

Mircea-Iosif Rus, Aivaz Kamer-Ainur, Larissa Margareta Bătrâncea

**Institution**

**NIRD URBAN-INCERC Cluj-Napoca Branch**

**Description**

Green building. What is a green building? A green building is a building that is built and used in such a way as to protect the environment throughout its life cycle, starting with design, construction, use, maintenance, renovation and demolition.

The Green Building is an environmentally friendly building, and this means, first of all, that such a building has no or very low heat loss, which means very good insulation from this point of view. Secondly, all the materials used to construct this type of building are recyclable.

Although the costs of this type of building are higher than a normal building, any investment can be recouped by substantially reducing energy costs. Another thing to bear in mind about green buildings is that they have an extremely low heat transfer with the environment.

The number of green buildings is increasing, especially as, at European level, it is desired that in the future each building should "consume" only the energy it "produces".

The main indicators of the economic efficiency of a green building are the payback period of an additional investment and the cost per unit of energy saved (RON/kwh). The shorter the payback period and the higher the consumption saved, the more cost-effective a green building is. The aim of this research is to present aspects regarding the benefits of building green and to establish efficiency indicators regarding buildings and the impact on the environment.

RO.262.

**Title** INNOVATIVE CARBONATION TECHNOLOGY USED IN THE MANUFACTURE OF PREFABRICATED VIBROPRESSED CONCRETE PRODUCTS

**Authors** Tudor Panfil TOADER, Ioan Nicolae SCURTU, Călin G.R. MIRCEA, Carmen DICO, Andreea MIRCEA, Anamaria Cătălina CIRCA

**Institution** NIRD URBAN-INCERC, Cluj-Napoca Branch / Technical University of Cluj Napoca

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The aim of the research is to analyze the physical-mechanical performances and durability of prefabricated concrete elements with the help of carbonation technology.

The continuous development, namely the use of a much larger volume of materials for the construction of infrastructure and superstructure lead to an increase in the amount of carbon dioxide released into the environment. Due to this aspect, European Union encourage the creation of "ecological" construction materials, obtained by capturing and reusing carbon dioxide in the technology of producing various cementitious materials, through the carbonation process. The most used material, worldwide in building different types of construction is concrete, therefore it represents the main material for which different ways of using carbon dioxide are analyzed and proposed in the production process and conditioning the elements made of concrete.

**Description**

The information presented in this paper tend to find out more about present technical and industrial benefits of accelerated carbonation and its applicability to different construction applications and factors affecting environmental and economic impact.

The carbonation proces are influenced by many factors, like the CO<sub>2</sub> concentration and pressure, the precursor material and it's characteristics, the temperature where the materials need to be pre-cured and cured and the water to binder ratio. According to the characteristics of the precursor material, to development an effective method to enhance the carbonation reaction, future research need to focus on associated microstructural changes and optimizing the reaction mechanisms.

**RO.263.**

**Title** **THERMAL INSULATING OF THE CONSTRUCTIONS WITH LIQUID MATERIAL CONTAINING NANO-PARTICLES**

**Authors** Tudor Panfil TOADER, Carmen DICO, Călin G.R. MIRCEA, Ioan Nicolae SCURTU, Gabriela CĂLĂȚAN, Mihail CHIRA.

**Institution** **NIRD URBAN-INCERC, Cluj-Napoca Branch / Technical University of Cluj Napoca**

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The research highlights the performance regarding the adhesion to the support layers and the thermal resistance obtained after the application of a liquid thermal insulation with nano-particles content (provided by manufacturer), on different exterior elements of civil, industrial and agricultural buildings.

The analyzed liquid thermal insulation material contains spherical ceramic particles, uniformly distributed in a mixture of synthetic rubber, inorganic polymers and inorganic pigments. Its application on the analyzed support surfaces was achieved by mechanical application, respectively by spraying with an electrically operated atomizer.

**Description** After carrying out the determinations regarding the adhesion of the material containing nano-particles to different support layers, the average resistances to adhesions, on different support layers, are highlighted:

- 0,6 MPa on brick elements,
- 0,3 MPa on concrete elements
- 0,2 MPa plasterboard and BCA elements

Regarding the thermal transfer resistance research, (on values provided by the manufacturer).the product applied in two layers, with a final thickness of the dry layer of 0,5 mm has a value of 2,272 m<sup>2</sup>K/W, of 0,7 mm – 3,182 m<sup>2</sup>K/W, and of 1,0 mm has 4,545 m<sup>2</sup>K/W.

In this research, the good behavior of the thermal insulation material in terms of adhesion and thermal resistance is highlighted.

**RO.264.**

<b>Title</b>	<b>Capitalizing on sustainable material resources in the context of extreme environmental, seismic and climatic actions</b>
<b>Authors</b>	<b>Adrian-Alexandru CIOBANU, Aurelia BRADU, Andreea Cristina Hegzi, Cristian PETCU, Ioana ALEXE, Cornelia Baeră, Claudiu ROMILA, Marius MÂRȚ</b>
<b>Institution</b>	<b>National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development „URBAN - INCERC”, Iasi Branch PN 23 35 03 01</b>
<b>Description</b>	<p>The general objective of the project aims to open new directions of research and development of studies dedicated to achieving a goal of major interest for society, namely increasing community resilience to extreme environmental, seismic and climatic actions. The purpose of the project comes as a response to society's need regarding the decarbonization of the construction sector, in the context of severe climate change, by proposing the development of an integrated system of scientific research in order to capitalize on sustainable resources of traditional, local materials (e.g. natural lime, different types of clay, vegetable waste, wood derivatives, etc.) that can be used in constructions and vital complementary fields, exposed to extreme environmental, seismic and climatic phenomena.</p> <p>The research focuses on the design - execution - testing and validation of innovative and sustainable products, as well as the development of new experimental research methods regarding the evaluation of their sustainability through exposure to extreme environmental actions (climatic and seismic) specific to Romania, in order to increase community resilience and limiting the impact of extreme weather phenomena on civil society.</p>

**RO.265.**

<b>Title</b>	<b>Sustainable alternative building materials for non-structural elements</b>
<b>Authors</b>	<b>Aurelia BRADU, Adrian-Alexandru CIOBANU, Adrian LĂZĂRESCU, Aurelian GRUIN, Ioana ALEXE, Claudiu ROMILA, Marius MÂRȚ, Ștefania-Mădălina RUSU</b>
<b>Institution</b>	<b>National Institute for Research and Development in</b>

## **Construction, Urban Planning and Sustainable Spatial Development „URBAN - INCERC”, Iasi Branch**

PN 23 35 03 01

The building industry involves a high consumption of natural resources, it accounts for 32% of global energy use and 19% of greenhouse gas emissions. Enhancing the sustainability and reduction the energy consumption of built environments represents momentous priorities to combat climate change consequences.

**Description** Considerable amount of non-structural elements are made from products containing cement, a material that involves significant fabrication costs and massive CO<sub>2</sub> emissions.. the Hence, the implementation of environmental-friendly materials in building sector, it becomes inevitable in order to align the global trends of slowing the effect of global warming

The hempcrete is an innovative bio-composite material, made of hemp, lime and water, which can be employed as an alternative solution for execution of non-structural elements.

The hempcrete is a durable and strong material, which equilibrates the humidity and temperature of a building, eventually moderating the energy consumption, fire resistance, soundproof and enhancing the thermal comfort for the people living in the building.

**RO.266.**

**Title** **Global Research Aimed at Enhancing the Eco-Innovative and Sustainable Development of Romania's Civil and Transport Infrastructure by Leveraging Current National Resources**

**Authors** Gruin Aurelian, Baeră Cornelia, Enache Felicia, Bolborea Bogdan, Ion Alexandru, Ciobanu Adrian, Lăzărescu Adrian Victor, Vasile Vasilica, Varga Luiza, Chendeş Remus Vasile

**Institution** **NIRD URBAN-INCERC Timisoara**

**Description** The purpose of the project is design and corresponding applicative validation of technological algorithms specific to construction and supporting industries, in direct partnership with the entrepreneurial environment, in two distinct directions, but in continuous complementarity: I. Development of innovative engineering solutions for eco-intelligent construction products by efficient capitalization of additions generated by local industries; II. Innovative assembly of solutions for the

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conceptual and applied fructifying of the traditional technology for earthen inhabited space. The structure of the project includes 16 distinct phases, assigned alternately to the two directions, considering the conceptual symmetry generating a synergistic convergence in the final stage. The estimated results, associated with the 14 specific objectives, offer concrete solutions to the current problems in the construction sector integrated into the general context: the development of products and services (materials, elements and structures, processes and technologies, etc.) with superior overall performance and increased energy efficiency, for the intelligent and sustainable transition of the Romanian construction infrastructure and implicitly the increase, in the short and medium term, of the degree of implementation of the principles of the Circular Economy (EC) in Romania. A special emphasis is given to the entrepreneurial environment, for mobilizing organizations towards open innovation through concrete and efficient technological transfer of research results, simultaneously with the cohesion of the academic environment on complementary directions of scientific interest.

#### **Acknowledgement:**

This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by MCID, "ECODIGICONS" project no. PN 23 35 04 01: "Fundamental-applied research into the sustainable development of construction products (materials, elements, and structures, as well as methods and technologies) that utilizes current national resources to enhance the eco-innovative and durable aspects of Romania's civil and transport infrastructure", financed by the Romanian Government.

#### **RO.267.**

<b>Title</b>	<b>New Solutions for Innovative Conceptual-Applicative Valorisation of the Traditional Earth Technologies of Romanian Inhabited Spaces</b>
<b>Authors</b>	Enache Felicia, Gruin Aurelian, Baeră Cornelia, Bolborea Bogdan, Ion Alexandru, Ciobanu Adrian, Vasile Vasilica, Varga Luiza
<b>Institution</b>	<b>NIRD URBAN-INCERC Timisoara</b>
<b>Description</b>	The purpose of the study is to identify innovative solutions and directions for enhancing the conceptual and applied valorisation of the traditional technologies of earth inhabited spaces, using

modern methods, techniques and tools, with multiple applicability, both on the existing buildings as well as for new housing entities. The proposed research is considered in direct relation to all stakeholders, namely the interested parties in the direct or indirect outcomes of the study. Belonging to internal and also external environment with respect to the research core, they include the academic and research media, the entrepreneurs, the users (clients), suppliers, and also the social, economic and politic compounds, local and central authorities, etc. The study aims to cover the whole range of construction products, namely materials, elements and structures, technologies for production and implementation, bringing a consistent contribution to the sustainable transition of the Romanian construction infrastructure towards the principles of the Circular Economy (EC) in Romania. Natural clay-based materials are currently experiencing a return to the spotlight due to their very low impact on the environment, considering the complete life cycle, namely the production / application / exploitation / disposal process, compared to modern materials.

#### **Acknowledgement:**

This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by MCID, "ECODIGICONS" project no. PN 23 35 04 01: "Fundamental-applied research into the sustainable development of construction products (materials, elements, and structures, as well as methods and technologies) that utilizes current national resources to enhance the eco-innovative and durable aspects of Romania's civil and transport infrastructure", financed by the Romanian Government.

**RO.268.**

<b>Title</b>	<b>Innovative Engineering Solutions for Eco-Intelligent Construction Products by Efficient Capitalization of Additions Generated by Local Industries</b>
<b>Authors</b>	Baeră Cornelia, Gruin Aurelian, Bolborea Bogdan, Enache Felicia, Ion Alexandru, Ciobanu Adrian, Varga Luiza, Chendeş Remus Vasile
<b>Institution</b>	<b>NIRD URBAN-INCERC Timisoara</b>
<b>Description</b>	The study aims to offer a clear perspective towards the development of innovative engineering solutions for eco-intelligent construction products, with advanced functionality (materials, elements and structures, models and technologies),



considering the efficient and customized valorization of by-products and generated waste of local industries, in the context of National Strategy for Research, Innovation and Smart Specialization 2022-2027 regarding the transition to Circular Economy (EC).

The entrepreneurial environment of construction industry or complementary branches is considered an important stakeholder of the scientific research. It proves direct interest in the estimated results, on two distinct directions: 1. For efficient valorization of the developed construction products in future production flows, by the means of technological transfer of the research outcomes; 2. Efficient recyclability solutions for the waste/by-products (mineral powders, sludge, artificial aggregates, etc.) generated by their existent industrial flows and ecologic closure of the production loop. Supplementary, political and administrative entities, together with complementary academic media are simultaneously connected to the research chain, encouraged by the national and European strategies and politics in terms of environmental protection and sustainability.

#### **Acknowledgement:**

This work was carried out within Nucleu Programme of the National Research Development and Innovation Plan 2022-2027, supported by MCID, "ECODIGICONS" project no. PN 23 35 04 01: "Fundamental-applied research into the sustainable development of construction products (materials, elements, and structures, as well as methods and technologies) that utilizes current national resources to enhance the eco-innovative and durable aspects of Romania's civil and transport infrastructure", financed by the Romanian Government.

#### **RO.269.**

<b>Title</b>	<b>A systematic review of Romanian and urban planning documentations legislation on green and blue infrastructure with the aim of improving the quality of urban life</b>
<b>Authors</b>	Teodora UNGUREANU, Andreea Cătălina Popa
<b>Institution</b>	<b>INCD URBAN-INCERC</b> PN 23 35 06 01
<b>Description</b>	The research focuses on an extensive study of "urban green and blue infrastructure" (UGI and UBI) in Romanian legislation and other normative documents. Given the fact that the current legislation does not provide a definition of UGI and UBI, the

methods applied in this study focus on establishing a comprehensive definition based on international research and evaluating the existing legislative documents from this perspective. The European Commission defines UGI as a network of planned areas within a city with the function of public and private green spaces, while UBI is defined as ecosystems associated with water bodies, lakes, rivers, coastal vegetation, urban wetlands and urban flood management systems. Various organisations and studies have shown the positive impact of implementing a large UGBI in cities, with benefits in social, economic, health and environmental aspects. Considering the current environmental problems in Romanian cities, such as high pollution levels, lack of green spaces and unmaintained water bodies, this study proposes the development of comprehensive definitions and the inclusion of UGBI in urban planning documents.

## National Institute of Research and Development for Optoelectronics - INOE 2000

### RO.270.

<b>Title</b>	Thin transparent copper-based multilayer structures with heat reflector properties
<b>Authors</b>	Vitelaru Catalin, Pana Iulian, Parau Anca Constantina, Dinu Mihaela, Alina Vladescu, Adrian Emil Kiss
<b>Institution</b>	National Institute of Research and Development for Optoelectronics - INOE 2000;
<b>Patent no.</b>	A/00543/07.09.2022
<b>Description</b>	The invention refers to a copper based multilayer structure, transparent in the visible range and with high reflectivity in the infra-red domain, along with the technology for obtaining the material. The layers are obtained by magnetron sputtering, HiPIMS for the copper layer and RF sputtering for the dielectric layer. The multilayer structure comprises three individual layers: one dielectric, one metallic and a third also dielectric. Total thickness is between 85-16- nm, having optical properties that are stable both in time and at temperature variations up to 400°C. The design of the structure is obtained by optical modelling using Optilayer software. The experimentally obtained structure optical properties are successfully compared with the theoretical design, showing similar characteristics.

### RO.271.

<b>Title</b>	<b>Nanostructured thin films based on carbo-nitrides if transition metals with silicon additions resistant to wear</b>
<b>Authors</b>	Spiridon Dragomir <sup>2</sup> , Anca C.Parau <sup>1</sup> , Diana M.Vranceanu <sup>2</sup> , Lidia R. Constantin <sup>1</sup> , Claudia P.Dragomir <sup>2</sup> , Alina Vladescu <sup>1</sup>
<b>Institution</b>	<sup>1</sup> <b>National Institute of Research and Development for Optoelectronics - INOE 2000;</b> <sup>2</sup> <b>Drugon International SRL</b>
<b>Patent no.</b>	A00605/04.10.2022
<b>Description</b>	The invention relates to preparation of nanostructured thin films based on carbo-nitrides consisted in one or more of transition metals with Si additions prepared by cathodic arc evaporation method used as protective films of cutting tools which ran under wear harsh regime by abrasion, erosion, and corrosion used in wood machining and cutting. Materials consist in complex carbo-nitrides based on Cr, Fe, Ti and W as base metal with elemental concentrations of min. 30 at.%, and max. of 30 at.% of C or N, and Si ranged from 2 to 12 at.%

**RO.272.**

**Title** **Biocompatible thin films based on thin metallic glasses used in orthopedy**

**Authors** Alina Vladescu, Anca C. Parau, Catalin Vitelaru, Lidia R. Constantin, Iulian Pana, Mihaela Dinu

**Institution** **National Institute of Research and Development for Optoelectronics - INOE 2000**

**Patent no.** A100544/07.09.2022

**Description** The invention relates to preparation of ternary biocompatible thin films metallic glasses based on ZrCu-X, where C can be one of the elements Ca, Mg, Mo, Si, Sr, by cathodic arc evaporation method used for coating of orthopaedic implants. Thin films are amorphous with 2  $\mu\text{m}$  thickness, adherent to substrates and hard (10 -20GPa), with contact angle ranged from 115° to 134°. Thin films are resistant to corrosion in SBF at 37 °C, with a high protection efficiency (>58%) and good biomineralization abilities in SBF and DMEM solutions, having the adsorption of bovine serum albumin (BSA) higher than the uncoated surfaces.

**RO.273.**

**Title** **Innovative strategies for bioactive/antibacterial advanced prostheses**

**Authors** Alina Vladescu, Catalin Vitelaru, Anca C.Parau, Iulian Pana, Mihaela Dinu, Adrian Kiss, Lidia R.Constantin

**Institution** **National Institute of Research and Development for Optoelectronics - INOE 2000**

**Patent no.** ERANET-M-ISIDE-1-171/01.07.2020

**Description** The project relates to a possibility to reduce the degradation rate of Mg alloys used for the maxillofacial surgery by coatings with thin films-based hydroxyapatite prepared by RF magnetron sputtering. The coatings exhibit a thickness ranged from 250 nm to 300 nm, being deposited up to 400° C. These coatings resist to corrosive attack of SBF, DMEM and PBS at 37°C, having a high protective efficient in these corrosive media (min 82%).

**RO.274.**

<b>Title</b>	<b>Procedure for removing consolidants and organic deposits from the surface of mural paintings using microfungal cultures</b>
<b>Authors</b>	I. Gomoiu, L. Ghervase, R. Radvan
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics, INOE 2000</b>
<b>Patent no.</b>	Patent application A00194 / 15.04.2022
<b>Description</b>	The invention relates to a process of using microfungal cultures for removing consolidants and organic deposits from the surface of mural paintings, icons on wooden support, or stone. The process involves the preparation of the spore suspension and inoculation on the deposits of organic compounds and consolidants on the surfaces to be cleaned. After 10 days incubation, the mycelium is mechanically removed and the surface is cleaned, dried and decontaminated, then the process' efficiency is evaluated, through a complementary approach, using direct analysis, optical microscopy, electron microscopy, colorimetry, FTIR and hyperspectral imaging.

**RO.275.**

<b>Title</b>	<b>Procedure for removing consolidants and organic deposits from the surface of mural paintings using bacterial esterases immobilized in polysaccharides-based gel</b>
<b>Authors</b>	I.Gomoiu, R. Ruginescu, S. Neagu, R. Cojoc, M. Enache, L. Ghervase, R. Rădvan
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics, INOE 2000</b>
<b>Patent no.</b>	Patent application A00195 / 15.04.2022
<b>Description</b>	The invention presents a process for removing consolidants and organic deposits from the surface of mural paintings, using bacterial esterases immobilized in gel. The process consists in preparation of enzyme solution (esterases) from acetone powder in potassium phosphate buffer (pH 7.5), followed by preparation of the gel based on polysaccharides extracted from Rhodophyceae family' algae (Agarart) or from Xanthomonas campestris bacteria (Vanzan), with immobilized esterases (1:1), then adjusting the gel size to the surface to be treated. After applying it to the surface and a period of incubation, the gel is removed,

the surface is cleaned and dried. Finally, the efficiency of the process is evaluated by complementary techniques (direct analysis, optical microscopy, electron microscopy, colorimetry, FTIR, hyperspectral imaging).

**RO.276.****Title**

**Procedure for in situ LIBS analysis of the chemical composition of submerged objects**

**Authors**

M. Dinu, R. Radvan

**Institution**

**National Institute of Research and Development for Optoelectronics, INOE 2000**

**Patent no.**

A/00353/23.06.2020

**Description**

The invention describes a method for analyzing submerged cultural heritage using the Laser Induced Breakdown Spectroscopy (LIBS) technique. The procedure for the analysis and stratigraphic characterization of the artefacts consists in triggering 2 successive collinear laser pulses emitted by a laser with YAG:Nd, in double pulse mode, with a delay of ns- $\mu$ s order (depending on the characteristics of the liquid medium), at a fluency high enough so that the first laser pulse creates an air bubble on the investigated surface, and the second pulse will hit at its maximum expansion time and create a small cloud of plasma containing the elemental information. The spectral information in the plasma cloud is collected under local thermodynamic equilibrium (LTE) conditions by an optical fiber and transmitted to the spectrometer, allowing a precise elemental characterization (ionic/atomic) of the submerged artefact without sampling or disturbing its preservation environment.

**RO.277.****Title**

**Complex method for identification, characterization and mapping of polychrome multilayer objects, from macroscopic to microscopic level**

**Authors**

M. Dinu, R. Radvan, L.C. Ratoiu

**Institution**

**National Institute of Research and Development for Optoelectronics INOE 2000**

**Patent no.**

A00638 / 09.10.2019

**Description**

The present invention proposes an innovative method that combines complementary techniques in order to obtain a complex package of spectral and imaging data: Hyperspectral analysis, RAMAN and LIBS. The analysis

package creates in real time a “profile” of the investigated heritage object, starting from 2D macroscopic hyperspectral imaging, pixel by pixel hyperspectral analysis, micrometric RAMAN, and reaching 3D micro level through LIBS that offers the package the stratigraphic component. LIBS provides stratigraphic spectral data, advancing pulse by pulse in the depth of the layers, but the chained triggering of the complementary systems introduced by the current method gives us the possibility to acquire stratigraphy Raman spectra, as well.

**RO.278.**

**Title** GoT in art

**Authors** Monica Dinu, Roxana Radvan, Marilena Claudia Stancu

**Institution** National Institute of Research and Development for Optoelectronics, INOE

**Patent no.** exploratory research project PN-III-P4-PCE-2021-1605

**Description** The project is focused on developing an original remote setup for investigation and diagnosis of cultural assets, providing valuable results that will improve the characterization and discrimination of materials (mapping) for preservation, restoration, evaluation of interventions or authentication of heritage. The solution correlates for the first time 3 extremely versatile methods of physical-chemical investigation, with high sensitivity and precision: Hyperspectral Imaging, Laser Induced Breakdown Spectroscopy and Raman Spectroscopy in a hybrid Go-on-Target (GoT) system for in situ analyses of cultural heritage (without sampling). GoT will generate a complete stratigraphic profile of the object and will guide the restorer and the investigator in the micro/nanoscope universe of the hidden layers, providing information about the original material, but also about degradation mechanisms, hidden defects, hidden layers, repainting, previous interventions, painting technique, new (contemporary) or historical materials validation etc. The hyperspectral analysis will digitally "decompose" the layers of the artwork and will reveal the particularities of the technique specific to an artist or a school. By associating spectroscopic analyses with the imaging ones using the GoT system, we will obtain a valuable tool for authentication of works of art, the anti-fraud fight and art trafficking.

**RO.279.**

<b>Title</b>	Innovative analytical methodology for in-situ identification and real-time mapping of organic binders used in ancient wall paintings- artMAP
<b>Authors</b>	Ioana Maria Cortea, Luminița Ghervase, Marilena Claudia Stancu
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics, INOE 2000</b>
<b>Patent no.</b>	PN-III-P2-2.1-PED-2021-3576
<b>Description</b>	The artMAP project aims to develop, optimize and implement a new analytical methodology for the in-situ identification and real-time mapping of organic binders used in ancient wall painting through a two-step approach (two levels of identification). The proposed methodology combines two complementary molecular techniques of high specificity – laser induced fluorescence (LIF) and Fourier transform infrared spectroscopy (FTIR), the latter being enhanced using a micro-extraction protocol.

**RO.280.**

<b>Title</b>	NON-INVASIVE METHOD AND OPTOELECTRONIC SENSOR DEVICE OF DFB-FL-TYPE FOR DETERMINING THE AIRFLOW TYPE ON THE LEADING EDGE OF AN AIRPLANE WING
<b>Authors</b>	Sorin Micloș, Ion Ioan-Ferdinand Lăncrăjan, Dan Savastru, Marina Tautan
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics INOE 2000</b>
<b>Patent no.</b>	Patent application No. 127915/2018
<b>Description</b>	The invention relates to a non-invasive method and to an optoelectronic sensor device of DFB-FL-type for determining the airflow type on the leading edge of an airplane wing by measuring the amplitude variation and the frequency of the variable force corresponding to the static pressure and normally applied on the wing surface in a non-invasive manner and without affecting the characteristics of the wing material. The claimed method consists in using a DFB-FL laser emitter pumped with a laser beam emitted by a laser diode and in determining the modifications of the output power of the DFB-FL laser emitter induced by the non-linear variations of the refraction index of the optical



fiber nucleus of the DFB-FL laser emitter depending on the magnitude of the variable force characteristic to the normal static pressure of the air on the surface of the airplane wing.

**RO.281.**

<b>Title</b>	METHOD AND DEVICE WITH OPTOELECTRONIC SENSOR WITH OPTIC FIBER USING THE MICROBENDING EFFECT FOR DETERMINING THE WEIGHT OF MOVING MOTOR VEHICLES
<b>Authors</b>	Sorin Micloș, Ion Ioan-Ferdinand Lăncrănjan, Dan Savastru, Marina Nicoleta Tăutan
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics INOE 2000</b>
<b>Patent no.</b>	Patent application No. 127980/2017

<b>Description</b>	<p>The invention relates to a method for determining the weight of moving motor vehicles without restricting in any way the traffic of the motor vehicles to be weighed and to a device applying the method. The claimed method measures the variation of the optical power transmitted through an optical fiber depending on the applied variable weight, by using an optoelectronic device with a single mode or multi-mode optical fiber wherethrough there is propagated a luminous radiation. The claimed device comprises a near infrared radiation source which may be a laser diode or a LED, injecting the infrared radiation through an optical fiber bending under the weight of the weighed motor vehicle within the fiber bending assembly, modifying the power of the radiation transmitted through the optical fiber, the said modification being recorded by a photodiode which generates a voltage measured by means of an acquisition board connected to a computer.</p>
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**RO.282.**

<b>Title</b>	METHOD AND LASER DEVICE OPERATING UNDER PASSIVE OPTICAL SWITCH REGIME WITH HIGH ENERGY PULSE EMISSION AND ULTRA-SHORT SEMI-AMPLITUDE DURATION, IN THE RANGE OF NANOSECONDS
<b>Authors</b>	Sorin Micloș, Ion Ioan-Ferdinand Lăncrănjan, Dan Savastru, Aurelian Popescu
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics INOE 2000</b>

<b>Patent no.</b>	Patent application No. 128119/2017
<b>Description</b>	<p>The invention relates to a method and a laser device which operates under passive optical switch regime with high energy pulse emission and ultra-short semi-amplitude duration, in the range of nanoseconds. According to the invention, the method is characterized in that, in order to obtain, under passive optical switch regime of the quality factor of the laser resonant cavity, a high-energy laser pulse emission with Gauss or super-Gauss distribution of laser intensity, corresponding to the laser oscillation in TEMmode of high volume, at wavelengths in the spectral range of 1...5 <math>\mu\text{m}</math> and semi-amplitude duration approximately equal with the time of passing both ways through said laser resonant cavity, there is employed a passive optical switch, device having a high contrast factor, i.e. having, at the laser wave length, an optical transmittance which varies from a very low initial value to a very high final value corresponding to the laser emission, limited by Fresnel reflections on its optically-active surfaces, as well as laser mirrors having radially variable reflectance according to a Gauss or super-Gauss distribution law.</p>

**RO.283.**

<b>Title</b>	METHOD AND DEVICE FOR OPTICAL MODULATION OF LIGHT
<b>Authors</b>	Puşcaş Nicolae; Popescu Aurelian; Micloş Sorin; Savastru Dan; Stafe Mihai; Neguţu Constantin; Baschir Laurenţiu; Savu Valeriu; Tăutan Marina; Vasile Georgiana; Mihăilescu Mona
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics INOE 2000</b>
<b>Patent no.</b>	Patent application No. 131293/2021
<b>Description</b>	<p>The invention relates to a method and a device for optical modulation of light, which may be useful for making various optoelectronic elements used to optically process the information. According to the invention, the method for optical modulation of light consists in passing a monochromatic light beam, which is to be modulated, through a prism which has the role of reducing the beam incidence angle on a structure consisting of a sublayer made of the same material as the prism or a material with a refraction index as close as possible to that of the prism,</p>

sublayer on which a metallic film and a chalcogenide film are deposited, generating a plasmonic wave the propagation constant of which is modified by an excitation light source, incident on an external surface of the chalcogenide film and which modulates the refraction index of the chalcogenide film, generating an intensity modulation in the beam reflected from the metallic film surface, available upon the exiting prism. As claimed by the invention, the light optical modulation device consists of a monochromatic light source , a prism having the role of reducing the angle of incidence of a beam on the modulating structure, a sublayer made of the same material as the prism or a material with refraction index as close as possible to that of the prism, sublayer on which a metallic film and a chalcogenide film are deposited, an excitation light source and a photo-detector which receives the modulated beam.

**RO.284.****Title**

OPTICAL MEMORY CELL AND METHOD FOR MANUFACTURING THE SAME

**Authors**

Popescu Aurelian; Pușcaș Nicolae; Savastru Dan; Baschir Laurențiu; Neguțu Constantin; Stafe Mihai; Savu Valeriu; Tenciu Daniel; Vasile Georgiana; Mihăilescu Mona

**Institution**

**National Institute of Research and Development for Optoelectronics INOE 2000**

**Patent no.**

Patent application No. 132008/2022

**Description**

The invention relates to an optical memory cell and to a process for manufacturing the same. The claimed cell comprises a glass prism on whose base a metal film and a film of amorphous chalcogenide material are deposited, a writing/erasing polarized light source, a reading light source and a polariser, a photodiode measuring the light reflected on the prism base, where the illumination with polarized light beam induces the optical anisotropy of the refraction index into the film of chalcogenide material, the direction thereof being modified in the same time with the change of polarization of said laser by means of an optical element, the anisotropy being kept also after stopping the illumination.

**RO.285.**

<b>Title</b>	<b>PLASMONIC CHEMICAL SENSOR IN KRETSCHMANN CONFIGURATION</b>
<b>Authors</b>	Başchir Laurențiu; Micloș Sorin; Savastru Dan; Savastru Roxana; Popescu Aurelian
<b>Institution</b>	<b>National Institute of Research and Development for Optoelectronics INOE 2000</b>
<b>Patent no.</b>	Patent application No. 133446/2022
<b>Description</b>	The invention relates to a plasmonic chemical sensor made in Kretschmann configuration. According to the invention, the sensor comprises a laser diode which emits a laser beam at a desired wavelength for the optimal detection of the investigated substance, an input scanning mirror which achieves the desired incidence angle, an isosceles prism on whose base a metal film is deposited and, over said film, a chalcogen film in contact with the medium to be tested, a detection scanning mirror, a driver for controlling the two mirrors, a computer which controls the rotation of the mentioned mirrors, acquires the measurements results and processes the data, a photodetector and an analogue-to-digital convertor necessary for transmitting the data measured, in digital form, for the computer.

### **INCDO INOE 2000 - Subsidiary Hydraulics and Pneumatics Research Institute - INOE 2000-IHP**

**RO.286.**

<b>Title</b>	<b>Stand for Optimization of Blades Hydrodynamic Profile and for Functional Tests in Hydraulic Turbine Rotors</b>
<b>Authors</b>	Teodor Costinel Popescu, Radu-Iulian Rădoi, Marian Blejan
<b>Institution</b>	<b>INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP</b>
<b>Patent no.</b>	RO131813B1-28.02.2022
<b>Description</b>	The invention relates to a small gauge stand for experimental tests on scale models, with small dimensions and masses, of rotors and rotor blades of axial hydraulic turbines with vertical or horizontal axis. The stand is meant for experimental research activity conducted in laboratories of universities and institutes that endeavor to conduct research in the field of hydro power units. According to the invention, this stand is a test facility that

can be used to determine experimentally, successively in two stages, both the distribution of speeds on the rotor blades of axial hydraulic turbines of small dimensions and masses, in order to optimize their hydrodynamic profile - in the first stage - and the mechanical parameters (speed and torque), of the hydraulic turbine rotors, with the previously experimentally optimized blades profile - in the second stage.

The proposed solution has the following advantages:

- It combines two functions – (1) optimizing the hydrodynamic shape of the rotor blades through experimental tests, and (2) testing for determining the functional characteristics of the rotor assembly with hydro dynamically profiled blades - in a single test facility;
- It provides the ability to test both vertical axis and horizontal axis hydraulic turbine rotor models on the same test facility;
- Both the stand and the turbine rotor testing devices that equip it are small in size, which allows for the stand to be mounted and operated in confined spaces;
- It reduces the costs of experimental measurements on scale models of hydraulic turbine rotors and rotor blades.

#### **RO.287.**

##### **Title**

**Universal Stand for Volumetric Rectilinear and Rotary Machines Endurance**

##### **Authors**

Teodor Costinel Popescu, Ioan Bălan, Radu-Iulian Rădoi

##### **Institution**

**INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP**

##### **Patent no.**

RO133361B1-28.10.2022

##### **Description**

The invention relates to a universal stand for volumetric rectilinear and rotary machines endurance, advantageous in terms of energy, which works with energy recovery on the principle of hydromechanical power recirculation. Endurance tests of volumetric machines (pumps, linear motors and rotary motors), used in hydraulic drive systems, are tests by which the duration of operation is determined; they are performed at nominal power (nominal flow rate and nominal pressure), so they involve high energy consumption. The proposed solution has the following advantages:

- The module for endurance of hydraulic cylinders, with the directional control valve not actuated, can be connected to

the module for endurance of volumetric pumps or the module for endurance of rotary volumetric motors;

- It enables endurance testing of cylinders / volumetric pumps / rotary volumetric motors, by using the same pumping and energy recovery unit, which consists of a constant-speed electric motor equipped with a frequency converter, a volumetric pump and a rotary volumetric motor, the capacity of the volumetric pump being at least 10% higher than the capacity of the volumetric motor ( $V_p \geq 1.1 V_m$ );
- The module for endurance of hydraulic cylinders has a single electrohydraulic directional control valve to control the displacement of the two - test and load (resistive) - cylinders;
- It works on the basis of "hydromechanical power recirculation";
- Energy dissipation in heat is reduced, due to the discharge of a much smaller flow to the reservoir, through a single normally closed pressure relief valve;
- It requires oil coolers with small heat transfer surfaces.

#### RO.288.

##### Title

**Theoretical and experimental contributions to optimizing the dynamic parameters of multipurpose motor trucks by using hydrostatic transmissions**

##### Authors

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**INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP**

##### Patent no.

Doctoral research project

##### Description

Multipurpose motor trucks are trucks on the chassis of which two or more productive technological equipment pieces are installed and used simultaneously. When technological equipment is used, the speed of the motor truck must be adapted to the technological process; in some cases, it is necessary to precisely and continuously adjust a low speed of the motor truck with a PID controller to satisfy one of the parameters of the technological process that varies continuously. Since the mechanical or hydrodynamic transmission currently equipping the motor trucks does not meet the needs of the technological process and / or is energy-ineffective in the technological travel speed regime,

the author of the thesis proposes to equip motor trucks with a closed-circuit hydrostatic transmission and a PID regulator, which will allow multipurpose motor trucks to achieve lower travel speeds than the mechanical transmission with which the motor trucks are already equipped. The multipurpose motor truck combines the advantages of all the motor trucks currently on the market, with increased productivity due to an increased transport capacity (10 tonnes). It will have an authorized mass of 18 tonnes; it will be able to travel upwards and downwards a rough road with a 45% gradient at a maximum speed of 4.3 km/h, and upwards a paved road with a 15% gradient at a maximum speed of 7.35 km/h. As to the minimum travel speed, the motor truck can travel at 0.045 km/h. The motor truck will achieve low travel speeds with better energy efficiency compared to trucks equipped with hydrodynamic transmissions; the two different transmissions which the motor truck will be equipped with can be used independently.

The research is based on the patent application “Mixed - mechanical and hydraulic - all-wheel drive transmission for multipurpose motor vehicles”, authors: I. Lepădatu, L. Dumitrescu, Al. P. Chiriță, no. A/00638 -05.09.2018.

#### RO.289.

<b>Title</b>	<b>Hybrid Solar System with Overload Protection</b>
<b>Authors</b>	Ioan Pavel, Radu-Iulian Rădoi, Gheorghe Șovăială, Kati Pavel
<b>Institution</b>	<b>INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP</b>
<b>Patent no.</b>	Patent application No. A/00740 – 17.11.2022

<b>Description</b>	<p>The invention relates to a hybrid installation for converting solar energy into thermal and electrical energy with overload protection, for domestic or industrial use. During the period when low consumption is recorded or when the solar installation produces more hot water than is consumed, the solar panels can reach temperatures of over 200°C; at that moment it is recommended to use a protection system in order to avoid overheating of the solar system. The solar thermal installation must always have the possibility of discharging (loss of) the thermal energy produced by the</p>
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solar panels, otherwise it gets overheated and there is a risk of damage.

The hybrid solar system with overload protection, proposed in the patent application, is composed of several rotating hybrid solar panel units. Each unit has three sides, one on which there are two tubes with Heat Pipe technology, one on which there are 10 photovoltaic cells, and one that is energy neutral, for shading the two capture systems. The units are connected by gear couplings and driven by a pinion from a stepper motor. The system is able to alternately produce electricity or hot water, and also provide overload protection, by shading the two capture systems, depending on the control signal received from a controller that can determine the degree and priorities of capturing according to consumption, water temperature in the boiler or battery charge level, thus optimizing the conversion efficiency of the available solar energy.

#### RO.290.

<b>Title</b>	<b>Platform for Lifting-Lowering Persons, Driven by a Linear Hydraulic Motor with Hydraulic Energy Recovery System</b>
<b>Authors</b>	Corneliu Cristescu, Ionaș Cătălin Dumitrescu, Florin Georgescu, Liliana Dumitrescu
<b>Institution</b>	<b>INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP</b>
<b>Patent no.</b>	RO129553B1-26.02.2021

<b>Description</b>	<p>The invention relates to a platform for lifting-lowering persons, driven by a linear hydraulic motor with hydraulic energy recovery system, meant for the field of vertical transportation for the mobility-impaired persons and for the construction field. The platform uses a hydraulic system for partial recovery of potential energy and reuse; thus, an additional energy conversion system is no longer necessary. The recovery / reuse system comprises the following as main parts: a pressure multiplier cylinder, a hydraulic accumulator and a hydraulic block on which check valves and directional control valves are mounted that control the path of the working fluid. The hydraulic circuits are provided with equipment pieces that ensure safety lowering in case of</p>
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failure and controlled speed. Optionally, the platform can be connected to a data acquisition and processing system.

# **RO.291.**

**Title** Hydraulic Cylinder with Embedded Distribution  
**Authors** Sava Anghel, Gabriela Matache, Gheorghe Șovăială  
**Institution** INCDO-INOE 2000, Subsidiary Hydraulics and Pneumatics Research Institute INOE 2000-IHP  
**Patent no.** RO132059B1-30.12.2022

## **Description**

The invention relates to a hydraulic cylinder with embedded distribution which, upon actuation of some valves embedded within the piston, achieves distribution of motive fluid while permitting alternating linear displacement between two adjustable limit stops.

The cylinder is made up of a casing provided with two adjustable limit stops, a piston consisting of a sealing part and a rod, which, by assembling, generate two valves that may be closed or opened, depending on the position of a bistable disc spring that can be controlled from the limit stops, by means of a rod-ring-disc assembly piece. When the first valve is closed, the second one is open and the motive fluid moves the rod to the left; the motive fluid is eliminated through the second valve. When the rod-ring-disc assembly piece makes contact with the first limit stop and blocks the bistable disc spring, the first valve opens and the second one closes; the motive fluid enters through the first valve moving the rod to the right, until the rod-ring-disc assembly piece touches the second limit stop, closes the first valve and opens the second one, the cycle being further resumed.

The cylinder is meant to be used in driving the pumps for transferring harmful liquids, either acid or explosion-prone, in driving the fertilizer dosing devices in agriculture or wherever linear displacements repeated without electric or hydraulic control or drive are needed.

## National Institute of Research & Development for Technical Physics, Iasi

**RO.292.**

<b>Title</b>	<b>Method for preparing magnetic nanoparticles based on magnetite and iron oxyhydroxide</b>
<b>Authors</b>	Herea Dumitru-Daniel, Chiriac Horia, Lupu Nicoleta
<b>Institution</b>	<b>National Institute of Research &amp; Development for Technical Physics</b>
<b>Patent no.</b>	Patent application No. a 2020 00298/ 29.05.2020
<b>Description</b>	The invention relates to a process for obtaining a magnetic compound based on magnetite and iron oxyhydroxide with applications in the biomedical field. The process according to the invention consists in the hydrothermal treatment of a mixture between a ferrous salt and a ferric salt at a temperature of 50-100 °C, in the presence of a precipitating agent like sodium hydroxide, for 3-5 min, followed by adding a volume of water 2-4 times larger than the initial one. The reaction continues for 5-40 min, after which the product is magnetically separated and washed, finally resulting in magnetite nanoparticles partially or completely covered with ferrihydrite lamella.

## National Research and Development Institute for Non-ferrous and Rare Metals – IMNR

**RO.293.**
**Title**                    **Advanced fabrication of nature-inspired and environmentally friendly porous ceramic scaffolds**
**Authors**                Stefania Chiriac, Cristina-Florentina Ciobota, Mihai Ghita, Ana-Maria Mocioiu, Laura-Madalina Cursaru, Roxana Mioara Piticescu, Adrian Mihail Motoc

**Institution**           **National Research-Development Institute for Non-ferrous and Rare Metals - IMNR**
**Patent no.**

The fabrication of ceramic scaffolds by versatile and reproducible 3D printing techniques represents an interesting and increasingly studied strategy to avoid the problems that arise in the case of using conventional production methods. The most well-known materials used to obtain porous scaffolds are hydroxyapatite (HAp), composites based on HAp and different biopolymers, but also bioceramics based on calcium silicates, which being composed of CaO and SiO<sub>2</sub>, have attracted the attention of researchers for applications in orthopedic implants due to their excellent bioactivity and biocompatibility.

**Description**           This project aims to provide alternatives for the field of ceramic biomaterials and bring new solutions regarding their processing for applications in the field of bone tissue engineering. For the first time, 3D printed scaffolds based on Ca silicate doped with Ba (walstromite) and Zr (baghdadite) will be obtained through the robocasting technique, an additive manufacturing method with numerous advantages: fast printing, good printing accuracy, versatile (allows 3D printing processing of many bioceramic materials), simple, easy to use, without the risk of powder entering the pores. It allows the selection of non-toxic binders, unlike stereolithography where incompletely polymerized resins are toxic, the printing process takes a long time and the post-processing steps after printing are long and laborious.

**Acknowledgement:** This work was supported by MCID, Core Program no. 5N/01.01.2023 – ENERCLEAN, project number PN23250201/2023 and INOVADIT project of the Ministry of Research, Innovation, and Digitization through Program 1—Development of the national research-development system, Subprogram 1.2—Institutional performance projects for financing excellence in RDI, contract no. 9PFE/2021.

**RO.294.**

<b>Title</b>	<b>Advanced manufacturing technologies of hybrid nanostructures for efficient use of natural plant sources</b>
<b>Authors</b>	Miruna-Adriana Ioța <sup>1,2</sup> , Ioan Albert Tudor <sup>1</sup> , Laura-Mădălina Cursaru <sup>1</sup> , Ana-Maria Mocioiu <sup>1</sup> , Adrian Mihail Motoc <sup>1</sup> , Adriana-Gabriela Schiopu <sup>3</sup> , Roxana Mioara Piticescu <sup>1</sup>
<b>Institution</b>	<b><sup>1</sup>National Research-Development Institute for Non-ferrous and Rare Metals – IMNR</b> <b><sup>2</sup> University of Pitești, Interdisciplinary Doctoral School, Pitești, Romania</b> <b><sup>3</sup>University of Pitesti, Department of Manufacturing and Industrial Management, Romania.</b>
<b>Patent no.</b>	

<b>Description</b>	<p>In recent years, various ZnO/chitosan, or Fe<sub>3</sub>O<sub>4</sub>/chitosan-based hydrogels with antimicrobial activity have been studied as controlled release systems of antibiotics for wound treatment. The objective of this project is to demonstrate the potential use in cancer prevention of new nanostructured materials (20-50 nm) based on zinc oxides and/or iron oxides, functionalized with chitosan and plant extracts, knowing that plants have a huge therapeutic potential. This material can be used after removing a mole (benign tumor formation) on the surface of the skin. To achieve this objective, the project focuses on three directions: i) Development of a nanostructured hybrid material based on Fe<sub>3</sub>O<sub>4</sub> and chitosan to test its stability and efficiency in medical applications; ii) Development of a nanostructured hybrid material based on ZnO-Fe<sub>3</sub>O<sub>4</sub>, functionalized with chitosan for testing its anti-bacterial and anti-cancer potential; iii) Development of a nanostructured hybrid material based on ZnO and chitosan, which incorporates active principles (plant extracts) integrating the anti-bacterial properties of ZnO and chitosan with the anti-cancer properties of the active principles on the skin surface.</p>
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**Acknowledgement:** This work was supported by MCID, Core Program no. 5N/01.01.2023 – ENERCLEAN, project number PN23250202/2023 and INOVADIT project of the Ministry of Research, Innovation, and Digitization through Program 1—Development of the national research-development system, Subprogram 1.2—Institutional performance projects for financing excellence in RDI, contract no. 9PFE/2021. M.-A. Ioța acknowledge the support of Interdisciplinary Doctoral School from University of Pitești.

RO.295.

<b>Title</b>	<b>COMPOSITES BASED ON COMPOSITIONALLY COMPLEX ALLOYS FOR TRANSPORTATION INDUSTRY - COM@TRANS</b>
<b>Authors</b>	D. Mitrica <sup>1</sup> , J. Trapp <sup>2</sup> , A. Storz <sup>3</sup> , I. Carcea <sup>4</sup> , B. A. Serban <sup>1</sup> , I. C. Badea <sup>1</sup> , I. Anasiei <sup>1</sup> , M. Schölzel <sup>2</sup>
<b>Institution</b>	<sup>1</sup> National R&D Institute for Nonferrous and Rare Metals – IMNR <sup>2</sup> Fraunhofer Institute for Manufacturing Technology and Advanced Materials – IFAM <sup>3</sup> Sigma Materials GmbH <sup>4</sup> RANCON SRL
<b>Description</b>	<p>The braking system is one of the most important components of a vehicle, therefore the development of new materials with increased performances is a necessity. The new material should meet a characteristics, such as: high strength at low and higher temperatures, high friction coefficient, good heat capacity and corrosion resistance. COMPTRANS project aims to develop a new material for the manufacturing of the brake discs, that answers the challenges faced by conventional materials during usage. The brake disc is manufactured using an innovative composite material, which is composed of a metal matrix based on low weight compositionally complex alloys (CCA) and ceramic particles reinforcement. CCA represent a new group of materials with superior characteristics, that can be applied in several fields of activity. The new class of materials contains at least four elements, that can be combined in many ways, each composition having unique characteristics. Following a process of selection and optimization of the alloy composition, a material with improved properties can be obtained. The new metal matrix proposed material possess low density, increased corrosion properties and high temperature resistance. CCA alloy is a component of a new innovative composite material, which, after being reinforced with ceramic particles, improves the characteristics of the brake system. The obtained result is the development of a concept applied in the design and manufacturing of new material that posses increased characteristics and reduced environmental impact, with applications in the transportation industry.</p>

**RO.296.**

<b>Title</b>	<b>Hydrothermal process for the synthesis of multicomponent nanostructured powders based on rare earths elements</b>
<b>Authors</b>	Ciobota C., Piticescu R.R., Sobetkii A., Mosinoiu L. Motoc A. M.
<b>Institution</b>	National Research&Development Institute for Non-ferrous and Rare Metals - IMNR
<b>Patent no.</b>	Patent application A 00822/20.12.2022
<b>Description</b>	The invention refers to obtaining in situ a multicomponent oxide based on LSGYN type rare earths by hydrothermal synthesis thus removing the disadvantages encountered over time in the case of other synthesis methods. The process according to the invention consists in that: this material is prepared by the hydrothermal method under mild conditions of temperature (180-200°C) and pressure (20-60 atm), it is dried in an oven and then calcined at 1200°C for 8 hours.

**RO.297.**

<b>Title</b>	<b>Innovative technologies for obtaining complex electrolytic materials based on BaCeZrO<sub>3</sub> doped with REE, for SOFC applications</b>
<b>Authors</b>	Anca Elena SLOBOZEANU, Radu Robert PITICESCU, Lidia LICU, Cristina Florentina CIOBOTA, Adrian MOTOC
<b>Institution</b>	<b>National Research &amp; Development Institute for Nonferrous and Rare Metals-IMNR, Blvd.Biruintei no.102, Pantelimon, Ilfov, Romania</b>
<b>Patent no.</b>	
<b>Description</b>	Solid oxide fuel cells (SOFCs) have the potential to support the European Union's 2030 targets promoting the development of cleaner and more efficient energy systems to reduce greenhouse gas (GHG) emissions. Conventional SOFC stack manufacturing involves many industrial steps that are reflected in the total cost of the final product. The aim of the present project is to develop innovative and emerging technologies in the energy sector, specifically in the field of solid oxide fuel cells (SOFCs), which will contribute to the transition to clean energy, energy

independence and low product cost final.

Following the integration of hydrothermal synthesis with the additive manufacturing technique (3D printing), three categories of electrolytic 3D printed structures for SOFC will be obtained: two based on complex compounds of the type  $\text{Ba}(\text{Ce}_x\text{Zr}_z)\text{O}_3$  (hereinafter referred to as BCZ), respectively  $\text{Ba}(\text{Ce}_x\text{Zr}_z\text{Y}_y)\text{O}_3$  (BCZY), (where  $x = (0.5-0.7)$ ,  $z = (0.1-0.2)$ ,  $y = (0.1-0.2)$ ), and one based on Y-doped  $\text{ZrO}_2$  (YSZ), standard material used for SOFC electrolytes. These will be integrated into SOFCs that operate at lower temperatures, leading to faster start-up and lower power consumption.

The identification of appropriate parameters regarding the characteristics of electrolytic materials will be considered; Approval of a laboratory technology for electrolytic ceramic materials based on BCZ, BCZY; Demonstration of the potential of the emerging additive manufacturing technology to be used to make YSZ, BCZ, BCZY electrolytic structures; Performance testing of electrolytic materials

#### RO.298.

**Title** **Methods for obtaining Sb-Te-Zn-Sn alloys with thermoelectric properties**

**Authors** Marian Burada, Dumitru Mitrica, Mihai Tudor Oлару, et.al.

**Institution** National Research & Development Institute for Non-ferrous and Rare Metals – IMNR, Pantelimon, Ifov, Romania

**Patent no.** Patent application: A00906/2017  
Patent granting decision: 4.2/143/28.10.2022

**Description** The invention discloses an electrochemical process for obtaining materials from the Sb-Te-Zn-Sn system for thermoelectric applications. The process according to the invention is carried out in potentiostatic mode, in several stages, and consists in the sequential electrodeposition of layers of Sb-Te and Zn-Sn, respectively, from two different electrolyte baths, containing salts of the deposited metals with complexing agents, and transferring the electrodes, a copper foil cathode, a platinum foil anode, and a saturated calomel reference electrode, from the Sb-Te deposition bath to the Zn-Sn deposition bath. The sequential electrodeposition process is followed by a solid phase homogenization-diffusion heat treatment.

## National Institute for Research and Development in Electrochemistry and Condensed Matter

**RO.299.****Title**            **Toroidal Counter-electrode for Ionic Propulsion**

**Authors**        Marius Chirita, Adrian Ieta  
*National Institute for Research and Development in  
 Electrochemistry and Condensed Matter, Timisoara,  
 Romania*

**Institution**    Ieta, A. & Chirita, M. Toroidal counter-electrode for ionic  
 thruster. Patent application, SUNY RF case #: 230-2218.

**Patent no.**      Chirita M. Toroidal counter-electrode for ionic thruster.  
 Patent application, INCEMCT, OSIM Nr.  
 A/00268/17.05.2022

**Description**    Significant attention has recently been given to applications  
 of ionic wind to atmospheric propulsion.

Rotational ionic engines (RIE) have also demonstrated to have potential for in-atmosphere propulsion in negative polarity. However, such devices have not yet produced enough thrust for a rotary ionic drone to be developed. We demonstrate here that a toroidal counter electrode can increase the RIE's performance by up to 7.8 times greater than in previous configurations (upper limit not determined). The RIE is designed with pin emitters extended on the trailing edge of a 12.6 cm two blade plastic propeller placed above a toroidal counter-electrode which provided axial thrust up to 288.55 mN at 23.15 N/m<sup>2</sup>, 4.2 m/s bulk airflow speed within the propeller plane, and 251 m<sup>3</sup>/h flow rate. The new design generates axial thrust due to the linear acceleration of ions between electrodes, and also due to the induced rotary motion of the propeller which captures the energy and momentum of ions accelerated in the propeller rotational plane. Thrust to power ratio can be measured by the ratio of voltage to current or propeller kinetic energy to power. The thrust obtained with arrays of toroidal RIEs was overall proportional to the number of RIEs proving the scalability of the systems. The 4-RIE array produced a maximum thrust of almost 1 N (or about 100 g-force), similar to the maximum thrust of the commercial four-blade X15A Guangdong Syma drone (using similar diameter propellers like our RIE array).



## National Research and Development Institute for Textiles and Leather INCDTP

### RO.300.

**Title**                    **Grid structure functionalized by ultrasound for electromagnetic shielding**

**Authors**                Aileni Raluca Maria, Toma Doina

**Institution**           **National Research and Development Institute for Textiles and Leather**

**Patent no.**             Patent application No. A/00801/ 8.12.2022

The invention refers to a composite grid structure with electroconductive properties obtained by ultrasound-assisted cleaning in distilled water at 70-75°C at 37 kHz frequency, followed by ultrasound-assisted graphite deposition on textile grid structure. The composite is based on a clean textile layer coated by ultrasound-assisted graphite deposition using polyvinyl alcohol and polyvinylpyrrolidone dispersion with graphite microparticles (dispersion A), respective polyvinylpyrrolidone and polyethylene glycol with graphite microparticles (dispersion B).

**Description**

The novelty consists of developing the textile composite material by depositing the graphite directly on the grid textile structure by immersion in polymeric dispersions (A and B) and ultrasound technology at high temperature (70-80°C), followed by free drying at 16-20°C for 24 hours and crosslinking at 160-175°C. This technique allows the deposition of thin graphite layer, perfectly adherent to the fabric's surface, having an electrical surface resistance between  $10^3$  and  $10^4 \Omega$ , specific to the electroconductive materials for electromagnetic shielding.

The composite grid structure obtained has applications in the development of electromagnetic shielding, surface conductive electrodes, and technical applications for medical electronics or smart textiles.

### RO.301.

**Title**                    **Assembly method of the light panels, made specially, for the hull of the modular system for the development of the biofiltering materials in brackish sea**

**Authors**                Mihaela Jomir, Alexandra-Gabriela Ene, Ionela Badea

**Institution**           The National Research & Development Institute for Textiles and Leather

<b>Patent no.</b>	A/00250/2022
	<p>The inventions refers to a special method for assembling the light panels from composite materials with woven fabric matrix used for the hull of the floating elements for the development of the bio filtering materials from the species <i>Mytilus galloprovincialis</i> and <i>Crassostrea gigas</i>.</p> <p>Main components are represented by:</p> <ul style="list-style-type: none"> <li>- floating elements located offshore (4000 m from shore) and in the area of shore (1000 m);</li> <li>- submersible cylinder for the floating elements destined to growth and development of biofilter material (the <i>Mytilus galloprovincialis</i> and <i>Crassostrea gigas</i> species) fixation;</li> <li>- central floating element for system support and growth - development of bio filter material (mussels and oysters);</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>- main and secondary anchors of mooring anchors type;</li> <li>- floating elements for controlled growth of mussels;</li> <li>- floating elements for controlled growth of mussels and oysters development;</li> <li>- submerged enclosure for the development of oyster larvae;</li> <li>- artificial collectors for the direct growth of mussels and the development of oysters;</li> <li>- enclosure fixing systems for the development of oyster larvae;</li> </ul> <p>The sewing thread is treated with an innovative process to give the finished thread anti-microbial properties.</p> <p>The anti-microbial process creates a "zone of inhibition" that prevents the growth of bacteria and pathogens around sewn seams where microbes like to harbor, also provides superior abrasion resistance in the sewn product.</p>

**RO.302.**

<b>Title</b>	<b>Electronic and automation system for optimizing the recirculation pumps speed regime in textile fibers dyeing process</b>
<b>Authors</b>	Cristian Jipa Alexandra-Gabriela Ene, Carmen Mihai
<b>Institution</b>	The National Research & Development Institute for Textiles and Leather
<b>Patent no.</b>	133525/2022
<b>Description</b>	<p>The electronic and automation system according to the invention ensures the intake and transmission of information through the temperature and pressure sensors to the process controller, which through the speed variators controls and</p>

monitors the pumping system so that, according to the painting diagram, the process unfold under conditions of constant pressure.

Main components:

- power supply and protection block that ensures the distribution of electricity for all functional blocks;
- system of sensors that monitors temperature, pressure, flow and oversees the proper functioning of the other functional modules;
- process controller specially dedicated to control the painting processes variable speed;
- three-phase asynchronous motor type with a voltage and a current proportional to the commands applied;
- software that ensure the programming by the pumping;
- additional system that realizes the pumping of the working float and the pressure in the textile fibre dyeing vessel.

Novelties: ► Maintenance of a float flow at a constant pressure and a variable temperature depending on the diagram painting; ► constant pressure during the entire period of development of the technological process in the conditions of maintaining the physical integrity of the technological equipment and preserving the quality of the environment; ► uniformity of dye absorption from the fleet and implicitly a uniform dyeing of the textile material.

### RO.303.

<b>Title</b>	<b>Biodegradable polymer composite based on butadiene-acrylonitrile rubber and functionalized leather waste</b>
<b>Authors</b>	Nituica Mihaela, Sonmez Maria, Alexandrescu Laurentia, Stelescu Maria Daniela, Georgescu Mihai,
<b>Institution</b>	National Research and Development Institute for Textiles and Leather (INCDTP) - Division Leather and Footwear Research Institute (ICPI)
<b>Patent no.</b>	Patent application No. A/00511/2021
<b>Description</b>	The invention refers to a biodegradable polymer composite based on elastomer (butadiene-co-acrylonitrile rubber: NBR) and protein waste (post-consumer leather, from the leather goods and footwear industry) ground down to micrometric size and functionalized with potassium oleate, mineral filler (kaolin), active filler (zinc oxide), mineral oil, antioxidant (N-isopropyl-N,-phenyl-p-phenylene diamine), SiO <sub>2</sub> , flame retardant/plasticizer (stearin) in the presence of vulcanization

accelerators (S and Th).

The products obtained by using the invention have the following advantages: protection of the human factor by reducing the toxicity of the work environment; non-toxic finished products; environmental protection by transforming leather waste from the leather goods and footwear industry into new value-added products; reducing pollution; due to the functionalization of the waste with potassium oleate, good processability of the ingredients when mixing; the physical-mechanical properties are maintained within the standardized parameters: elasticity, tensile strength, tear strength, resistance to thermo-oxidative aging increases, etc.; increasing the turnover of the economic operator.

The composite material is intended for the obtaining of products for the footwear industry and consumer goods, such as: sheets for general use, and water and mud soles but also for those used in the food industry, car mats, gaskets and other goods used in normal conditions of work, technical plates, insoles, etc.

#### RO.304.

<b>Title</b>	<b>Sealing materials based on ethylene-propylene-terpolymer rubber and halogenated butyl rubber</b>
<b>Authors</b>	Stelescu Maria Daniela, Manaila Elena, Craciun Gabriela, Alexandrescu Laurentia, Sonmez Maria
<b>Institution</b>	The National Research & Development Institute for Textiles and Leather
<b>Patent no.</b>	RO134225-B1/2022
<b>Description</b>	<p>The invention refers to the production of (nano)composites based on ethylene-propylene terpolymer rubber and halogenated butyl rubber intended for the production of sealing gaskets (O-rings) and other technical articles from rubber, with applications in the aerospace field, the automobile industry, construction, agriculture, etc. In order to obtain performance properties, the nanocomposites contain both an active filler - precipitated silica, and a nano filler - organically modified montmorillonite. The new materials show a high degree of interaction between elastomers and filler/nano filler, both as a result of the use of a polar elastomer - halogenated butyl rubber, as well as of polyethylene grafted with maleic anhydride or of an adhesion promoter of the bis silane coupling agent type -[3-</p>

(triethoxysilyl)-propyl]-tetrasulfane. They are obtained by the melt mixing technique and the melt intercalation method, using equipment specific to the rubber industry, as follows: the rubber mixtures are obtained in an internal Plasti-Corder Brabender type mixer, temperatures 125-190°C, 30-80 rpm /min for 8-12', the crosslinking agents are added on a roller, at 70-100°C, friction of 1:1.1, time 5-8', the semi-finished products are obtained in the form of rubber sheet, then vulcanized at high temperatures (150-170°C) and a pressing force (200-300 kN), using molds and vulcanizing presses, resulting in the final shape of the products. The characteristics of the new elastomeric (nano)composites are the following: hardness: 62 – 71°ShA, elasticity: 30-38%, tensile strength: 10-22 N/mm<sup>2</sup>; density: 1-1.2 g/cm<sup>3</sup>, tearing strength: 25-55 N/mm, elongation at break: 400-700%, abrasion resistance 70-170 mm<sup>3</sup>, Mattia flexures: over 150,000 cycles at 180°, permanent deformation at 25% compression after 70h at 25°C; 8-25%, mass variation after 72 hours immersion in water or sodium hydroxide sol. 50% at 25°C: ±2%.

**RO.305.****Title**

**Organic pre-tanning material, method of obtaining and using**

**Authors**

Gaidau Carmen-Cornelia, Niculescu Mihaela-Doina, Stanca Maria, Berechet Mariana-Daniela, **Alexe Cosmin-Andrei**

**Institution**

Research and Development National Institute for Textiles and Leather (INCDTP)-Division Leather and Footwear Research Institute (ICPI) Bucharest

**Patent no.**

Patent application A00669 from 27.10.2020, RO-BOPI 412022/20.04.2022, p.33.

**Description**

The leather industry is the oldest industry that utilizes a waste, animal skin. Leather products are durable, processed with chemical materials containing heavy metals (basic salts of trivalent chromium), made from raw materials of petroleum origin (acrylic polymers, condensation syntans, phenol-formaldehyde resins, lubricating agents) or with materials energy-consuming chemicals (ammonium salts) and therefore, hardly biodegradable, which raises an important environmental problem regarding their storage, after the end of the life cycle.

A new organic tanning material as alternative to chromium

basic salts was designed, prepared and experimented as alternative for more biodegradable end products. The circularity of new composite with tanning properties was demonstrated by using of collagen hydrolysates extracted from leather waste, whey and vegetable tanning materials and manufacturing organic leathers with good physical-mechanical properties. The final leather products showed not only applicability for medical, children footwear and luxury bags manufacturing but a life after the end of their life, as compost for plant growth.

The new composite allows to reintegrate leather industry waste and food waste into economical circle of production and to diminish the use of vegetable tanning materials with favorable impact on deforestation reduction.

The new composite are easy to process into a paste or granule forms with application in pre-tanning of skin or leathers before mechanical processes for leather thickness adjustment which generate the most important quantity of waste. The new leather waste showed the potential to be regenerated by hydrolyses process and reintegrated in the new composite with tanning properties.

### RO.306.

<b>Title</b>	<b>Keratin and Collagen Based Materials from Renewable Resources for Leather Processing in the Frame of Circular Economy - International research project, PN-III-P3-3.5-EUK-2019-0175, Eureka, E!13359_KER_COL_CE,</b>
<b>Authors</b>	Carmen Gaidau <sup>1</sup> , Stoica Tonea <sup>2</sup> , Mihaela Niculescu <sup>1</sup> , Cosmin-Andrei Alexe <sup>1</sup> , Maria Stanca <sup>1</sup> , Mariana Daniela Berechet <sup>1</sup> , Demetra Simion <sup>1</sup> , Aykut Sancakli <sup>1</sup>
<b>Institution</b>	<sup>1</sup> Research and Development National Institute for Textiles and Leather (INCDTP)-Division Leather and Footwear Research Institute (ICPI) Bucharest, Romania <sup>2</sup> SC Taro Commimpex SRL Jilava, Romania <sup>3</sup> KAZLIÇEŞME DERİ ÜRN. AR-GE SAN.TİC.LTD.ŞTİ, Istanbul, Türkiye
<b>Project.</b>	PN-III-P3-3.5-EUK-2019-0175, Eureka, E!13359_KER_COL_CE
<b>Description</b>	KER_COL_CE project's thematic is in line with the latest European strategies related to circular economy through

proposed objective for prevention (PRODUCT DESIGN), reduction and recovery (WASTE MANAGEMENT) of leather industry waste in the frame of an eco-design for protein waste reintegration in economical circuit.

The general objective of the KER\_COL\_CE project is the development of a circular technology for leather processing by using collagen and keratin byproducts.

The main results are summarized as follows:

- Elaboration of new technologies for leather processing by using biobased products as alternatives to petroleum based chemicals in deliming, pe- tanning, tanning or retanning stages
- Development of new biobased material prototypes and ecological leather prototypes in the frame of a new circular technology for leather industry
- Demonstrative experiments on leather processing with materials made with renewable resources
- Consolidation of a new consortium of three partners from Turkey (KAZLIÇEŞME) and Romania (SC TARO Comimpex SRL, Leather and Footwear Research Institute-ICPI).

Deliming products based on collagen and keratin hydrolysates extracted from leather industry wastes were developed as alternatives to commercial ammonium salts with efficiency in ammonium reduction by 86%-100% (Fig.1).

Retanning composites with collagen or keratin hydrolysates recovered from leather industry waste were demonstrated to be efficient in replacing synthesis resins, polymers or fatliquors.

After the completion of the project the new biobased materials will be produced by the project coordinator, KAZLIÇEŞME (Turkey) and new circular technology for ecological leather processing will be integrated in the production of SC TARO Comimpex SRL (Romania), assisted by the research partner, ICPI.

**RO.307.**

<b>Title</b>	<b>Ultra-light textile structure used for the wing construction of a para-motor UAV platform for logistics-observation-monitoring-communication</b>
<b>Authors</b>	Salistean Adrian, Carmen Mihai, Badea Ionela
<b>Institution</b>	<b>INCDTP- National Research and Development Institute for Textile and Leather</b>
<b>Patent no.</b>	Patent application no. A100672/27.10.2020
<b>Description</b>	<p>The problem that this invention solves consists in the choice of raw material and the bonding of the structure, so that the whole assembly ensures the following operating requirements: weight max. 30 g/sqm, air permeability of max. 30l/sqm/s, breaking strength of min. 25 daN, tear strength of min. 1.5 daN, 2 years technical resource, easy maintenance and low costs.</p> <p>Several weave variants were iterated, out of which the most performing was a double ripstop variant. Thus the textile structure according to the invention is a fabric made of polyamide 6.6 yarns both in warp and in weft, with a length density of 30den/32fx1, ripstop binding made in 12 sts (10 for the ground yarns and 2 for the edge yarns), with 2 yarns each in the windings for the edge and warp yarns.</p> <p>The weaving process consists of: conditioning the yarns for 24 hours at a temperature of 22-25°C and a relative humidity of 65%; the warping - waxing performed on a strip warping machine with a yarn tension of 0.10 cN/dtex; the weaving performed on an unconventional weaving - machine with flexible rod weights and 12 threads; the weave-control performed on the control ramp.</p>



RO.308.

<b>Title</b>	<b>Ultrasounds assisted synthesis of alginate-based tannin and PLA-based coating with antimicrobial properties: a step-forward biodegradable and functional leather</b>
<b>Authors</b>	Quaratesi Ilaria, Ferrara Vittoria, Chipurici Petre, Călinescu Ioan, Carșote Cristina, Casas Conceptiò, Bacardit Anna, Gaeta Carmine, Badea Elena.
<b>Institution</b>	<b>National Research and Development Institute for Textile and Leather - Research Institute for Leather and Footwear (INCDTP-ICPI), Ion Minulescu Str. 93, 031215 Bucharest, Romania</b>
<b>Project.</b>	Eureka project PN-III-P3-3.5-EUK-2019-0236 “Biodegradable and Antimicrobial Re-tanning Agent and Coating for Ecological and Safe Leather - BIOSAFE LEATHER E!13427 - Post doc research grant. The tanning process has a long-term impact on the environment due to chemicals that are difficult and expensive to remove from wastewater, sludge and solid waste. The BioSafe Leather project aims at developing chromium and aldehyde-free, high-performance biodegradable leathers with antimicrobial properties for a wide range of leather goods and footwear applications, while significantly reducing the chemical and environmental footprint of leather production and addressing an alarming issue: billions of shoes ending up in landfill each year. For these reasons, a new product based on sodium alginate derivative (SAD) and polylactic acid (PLA) functionalised with ZnO nanoparticles was developed.. Both SAD and PLA obtained from renewable resources were functionalised using ultrasound technology, a green technology that does not involve the use of synthetic chemicals. The SAD-based tanning agent can replace the commercial syntans actually used, mostly based on phenol/formaldehyde resins, obtained from fossil sources. PLA-based surface finishing solutions will eliminate about 30% of the chemicals used for water-based finishing formulations, namely toxic crosslinking agents mixed with binders, which generate VOC emissions and cause increased pollution of water effluents. The presence of ZnO nanoparticles on leather structure and/or surface imparts antimicrobial properties thus it is possible to eliminate toxic biocides usually used for the microbiological protection of mostly water based finishing formulations. This result represents a first step towards the development of new agents for the production of value-added leather without having to modify current technology.
<b>Description</b>	

**National Institute for Research - Development of Machines  
and Installations designed for Agriculture and Food  
Industry - INMA Bucharest, Romania**

**RO.309.**

<b>Title</b>	<b>MULTIFUNCTIONAL FAST-FREEZING EQUIPMENT</b>
<b>Authors</b>	Sorică Cristian, Muscalu Adriana, Sorică Elena, Vlăduțoiu Laurențiu, Grigore Andreea, Constantinescu Mihai
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00054 / 2023</b>
<b>Description</b>	The invention refers to a fast-freezing equipment, of cabinet type, with discontinuous operation, using the method of freezing by contact with liquid nitrogen, in order to reduce the temperature of the products to the frozen state storage temperature.

**RO.310.**

<b>Title</b>	<b>EQUIPMENT FOR SEPARATION OF SEEDS FROM FRUIT PULP</b>
<b>Authors</b>	Ciupercă Radu, Zaica Ana, Ștefan Vasilica
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00794 / 2022</b>
<b>Description</b>	The invention refers to an equipment for separating the seeds from the pulp of the fruit, after extracting the juice, which separates and evacuates the two fractions, the seed and the pulp respectively. It can function integrated within a technological flow for fruit processing or as an independent equipment. The equipment can be used for sea buckthorn, grapes or tomatoes using the dry raw material.

**RO.311.**

<b>Title</b>	<b>FACILITY FOR EXTRACTION OF VOLATILE OILS FROM MEDICINAL PLANTS, WITH ALTERNATE FLOW</b>
<b>Authors</b>	Vlăduțoiu Laurențiu, Sorică Cristian, Muscalu Adriana, Sorică Elena, Grigore Iulia
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00780 / 2022</b>
<b>Description</b>	The invention refers to an installation for the extraction of volatile oils from medicinal plants, through the method of distillation with water vapor at low pressures. The equipment is designed for small farmers that are growing medicinal and aromatic plants, who wish to make a better use of their production of plants.

**RO.312.**

<b>Title</b>	<b>FLOATING TECHNICAL EQUIPMENT, ELECTRICALLY OPERATED, SELF-PROPELLED, FOR HARVESTING LAKE BIOMASS</b>
<b>Authors</b>	Ștefan Vasilica, Matache Mihai, Ciupercă Radu, Popa Lucreția, Tudor Emil, Vasile Ionuț, Sburlan Ion-Cătălin, Paraschiv Maria, Mateescu Carmen
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00752 / 2022</b>
<b>Description</b>	The invention refers to a floating technical equipment, self-propelled, electrically operated and remotely controlled, intended for cutting reed stalks or any other type of lake biomass, picking it up and loading it into a collecting bin for further disposal.

**RO.313.**

<b>Title</b>	<b>AUTOMATED INSTALLATION FOR THE COLLECTION OF ATMOSPHERIC HUMIDITY</b>
<b>Authors</b>	Manea Dragoș, Marin Eugen, Mateescu Marinela, Gheorghe Gabriel, Vasilachi Carmen, Dumitru Florin
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00713 / 2022</b>
<b>Description</b>	The invention refers to an automated installation for collecting atmospheric moisture, intended to obtain an additional amount of water for the irrigation of vegetable crops grown in greenhouses or solariums.

**RO.314.**

<b>Title</b>	<b>INTELLIGENT SYSTEM FOR OPTIMIZING THE APPLICATION OF PHYTOSANITARY TREATMENTS ON FIELD CROPS</b>
<b>Authors</b>	Gheorghe Gabriel, Marin Eugen, Manea Dragoș, Vasilachi Carmen, Anghelache Dragoș
<b>Institution</b>	National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania
<b>Patent no.</b>	<b>Patent application No. A-00712 / 2022</b>
<b>Description</b>	The invention refers to an intelligent system for optimizing the application of phytosanitary treatments on field crops, intended for the landing, charging of the batteries and refilling the liquid tank of unmanned aerial vehicles (drones) for the application of phytosanitary treatments, with immediate practical applicability in the precision agriculture.

**RO.315.**

<b>Title</b>	<b>METHOD FOR THE PRODUCTION STIMULATION IN ORGANIC FARMS, THROUGH ORGANO-MINERAL FERTILIZATION OF THE AGRICULTURAL CROPS</b>
<b>Authors</b>	Marin Eugen, Mateescu Marinela, Manea Dragoș, Gheorghe Gabriel Bălțatu Carmen
<b>Institution</b>	National Institute for Research - Development of Machines

and Installations designed for Agriculture and Food Industry  
- INMA Bucharest, Romania

**Patent no.** **Patent application No. A-00707 / 2022**

**Description** The invention refers to a method for the production stimulation in organic farms, through organo-mineral fertilization of agricultural crops, used in agriculture for the distribution and incorporation of diatomite microgranules in the soil at the level of the root system, to provide a balanced and sufficient nutrition with silica-based substances, thus increasing the production by 15...20% - compared to the classic cultivation way - and the soil fertility is improved in a sustainable manner.

#### RO.316.

**Title** **METHOD FOR MONITORING AND COMBATING AGRICULTURAL LAND COMPACTNESS**

**Authors** Marin Eugen, Manea Dragoș, Mateescu Marinela, Nenciu Florin, Gheorghe Gabriel, Bălțatu Carmen

**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry  
- INMA Bucharest, Romania

**Patent no.** **Patent application No. A-00691 / 2022**

**Description** The invention refers to a method for monitoring and combating the state of compaction of the agricultural land, used in agriculture for improving the soil fertility and the production capacity.

#### RO.317.

**Title** **SENSOR NODE FOR MONITORING MICROCLIMATE PARAMETERS IN GREENHOUSES AND SOLARIUMS**

**Authors** Săcăleanu Dragoș, Matache Mihai, Voicea Iulian, Roșu Ștefan-George, Perișoară Lucian-Andrei

**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry  
- INMA Bucharest, Romania

**Patent no.** **Patent application No. A-00164 / 2022**

**Description** The invention refers to a multi-sensor sensory node for monitoring microclimate parameters in greenhouses and solariums, in order to control them and perform the irrigation operation in optimal conditions.

**RO.318.**

**Title** **HEMP SEED CONDITIONING EQUIPMENT**

**Authors** Stroescu Gheorghe, Olan Mihai, Păun Anișoara, Vlăduț Valentin, Matache Mihai, Popa Lucreția

**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

**Patent no.** Patent application No. RO: A-00236 / 2022  
EPO: 22020413.5 / 2022

**Description** The invention refers to an equipment for the conditioning of hemp seeds used mainly in the experimental plots of the agricultural stations, that carry out the threshing of hemp inflorescences harvested at maturity and the separation of impurities from the mass of threshed seeds. The conditioned seeds can then be used as seed material or in the extraction of hemp oil.

**RO.319.**

**Title** **HYDRAULIC CONTROL AND ACTUATION SYSTEM FOR THE VINE BALING MACHINE**

**Authors** Matache Mihai, Ciupercă Radu, Popa Lucreția, Marin Eugen, Zaica Ana

**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

**Patent no.** **Patent application No. RO: A-00540 / 2022**

**Description** The invention relates to a hydraulic control and actuation installation for the vine baling machine intended for the biomass evacuation system, as a by-product resulting from dry cutting in viticulture.

**RO.320.**

**Title** **MOUNTING AND PROTECTION SYSTEM OF THE PHYTOSANITARY PRODUCT RECOVERY PANEL OF THE SPRAYING MACHINES FOR VINEYARDS**

**Authors** Marin Eugen, Manea Dragos, Mateescu Marinela, Gheorghe Gabriel

**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

**Patent no.** **Patent application No. RO: A-00507 / 2022**

**Description** The invention refers to a system for mounting and protecting the phytosanitary product recovery panel from vineyard spraying machines, intended in agriculture for carrying out phytosanitary treatments with spraying machines equipped with spray panels on both sides of the vine row.

**RO.321.**

**Title** **AUTOMATED AND ENERGY INDEPENDENT VENTILATION SYSTEM FOR AQUATIC POOLS**

**Authors** Voicea Iulian, Vlăduț Valentin, Matache Mihai, Persu Cătălin, Cujbescu Dan, Găeanu Iuliana  
**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

**Patent no.** **Patent application No. RO: A-00237 / 2022**

**Description** The invention refers to an automated aeration system by micro-diffusion of air in the water of concrete aquariums or natural ponds in the ground, in order to achieve the growth of edible fish in a controlled environment, with an appropriate aeration-oxygenation of the growing water, allowing a unitary growth of fish species that are raised in a polyculture system, using a wind-photovoltaic renewable hybrid source for power supply.

**RO.322.**

**Title** **INSTALLATION FOR TABLETING LIGNO-CELLULOSIC WASTE**

**Authors** Găeanu Iuliana, Matache Mihai, Persu Cătălin, Cujbescu Dan, Voicea Iulian, Vlăduț Valentin, Cioca Lucian-Ionel, Ivașcu Victoria-Larisa  
**Institution** National Institute for Research - Development of Machines and Installations designed for Agriculture and Food Industry - INMA Bucharest, Romania

**Patent no.** **Patent application No. RO: A-00206 / 2022**

**Description** The invention relates to a plant for compacting and tableting ligno-cellulosic waste from horticulture, intended for their utilization as solid biofuel or as a raw material in the production of heat or smoke to protect vineyards and orchards against frosts or late spring frosts. The tableting process involves compacting the shredded biomass under high pressure inside a closed-end die and forcing it to greatly reduce its volume.

## National Institute for Research and Development in Mine Safety and Protection to Explosion - Insemex Petroșani

### RO.323.

<b>Title</b>	<b>Specialized scalable system for checking the operating parameters for pyrotechnic articles for professional use - Category F4</b>
<b>Authors</b>	Dragoș Gabriel VASILESCU, Emilian GHICIOI
<b>Institution</b>	<b>NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI</b>
<b>Patent no.</b>	CBI A00687/2020
<b>Description</b>	The invention relates to a specialized scalable system, intended for determining the operating parameters for pyrotechnic articles for professional use - category F4, which allows the processing of images for the purpose of scalable determination, based on the assignment of a known size, expressed in the unit of measurement - the meter, a reference mark with a certain number of pixels, as well as by using a calculation algorithm, for determining and monitoring the main specific functional parameters, such as: trajectory - ascending height, deviation from the vertical in two perpendicular planes, the dimensions of the main and side effects.

### RO.324.

<b>Title</b>	<b>Ventilation critical constructions recognition method.</b>
<b>Authors</b>	Doru CIOCLEA, George Artur GĂMAN
<b>Institution</b>	<b>NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI</b>
<b>Patent no.</b>	CBI A00358/2021
<b>Description</b>	The method of recognition of critical ventilation constructions is based on the identification of critical ventilation constructions at the level of a complex ventilation network, by establishing the degree of instability induced at the level of active fans. For this, first, the complex ventilation network is solved and the functional parameters related to the active fans are established, under normal working conditions, the influence zones specific to each main ventilation station are established.



After this stage, the type and position of the ventilation constructions is determined. The influence of ventilation constructions on the operating stability of active fans is established.

At the level of the complex ventilation network, the ventilation constructions that do not produce effects on the operation mode of the active fans are identified.

At the level of the complex ventilation network, the ventilation constructions that produce minor effects on the functioning of the active fans are identified.

Through successive simulations, the ventilation constructions that produce significant but harmless effects on the operation mode of the active fans are identified.

It is identified at the level of the complex ventilation network, those ventilation constructions that produce major effects on the operation mode of the active fans and therefore determine the instability of the ventilation network. Thus these identified ventilation constructions are considered critical.

The method of recognition of critical ventilation constructions was applied to the ventilation networks related to the Vulcan and Uricani Mines, but it can be applied to any underground mining of useful mineral substances as a necessity to improve the management of the ventilation networks as well as to increase the degree of security and occupational health.

#### **RO.325.**

<b>Title</b>	<b>Replacement of critical ventilation structures method.</b>
<b>Authors</b>	Doru CIOCLEA, George Artur GĂMAN
<b>Institution</b>	<b>NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION -INSEMEX PETROȘANI</b>
<b>Patent no.</b>	CBI A00359/2021
<b>Description</b>	<p>The method of replacing the critical ventilation constructions is based on the solution of the ventilation network and the establishment of the functional parameters, under normal working conditions, the establishment of the degree of instability induced at the level of the active fans by the critical ventilation constructions and the elimination of the critical character associated with the ventilation constructions at the level of a complex ventilation network.</p> <p>For this, the functional parameters related to the active fan are established. The specific influence zones of each main ventilation station are established.</p>

After this stage, the influence of the ventilation constructions on the operating stability of the active fans is established and the critical ventilation constructions are identified.

The critical nature of the ventilation structure is eliminated by eliminating the critical ventilation structure and the dispersion of the total resistance related to the critical ventilation structure, on parallel links, located downstream or upstream of the branch on which the critical ventilation structure is located, links parallels on which ventilation constructions are located with resistances equivalent to that of the critical ventilation construction.

The functional parameters specific to the active main fan are obtained in the new configuration of the ventilation network.

The method of replacing critical ventilation structures was applied to the ventilation networks related to the Vulcan and Uricani Mines, but it lends itself to any underground mining operation of useful mineral substances, as a necessity to improve the management of the ventilation networks as well as to increase the degree of security and occupational health.

#### RO.326.

<b>Title</b>	<b>Test stand for determining the electrostatic field generated by a light conveyor belt in operation.</b>
<b>Authors</b>	Florin Adrian PĂUN, Mihaela PĂRĂIAN
<b>Institution</b>	<b>NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION INSEMEX PETROȘANI</b>
<b>Patent no.</b>	BI 127990/2018
<b>Description</b>	<p>The invention refers to the design and construction of a test stand that allows the determination of the electrostatic field generated by the light conveyor belts in certain operating conditions to ensure an appropriate level of security in their operation.</p> <p>By designing and creating the test stand, according to the invention, the conveyor belts are tested for their protective performance against dangerous electrostatic discharges and, as the case may be, their compliance with the requirements imposed in certain fields is evaluated, based on acceptance criteria developed for the limitation of the electrostatic field.</p> <p>The test stand for the determination of the electrostatic field generated by a light conveyor belt in operation allows the simulation of electrification phenomena by friction in the laboratory under conditions of ensuring the reproducibility and</p>

repeatability of the test with the control of the influencing factors so that the precision of the measurement in the specific conditions is high. The accuracy of the tests is very important when selecting tapes based on the principle of comparing the best technological solutions.

The determination of the electrostatic field provides information of real interest for the manufacturers of transport belts in light construction in terms of their design and construction in order to avoid the danger of initiating potentially explosive atmospheres.

**RO.327.**

<b>Title</b>	<b>Automatic installation for performing thermal cycles for the conditioning of chemical fertilizers with high nitrogen content.</b>
<b>Authors</b>	Daniela Carmen RUS, Attila KOVACS
<b>Institution</b>	<b>NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN MINE SAFETY AND PROTECTION TO EXPLOSION INSEMEX PETROȘANI</b>
<b>Patent no.</b>	BI 127875/2019

Automatic installation for performing thermal cycles in laboratory conditions, it ensures the realization of thermal cycles necessary for the recrystallization of ammonium nitrate between phases III and IV under controlled conditions of temperature and time so that the sample thus prepared can be subjected to the detonation resistance test.

<b>Description</b>	<p>The automatic installation ensures the automatic realization of 5 thermal cycles that rigorously respect the programmed parameters. The equipment has the possibility to prove the traceability of compliance with these parameters, being computerized by the process computer which, based on information from the system regarding the temperature in the test sample, monitors through the probe and commands the switching on/off of the heating system with the heat exchanger. The homogenizer intensifies water circulation and command the emptying or filling of the water bath using the pump and actuation of electro- valves for filling or emptying.</p>
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## National Research & Development Institute for Welding and Material Testing – ISIM Timisoara

**RO.328.**

<b>Title</b>	<b>Method for ultrasonic welding of parts with spatial configuration of welding zones</b>
<b>Authors</b>	Nicușor-Alin Sîrbu
<b>Institution</b>	<b>National Research and Development Institute for Welding and Material Testing – ISIM Timisoara</b>
<b>Patent</b>	RO 133155 A1 / 29.07.2022
	<p>The invention relates to a method of ultrasonic welding of parts with a spatial configuration of the joining zones using sonotrodes equipped with pins that can be replaced according to their wear, allowing the reuse of the sonotrode. The method is applicable for the whole frequency range of the ultrasonic field. The pin length, which provides a sonotrode for ultrasonic welding of workpieces with spatial configuration of joint zones, i.e. their tolerance field, is limited by the resonant frequency of the sonotrode.</p> <p>Advantages:</p> <ul style="list-style-type: none"> <li>- Makes it possible to simultaneously weld parts with spatial configuration of welding zones under joint quality conditions;</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>- Increases work productivity, compared to the situation where welding could only be performed in plane and more operations were needed to weld parts with spatial configuration of joining zones;</li> <li>- These specialized sonotrodes, thanks to the constructive solution of the method, allow the replacement of worn parts in the sonotrode composition with new ones and the containment of welding operations with the same sonotrode;</li> <li>- The solution makes it possible to obtain new sonotrode configurations for welding parts with spatial arrangement of welding zones by replacing the pins at the level of the equalizer block;</li> <li>- Welded joints can be made for a wide range of polymeric materials as well as metallic or composite materials.</li> </ul>

**RO.329.**

**Title** Method and system for accelerated artificial aging of thermoplastic or composite materials

**Authors** Alin-Constantin Murariu, Lorand Kun

**Institution** National Research and Development Institute for Welding and Material Testing – ISIM Timisoara

**Patent no.** RO 131897 B1 / 29.04.2022

The method is based on the accelerated degradation of samples using ultraviolet (UV) lamps and comparing their physical-mechanical characteristics before and after the artificial ageing process. The accelerated artificial ageing system use UV radiation to age thermoplastic or composite materials. The system presented in figures designed to achieve accelerated materials degradation under controlled conditions, to estimate their behavior over time in industrial working conditions.

Advantages:

**Description**

- eliminates the effect of heat on samples, degradation being achieved exclusively by exposure to UV radiation and not by the cumulative effect of UV and IR radiations;
- provides high flexibility, as the method can be applied to different sizes of thermoplastic components, i.e. the system can be set to operate in different irradiation / temperature / time regimes, according to the requirements;
- the operating mode is simple and intuitive, the system being controlled by means of a PLC with dedicated software; it is a high-performance UV accelerated artificial ageing system.

Determining lifespan of components in the automotive industry, construction industries and different types of products and materials exposed to natural light

**RO.330.**

**Title** Research on Submerged Friction stir Welding

**Authors** Lia-Nicoleta Boțilă, Ion-Aurel Perianu, Matei Marin-Corciu, Iuliana Duma

**Institution** National Research and Development Institute for Welding and Material Testing – ISIM Timisoara

**Patent no.**

**Description**

Submerged friction stir welding (SFSW) is a method derived from the friction stir welding process and aims to reduce the overheating of the welding tool and the materials to be

joined, ensuring the increase in the service life of the welding tool and increased quality of welds.

Research on SFSW welding represent part II of the Nucleu project "Research on the development of the friction stir welding process in order to expand the possibilities of application in priority areas (Project PN 19 36 01 01 – Program Nucleu ISIM Timisoara 2019-2022).

The objectives of the SFSW research were the following :

- development of the techniques for applying the liquid working environment to friction stir welding
- joining of different metallic materials using submerged friction stir welding.

ISIM has designed and developed its own modules necessary to apply the liquid working environment (water) to friction stir welding.

Submerged friction stir welding was applied with good results on aluminum alloys (EN AW 1200, EN AW 6082, EN AW 7075) and copper (Cu99), obtaining improved mechanical properties of the welds (tensile strength) and refinement of the microstructure, a good quality of the joint surface and increasing of the service life of the welding tools by reducing the overheating of the tool material and of the materials to be joined.

#### **RO.331.**

<b>Title</b>	<b>Friction riveting procedure</b>
<b>Authors</b>	Radu Cojocaru, Lia-Nicoleta Boțilă, Cristian Ciucă
<b>Institution</b>	<b>National Research and Development Institute for Welding and Material Testing – ISIM Timisoara</b>
<b>Patent no.</b>	A/00049/05.02.2020 (publication number RO 135151 A2), OSIM Bucharest, Romania
<b>Description</b>	<p>The patent proposal refers to the development of a new, innovative and environmentally friendly riveting process of metallic materials, based on the use of an unconventional processing technique: - friction riveting process.</p> <p>It has applicability to join aluminum alloys with different properties and characteristics, difficult to join by using other processes.</p>

#### **X. Innovative Research**

**RO.332.**

**Title** Method of friction riveting with hybrid effect  
**Authors** Radu Cojocaru, Lia-Nicoleta Boțilă, Cristian Ciucă  
**Institution** National Research and Development Institute for Welding and Material Testing – ISIM Timisoara  
**Patent** A/00127/05.03.2020 (publication number RO 135207 A2), OSIM Bucharest, Romania

**Description** The patent application refers to the development and proposal of a new, innovative and environmentally friendly process for joining by riveting of metallic materials, based on the use of an unconventional processing technique: - joining process by riveting with hybrid effect (mechanical fastening - friction welding). This method for joining materials can offer an alternative to the current joining processes, having potential for development  
 It has applicability to join various types of materials with different properties and characteristics, that are difficult to be joined by using other processes (e.g. aluminum alloys and copper, using rivets made of heat treatable steels). The field of materials where this method could be used is continuously expanding.

**RO.333.**

**Title** Welding device for underwater friction stir welding method  
**Authors** Lia-Nicoleta Boțilă, Radu Cojocaru  
**Institution** National Research and Development Institute for Welding and Material Testing – ISIM Timisoara  
**Patent no.** A/00696/19.11.2021, OSIM Bucharest, Romania

**Description** The patent application relates to the development of a welding device usable for the Submerged Friction Stir Welding method (SFSW), whose constructive form allows a better cooling of the welding tool to avoid overheating it during the welding process. The constructive solution of the welding device ensures a large contact surface with water, thus reducing the overheating effect of the welding tools and bearings of the main shaft of the FSW machine .  
 The welding device for SFSW welding can be easily integrated on a specialized FSW welding machine and could be used for welding of lightweight alloys (2-10mm thickness), of copper alloys and steels (1.5-5.0 mm thickness), respectively.

**RO.334.**

<b>Title</b>	<b>Cooling system for friction stir welding in liquid environment</b>
<b>Authors</b>	Radu Cojocaru, Lia-Nicoleta Boțilă
<b>Institution</b>	<b>National Research and Development Institute for Welding and Material Testing – ISIM Timisoara</b>
<b>Patent no.</b>	A/00697/19.11.2021, OSIM Bucharest, Romania
<b>Description</b>	<p>The patent application refers to the development of a system that ensures cooling of the tool, of the welding device and materials to be joined, in the area of action of the welding tool, by continuous or intermittent spraying of water in several directions oriented towards the welding tool. The cooling system can be easily integrated on a specialized FSW machine and contribute directly to reduce the overheating of tool and of the welding device, and indirectly to protect the bearings of the main shaft FSW machine by overheating prevent. Also, using this cooling system, the overheating of the welding materials is reduced, that contribute to improvement of the mechanical properties of the welded joints.</p> <p>The cooling system is usable for SFSW (Submerged Friction Stir Welding) of a wide range of couples of similar and dissimilar metallic materials (lightweight alloys, steels, copper alloys, etc.) and can be easily integrated on the FSW welding machine.</p> <p><b>X. Innovative Research</b></p>

**RO.335.**

<b>Title</b>	<b>Real-time evacuation system for abrasive material sludge</b>
<b>Authors</b>	Ion-Aurel Perianu, Emilia Binchiciu, Gabriela Mnerie
<b>Institution</b>	<b>National Research and Development Institute for Welding and Material Testing – ISIM Timisoara</b>
<b>Patent no.</b>	Nr. înreg. OSIM: a 2020 00586 - 17/09/2020 RO-BOPI 3/2022 - 30.03.2022
<b>Description</b>	<p>The invention refers to a real-time evacuation system for abrasive material sludge which is generated when operating an abrasive waterjet cutting installation.</p> <p>The system according to the invention consists of a high pressure water pipe circuit mounted in a collector tank from an abrasive waterjet cutting equipment. This system is connected to a high pressure water pump, which in turn is</p>



connected to the network water source through a water buffer tank for supplying the necessary water high flow rate. The system has a predetermined layout for optimal mixing capabilities of the water collector tank, and it's equipped with a series of eductor nozzles which generate enough mixing power to form an abrasive sludge water suspension which then can be discharged through drain holes in the lower part of the collector tank, into a decanter tank, from where the water will be removed and the abrasive sludge will be stored. This solution will provide users of abrasive waterjet cutting installation their water collector tanks, without the need to stop the cutting process resulting in a higher productivity and easier and cleaner way to maintain the equipment in good working order.

## Regional Institute of Gastroenterology and Hepatology Cluj-Napoca

### RO.336.

<b>Title</b>	<b>Method for Obtaining A Carcinoembrionar Product with Applications in Immunoprophylaxis of Pancreatic and Colon Cancer.</b>
<b>Authors</b>	Iancu Cornel, Matea Cristian, Mocan Lucian, Mocan Teodora
<b>Institution</b>	Regional Institute of Gastroenterology and Hepatology „Prof. Dr. O. Fodor”, Cluj-Napoca, Romania
<b>Patent no.</b>	<b>131850 / 2020</b>
<b>Description</b>	The invention relates to a process for preparing a carcinoembryonic product to be applied in pancreatic and colonic cancer immunoprophylaxis. According to the invention, the process consists in that, in the first stage carboxylated carbon nano- tubes of MWCNT type are obtained, after which they are functionalized by covalent binding with the carcinoembryonic antigen, the so-functionalized nanostructures are subjected to successive stages of centrifugation and redispersion by ultrasound treatment in double distilled water, for removing the secondary reaction products.

### RO.337.

<b>Title</b>	<b>Process for Obtaining Biofunctionalized Nanostructures with Applicability in Photothermal Therapy Of Tumors.</b>
<b>Authors</b>	Mocan Lucian- Constantin, Iancu Cornel, Matea Cristian- Tudor, Ilie Ioana- Rada, Mocan Teodora.
<b>Institution</b>	Regional Institute of Gastroenterology and Hepatology „Prof. Dr. O. Fodor”, Cluj-Napoca, Romania „Iuliu Hatieganu”University of Medicine and Pharmacy , Cluj-Napoca, Romania.
<b>Patent no.</b>	<b>130737 / 2020</b>
<b>Description</b>	The invention relates to a process for preparing a product to be applied in the photothermal therapy of hepatic tumours. According to the invention, the process consists in that the gold nanoparticles - GNP - are prepared in an aqueous medium and stabilized with citrate, after which they are functionalized with beta-mercaptoethanol, at a neutral pH, at the room temperature, for 15 min. The thus functionalized gold nanoparticles are then subjected to successive stages of centrifugation and redispersion by ultrasonication in bidistilled water, for removing the secondary reaction products.

## Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering

RO.338.

<b>Title</b>	<b>Application of edaphic cyanobacteria <i>Nostoc linckia</i> for chromium in association with other heavy-metals-contaminated soils bioremediation under conditions of repeated pollution.</b>
<b>Authors</b>	Inga Zinicovscaia <sup>1,2,*</sup> , Liliana Cepoi <sup>3</sup> , Ana Valuta <sup>3</sup> , Liviu Codreanu <sup>3</sup> , Ludmila Rudi <sup>3</sup> , Tatiana Chiriac <sup>3</sup> , Nikita Yushin <sup>2</sup> , Dmitrii Grozdov <sup>2</sup> and Alexandra Peshkova <sup>2</sup>
<b>Institution</b>	<sup>1</sup> <i>Horia Hulubei National Institute for R&amp;D in Physics and Nuclear Engineering, Magurele, Romania</i> <sup>2</sup> <i>Joint Institute for Nuclear Research, Dubna, Russia</i> <sup>3</sup> <i>Institute of Microbiology and Biotechnology, Technical University of Moldova, Chisinau, Moldova</i>
<b>Patent no.</b>	-
<b>Description</b>	<p>Anthropogenic activity is the main factor contributing to soil pollution with various toxic metals, including Cr(VI), which dictates the need for decontamination. Often, the traditionally used remediation methods (soil removal, stabilization/solidification, physicochemical extraction, and soil washing) are not sufficiently efficient. Among gentle soil remediation options can be considered applicatio of biological objects. Cyanobacteria <i>Nostoc linckia</i> was tested for its ability to remediate soils contaminated with Cr(VI) in association with other metals under conditions of repeated pollution. According to obtained results the ability to bioaccumulate Cr(VI) from the contaminated medium by <i>Nostoc linckia</i> still remained high over three generations, while the uptake of Fe, Ni, Cu, and Zn in biomass increased from generation to generation.</p> <p>The repeated action of metals led to a state of moderate stress, expressed in a decrease in the amount of biomass and the accumulation of malondialdehyde. At the same time, the quality of biomass remained unaltered. Maintaining the quality of Nostoc biomass under stress conditions caused by the presence of metals was ensured by an increase in the content of compounds with antioxidant action.</p> <p>Due to its high bioaccumulation capacity and a specific growth pattern with the formation of crusts on soil surface, edaphic cyanobacterium <i>Nostoc linckia</i> is an important candidate for bioremediation of soil contaminated with Cr in combination with other metals.</p>

RO.339.

<b>Title</b>	<b>Accumulation and Effect of Silver Nanoparticles Functionalized with <i>Spirulina platensis</i> on Rats.</b>
<b>Authors</b>	Inga Zinicovscaia <sup>1,2,3,*</sup> , Ludmila Rudi <sup>4</sup> , Liliana Cepoi <sup>4</sup> , Tatiana Chiriac <sup>4</sup> , Alexandra Peshkova <sup>2</sup> , Anastasia Cepoi <sup>4</sup> and Dmitrii Grozdov <sup>2</sup>
<b>Institution</b>	<sup>1</sup> <i>Horia Hulubei National Institute for R&amp;D in Physics and Nuclear Engineering, Magurele, Romania</i> <sup>2</sup> <i>Joint Institute for Nuclear Research, Dubna, Russia</i> <sup>3</sup> <i>Institute of Chemistry, Chisinau, Moldova</i> <sup>4</sup> <i>Institute of Microbiology and Biotechnology, Technical University of Moldova, Chisinau, Moldova</i>
<b>Patent no.</b>	-
<b>Description</b>	<p>The effect of unmodified and functionalized with <i>Spirulina platensis</i> biomass silver nanoparticles on rats during prolonged oral administration was assessed. Both types of nanoparticles (biofunctionalized using spirulina culture and AgNPs stabilized by polyethylene glycol) were accumulated in the brain, spleen, liver, and kidneys. Biofunctionalized particles showed a higher affinity for the brain and spleen, whereas the unmodified ones showed higher affinity for the liver and kidneys. There was no accumulation of nanoparticles in the ovaries, while in the testicles biofunctionalized nanoparticles were accumulated only. This selectivity can serve as a basis for the development of preparations based on targeted AgNPs. During the clearance period, silver in the form of AgNPs-Spirulina was excreted from all organs, except the brain (where 82.3% of accumulated content remained), whereas unmodified AgNPs were excreted completely from the spleen and kidneys, but 24% of the silver accumulated in the liver and 65% in the brain remained. Thus, both types of studied AgNPs easily crossed the blood–brain barrier in the direction of the brain, while the reverse flow was very low. Based on the level of silver accumulation and elimination from the kidneys and liver, the involvement of these two organs in AgNPs elimination and the preferential renal pathway in the case of AgNPs-Spirulina can be assumed.</p> <p>Hematological and biochemical tests were performed in order to reveal the effect of nanoparticles on rats. The difference in the content of eosinophils in the experimental and control groups was statistically significant. The hematological indices of the rats did not change significantly under the action of the silver nanoparticles except for the content of reticulocytes and eosinophils, which increased significantly. Changes in the biochemical parameters did not exceed the limits of normal values.</p> <p>AgNPs should be used with caution by taking into account their persistence in the brain and evidence for some delayed or prolonged effects over time.</p>

## National Research and Development Institute for Industrial Ecology – ECOIND

**RO.340.**

<b>Title</b>	<b>Granular activated algae technology for wastewater treatment and resources recovery – GRAALrecovery</b>
<b>Authors</b>	Olga Tiron <sup>1</sup> , Ikumi Umetani <sup>2</sup> , Marius Bumbac <sup>3</sup> <sup>1</sup> National Research and Development Institute for Industrial Ecology – ECOIND, Romania <sup>2</sup> Norwegian Institute of Bioeconomy Research – NIBIO, Norway <sup>3</sup> Valahia University of Targoviste, Romania
<b>Institution</b>	Norwegian University of Life Sciences – NMBU, Norway
<b>Project no.</b>	RO-NO-2019-0691; <a href="http://www.graalrecovery.com">www.graalrecovery.com</a> As the worldwide population is facing limited available freshwater resources, used water by humans, discharged as <i>wastewater</i> , must be treated to ensure its <i>re-use</i> : objective provided by wastewater treatment plants. However, with more than 100 years of application, conventional wastewater treatment technology applied worldwide is a high-energy consumer, a continuous source of waste, with limited harnessing options, and a significant contributor to environmental pollution as an important greenhouse gas source. Graalrecovery technology addresses all these problems facing operators of the water supply and sewage service, providing a nature-based solution using one of the earliest life forms developed on earth: <i>microalgae</i> , targeting wastewater treatment with a low-energy requirement, environmental protection, and waste conversion to resources. The project brings innovation by implementing a Romanian patented process of biomass granulation presenting the advantage of efficient municipal wastewater treatment with effective and fast recovery of valuable microalgae biomass only by settling. With an investment of 1.147.010 euro and by fusion of Romanian and Norwegian knowledge acquired in microalgae research, the project led to significant expertise development in the field and advancement towards different technology readiness levels, with undergoing tests in real municipal wastewater. Long-term cooperation was established for knowledge transfer by attracting the private sector's interest in advanced biomass harnessing for the production of biodegradable plastic materials. The project has received funding from the NO Grants 2014-2021, under Project contract no. 27/2020.
<b>Description</b>	

**RO.341.**

<b>Title</b>	<b>Electrochemical procedure for mercury detection in wastewater</b>
<b>Authors</b>	Gabriela-Geanina Vasile <sup>1</sup> , George-Octavian Buica <sup>2</sup> , Cristina Dinu <sup>1</sup> , Anda-Gabriela Tenea <sup>1</sup>
<b>Institution</b>	<sup>1</sup> <b>National Research and Development Institute for Industrial Ecology - ECOIND, Romania</b> <sup>2</sup> <b>University Politehnica of Bucharest, Romania</b>
<b>Patent no.</b>	Patent application No. A/00464/29.07.2022, BOPI No. 11/2022
<b>Description</b>	<p>The patent application refers to an electrochemical procedure for on-site <math>Hg^{2+}</math> ions determination in wastewater samples using a modified carbon screen-printed electrode (SPE) with a complexing polymeric film based on poly(2,2'-(ethane-1,2-diylbis((2-(azulen-2-ylamino)-2-oxoethyl)azanediyl))diacetic acid) (polyL). The obtaining method for modified SPE-polyL is part of the present patent application. Using metal ions accumulation in an open circuit followed by anodic stripping voltammetry, the SPE-polyL electrode presents a linear range in the range of 20 <math>\mu g/L</math> to 150 <math>\mu g/L</math>, with 6 <math>\mu g/L</math> limit of detection, 20 <math>\mu g/L</math> limit of quantification, and 26% an average measurement uncertainty of mercury ions. The results obtained in situ and in the laboratory using the SPE-polyL modified electrode were compared with those obtained by the atomic absorption spectrometry coupled with the cold vapor generation standardized method, the average values indicating excellent recovery percentages.</p> <p>Applications: control and monitoring of wastewater quality</p>

**RO.342.**

<b>Title</b>	<b>Advanced Removal Procedure of Trichloroethylene from Underground Drinking Water Sources by Ultrasonication and Sorption on Algae Biomass</b>
<b>Authors</b>	Mihai Stefanescu, Olga Tiron, Costel Bumbac, Diana Puiu
<b>Institution</b>	<b>National Research and Development Institute for Industrial Ecology – ECOIND, Romania</b>
<b>Patent no.</b>	<i>Patent application no. a00821/20.12.2022</i>
<b>Description</b>	Trichloroethylene (TCE) is an aliphatic chlorinated compound that is still in use and can pollute the atmosphere, soil, and groundwater in case of inadequate application or disposal.

This paper is about the physical-chemical (ultrasonication) and biological (sorption on algae) hybrid treatment of groundwater with TCE content.

The treatment flow begins with the first ultrasonication of raw underground water with TCE content ( $\leq 4090 \mu\text{g/L}$ ) at 20kHz, 400 kJ ultrasonic energy) followed by sorption on *Chlorella* algae (400 mg algae/L, reported as dried substance) and microfiltration and the second ultrasonication step (20kHz, 800 kJ) both for the advanced removal of TCE and disinfection. Based on this hybrid treatment method, the trichloroethylene removal efficiency was 99,9% and the final residual concentration was below the admitted limit in drinking water ( $<10 \mu\text{g/L}$ ).

The residual microbial load was below the limits for each microorganism species but must be added short chlorination in order to assure residual chlorine in drinking water according to legislation in force.

## Research Development Institute for Plant Protection INCDPP

**RO.343.**

<b>Title</b>	<b>METARHIZIUM ANISOPLIAE PATHOGENIC STRAIN FOR THE MELOLONTHINAE SCARAB, ANOXIA VILLOSA</b>
<b>Authors</b>	FĂTU Ana-Cristina, DINU Mihaela Monica, MARIN Eugen, MUREȘANU Felicia, CICEOI Roxana, BURNICHI Floarea, IACOMI Beatrice Michaela Research Development Institute for Plant Protection Bucharest
<b>Institution</b>	The National Institute of Research – Development for Machines and Installations Designed for Agriculture and Food Industry – INMA Bucharest Agricultural Research and Development Station Turda University of Agronomic Sciences and Veterinary Medicine of Bucharest Vegetable Research and Development Station Buzau
<b>Patent no.</b>	Patent application No. a 2021 00187 The invention relates to the use of a strain of entomopathogenic fungi of the genus <i>Metarhizium</i> , for the biological control of native populations of the melolonthinae scarab, <i>Anoxia villosa</i> , a serious pest affecting plantations, forest nurseries, fruit trees and agricultural crops. The larvae of this pest feed below ground causing extensive and lethal damage to the roots. The infested culture presents attack centers in the form of smaller or larger bare patches and the attack begins in spring, from May and continues until autumn. The gnawing of the root system can lead, depending on the density of the larvae, to the perishing of the plants or their debilitation and, respectively, to the reduction of the harvest.
<b>Description</b>	The application consists in using this strain of <i>Metarhizium anisopliae</i> as an indigenous source of biological material for obtaining bioinsecticides (or as a biological control agent of the larvae of the steppe beetles). This strain has the ecological characteristics necessary for colonizing the habitat in which it is launched (forest crops in Romania), as well as the biological potential for natural regulation of the density of local populations of <i>Anoxia</i> sp.. The <i>Metarhizium anisopliae</i> strain (MaAn 1/2013), is deposited in the National Collection of Microorganisms for Industry and Agriculture, NCAIM, Budapest, with accession number (P) F 001481. The use of insect pathogens overcomes many problems arising from the use of chemical pesticides, therefore biological control methods have become appreciable in the control of economically important pests.



## Research and Development Station for Cattle Breeding Dancu, Iasi

RO.344.

**Title** Polymer-based hydrogel enriched with biogenic silver nanoparticles and essential oils with potential applications in bovine digital dermatitis

**Authors** Andra-Sabina Neculai-Valeanu; Adina Mirela Ariton; Bianca-Maria Madescu; Ciprian Radu

**Institution** Research and Development Station for Cattle Breeding Dancu, Iasi

**Patent no.** -

**Description** Bovine digital dermatitis (BDD), a leading cause of infectious lameness in dairy cattle, induces ulcerative skin lesions that impair cows' well-being, performance, and milk yield, costing dairy farmers a lot of money. Antibiotics have customarily been used to treat the disease, but widespread misuse has resulted in antibiotic-resistant pathogens, reducing their effectiveness. Silver nanoparticles (NPs) may improve hydrogels' physicochemical, healing, and antimicrobial properties and substitute antibiotics due to their antibacterial and antifungal properties.

This research employed the development of a polymer-based hydrogel containing biogenic silver nanoparticles, manufactured in an eco-friendly manner, and essential oils, with potential applications in bovine digital dermatitis. Cinnamon extract was mixed with the Silver Nitrate for the green synthesis of AgNPs. UV-Visible spectroscopy confirmed the presence of AgNPs, a spectrum being recorded from 200 to 600 nm. Xanthan gum, a natural polysaccharide, was used for the synthesis of the following hydrogels: control gel, containing xanthan gum alone, G1 containing xanthan gum and biogenic AgNPs, respectively and G2, containing xanthan gum, AgNPs and essential oils (clove and tea tree). Hydrogel G2, enriched with biogenic AgNPs and essential oils, presented superior stability and antimicrobial activity.

### Applications

Dairy industry - Alternative therapy for antibiotics, aiming at reducing the massive economic losses induced by bovine lameness, as well as the potential risk of antimicrobial resistance in farms

### Advantages

- Antibiotic-free
- Improves animal welfare and reduces antibiotic use.
- Strong adherence
- Size and shape of the biogenic AgNPs which ensures improved efficiency and effectiveness against pathogens
- Safe for both users and the environment.

No milk or meat withdrawals

RO.345.

**Title** **Formulation of a multifunctional nanocomposite cleansing foam with potential application in wound management in livestock**

**Authors** *Andra-Sabina NECULAI-VALEANU; Adina-Mirela ARITON; Bianca MADESCU; Ioana POROSNICU; Catalina SANDULEANU*

**Institution** Research and Development Station for Cattle Breeding Dancu, Iasi

**Patent no.**

**Description**

Silver nanoparticles (Ag-NPs) are metal-based nanoparticles with remarkable wound-healing potential due to their outstanding antibacterial characteristics. Microorganism growth is inhibited by Ag-NPs incorporated in wound dressing polymers. The present study aimed at designing a multifunctional nanocomposite cleansing foam enriched with silver nanoparticles and essential oils. Silver nanoparticles were green manufactured using cinnamon extract and AgNO<sub>3</sub> (Silver nitrate) solution (0.1 M), in a 1:9 ratio. UV-Visible spectroscopy was used to characterize the AgNPs suspension, spectrums ranging from 200 to 800 nm. Cocamidopropyl Betaine was employed to manufacture the following nanocomposite foams: control foam, with AgNO<sub>3</sub> alone, F1, with biogenic AgNPs, and F2 with AgNPs and essential oils (oregano, clove, and lavender). The Kirby-Bauer diffusimetric method was applied to investigate the antibacterial activity against Gram-positive, Gram-negative bacteria, and fungal species. The formation of silver nanoparticles was confirmed by the surface plasmon resonance (SPR) peak, ranging 214-235 nm. The control foam demonstrated the least antibacterial activity while F1 demonstrated much higher antibacterial activity, particularly against *Staphylococcus epidermidis* and *Candida albicans*. Foam 2 containing biogenic AgNPs and essential oils demonstrated increased antibacterial efficacy against both Gram-positive and Gram-negative microorganisms, as well as against MRSA ATCC 33591, a methicillin-resistant *Staphylococcus aureus*, a strain of great concern.

#### **Applications**

Dairy industry - Alternative therapy for antibiotics, aiming at reducing the potential risk of antimicrobial resistance in farms.

#### **Advantages**

- Antibiotic-free
- Suitable for livestock's wounds and excoriations, cuts, sores, burns, skin irritations
- Effective against Gram-positive and Gram bacteria
- Packed with antioxidants to gently cleanse and soften skin
- Repellent for insects

**RO.346.**

**Title** Phyto-enrichment of yogurt with Aronia extract jelly  
**Authors** POROȘNICU Ioana<sup>1,2</sup>; NECULAI-VALEANU Andra-Sabina<sup>1</sup>; ARITON Adina-Mirela<sup>1</sup>; TRINCA Carmen-Lucia<sup>2</sup>  
**Institution** 1)Research and Development Station for Cattle Breeding  
 2)Dancu, Iasi; Iasi University of Life Sciences  
**Patent no.**

**Description**

Dairy products enriched with fruit-based powders have received considerable attention and are now widely available mainly due to their safety and potential health benefits. However, the texture of yogurts could be improved to increase acceptability. Currently, fruit powder yogurts adopt the traditional manufacturing process of fermenting milk. The purpose of this research was the development of yogurt enriched with Aronia extract, encapsulated in a gel synthesized from a natural polysaccharide, with a prebiotic effect (xanthan gum). The Aronia extract was prepared by ultrasound-assisted extraction, which ensured a higher yield and improved preservation of its bioactive compounds. The raw milk was assessed, (physicochemical and microbiological parameters) and then heat treated, cooled down, and inoculated with the yogurt starter culture containing pre and probiotics. The aronia jelly was included in the milk base and the entire mixture was accordingly homogenized and incubated at 37°C, for 14 hours. The yogurt was then stored at 4°C for ripening and a quality assessment was carried out. The encapsulation of the Aronia extract in the polysaccharide-based gel ensured a smoother blending with the milk base, the final product having a higher acceptance rate, as well as a higher total content of phenolic compounds. The taste, color, and texture of the developed formula were also superior as compared to conventional powder fortification.

***Applications***

- Dairy producers

***Advantages***

- Rich in polyphenols
  - The jelly ensures a higher acceptance rate as compared to powder fortification
  - Improved texture and physicochemical appearance
- The xanthan gum acts also as prebiotic

**RO.347.**

**Title** **Yogurt Enriched with Pea Protein**  
**Authors** *POROȘNICU Ioana, NECULAI-VALEANU Andra-Sabina, ARITON Adina-Mirela, MADESCU Bianca-Maria*  
**Institution** Research and Development Station for Cattle Breeding Dancu, Iasi  
**Patent no.**

**Description**

The concept "food as medicine" is relatively new in the Western world, although it has been around for millennia and serves as the foundation of health care in a great number of civilizations all over the world. The role that diet and food play in the prevention and management of the disease is becoming increasingly recognized as diet-related chronic diseases are prevalent worldwide nowadays. The aforementioned concept integrates nutrition and healthcare with the purpose of improving consumers' life. Future trends in dairy science are oriented towards developing products, with a positive impact on consumer health, such as the case of the ones enriched with proteins, which offer an advantage in terms of high digestibility. The aim of this research was to develop a yogurt enriched with pea protein powder (0.5 %..... 1.5 %). Proteins interact through several aromatic compounds with reversible and irreversible bonds. The powder was added to milk pasteurized at 60°C for 60 minutes and fermented with a yogurt culture at 42°C until pH reached 4.6. The enrichment of yogurt with pea protein powder improved the texture, physicochemical and sensory properties. The obtained yogurts were similar in firmness to the control ones and had a good flavor and consistency.

**Applications**

- Dairy producers

**Advantages**

- High-quality protein and a great source of iron
  - Can aid muscle growth, weight loss, and heart health
- Great fit for most diets since it's hypoallergenic

**RO.348.**

**Title** **Functional Yogurt with MCT coconut oil and low carb content**  
**Authors** *ARITON Adina-Mirela, POROȘNICU Ioana, NECULAI-VALEANU Andra-Sabina, MADESCU Bianca-Maria*

<b>Institution</b>	Research and Development Station for Cattle Breeding Dancu, Iasi
<b>Patent no.</b>	<ul style="list-style-type: none"> <li>In Romania, obesity is a problem among both adults and children. Adult obesity prevalence projections (2010-2030) predict that by 2030, 15% of men and 10% of women will be obese. As for children, the number of those affected by obesity in Romania will increase to almost 500,000 by 2030. The ketogenic diet has been proposed as a feasible nutritional strategy for obesity management. This diet is low-carb, high in healthy fats like MCT coconut oil, which offer multiple health benefits. The present research relates to a functional yogurt-type product, enriched with MCT oil, intended for the ketogenic diet, low in carbohydrates. To develop the yogurt, cow's milk with a variable percentage of fat was used. The milk was filtered and heat treated. Coconut MCT oil, in powder form, was added to warm milk, at 50°C. The mixture was cooled to room temperature before adding the starter ferments with prebiotics and probiotics, respectively strains of <i>Lactobacillus acidophilus</i> La-5 and <i>Bifidobacterium</i> BB-12, <i>Streptococcus thermophilus</i>, <i>Lactobacillus delbrueckii subsp. Bulgaricus</i>. The fermentation process took place at 42°C for 10 hours. After the completion of the fermentation cycle, the yogurt was stored in the refrigerator for ripening (12 hours), and later filtered. The result was a product with a creamy consistency, fine texture, high fat content and low in carbohydrates. The nutritional values per 100 grams were: fat 10 grams, carbohydrates 2.5 grams, protein 4.6 grams, fiber 0 grams.</li> </ul>
<b>Description</b>	
	<p><b>Applications</b></p> <ul style="list-style-type: none"> <li>Dairy producers</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>Suitable for ketogenic diets</li> </ul> <p>Can aid with weight loss, and heart health</p>

RO.349.

Title	<b>PHYTOTHERAPEUTIC HYDROGEL-BASED SUPPLEMENT WITH A SUPPORTIVE ROLE AGAINST NON-SPECIFIC DIGESTIVE DISORDERS IN CALVES</b>
Authors	MADESCU Bianca-Maria; NECULAI-VALEANU Andra-Sabina; ARITON Adina-Mirela; AURSEI Alina
Institution	<i>Research and Development Station for Cattle Breeding Dancu, Iasi</i>
Patent no.	
Description	<p>The most significant component of veterinary costs for calves under one month old is neonatal calf diarrhea (NCD). The etiology of neonatal calf diarrhea is multifaceted: non-infectious causes such as flaws in milk feeding management, milk replacer quantity or quality, and calf management, or infectious factors such as bacteria (<i>E. coli</i>, <i>Salmonella</i>), viruses (i.e. Rotavirus), or parasites (i.g. <i>Cryptosporidium</i>). Oral rehydration is conventionally employed to treat calves with diarrhea since it is designed to correct the acid-base balance. However, neonatal calf diarrhea remains a major source of death and economic loss in the dairy sector. Diarrhea can cause calves to lose 5–10% of their body weight in one day, thus treatment should be effective. Calves require energy to maintain weight and immunity, especially while sick. Because the amount of glucose that may be added is limited in order to maintain osmolality, oral rehydration treatments cannot provide enough energy. Hence, feeding calves milk or milk replacers with an oral rehydration solution may deliver more energy and protein, helping them gain weight. The aim of this research was to develop a phytotherapeutic hydrogel-based supplement with active components and a supportive role against non-specific digestive disorders. The developed product is rich in swellable dietary fibers (inulin, carob flour), antioxidants, vitamins, and minerals.</p> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Dairy and beef farms</li> </ul> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Stabilizes digestion and promotes good gut health</li> <li>• Rich in fibers and antioxidants</li> <li>• Reduces the need of veterinary interventions</li> </ul> <p>May be administrated along whole milk or milk replacers feeding</p>

RO.350.

**FUNCTIONAL YOGURT WITH LOW LACTOSE  
CONTENT, BOVINE  
COLOSTRUM AND CAROB POWDER**

**Title**

**Authors** Adina-Mirela ARITON<sup>1</sup>, Andra-Sabina NECULAI-VALEANU<sup>1</sup>, Ioana POROȘNICU<sup>1</sup>, Elena UNGUREANU<sup>2</sup>

**Institution** *Research and Development Station for Cattle Breeding Dancu, Iasi*

**Patent no.** *Iasi University of Life Sciences, Faculty of Horticulture*

**Description**

The addition of various ingredients in the formulation of yogurts in order to develop a dairy product particularly appreciated by consumers represents a constant concern for specialists in the dairy industry. The present research proposes the use of carob powder and bovine colostrum in the recipes of a partially lactose-free yogurt, in order to improve its physical-chemical, textural, and sensory characteristics, thus making it successful useable in children's nutrition due to the special cocoa taste of carob. Bovine colostrum is considered "liquid gold" and contains a wide range of bioactive substances, including enzymes, growth factors, and immunoglobulins, has a low lactose content, and is a potential and attractive source from a nutritional point of view. Lactoferrin, lysozyme, lactoperoxidase, immunoglobulins, and growth factors are just a few of the physiologically active compounds found in bovine colostrum that can aid the immune system. Carob powder is in the attention of specialists because it is a very good source of antioxidants, and its addition to yogurt enriched with bovine colostrum modifies the physical-chemical, textural, and sensory properties, giving the product the possibility of being introduced to consumers' tables with multiple benefits.

#### ***Applications***

- Dairy industry

#### ***Advantages***

- Rich in antioxidants, soluble fibers, minerals, and vitamins
- High content of protein and omega 3 and omega 6
- Low content of lactose
- Anti-diarrheic

RO.351.

<b>Title</b>	<b>CLEAN-LABEL FUNCTIONAL YOGURT PROTOTYPE FOR DIABETIC CONSUMERS ENHANCED WITH RHODODENDRON spp. POWDER FLOWERS</b>
<b>Authors</b>	Alina Narcisa POSTOLACHE <sup>*1</sup> , Roxana Nicoleta RAȚU <sup>2</sup> , Ioana Cristina CRIVEI <sup>1,3</sup> , Cătălina SÂNDULEANU <sup>1,4</sup> , Ionuț Dumitru VELEȘCU <sup>2</sup> , Marius Mihai CIOBANU <sup>2</sup>
<b>Institution</b>	<i>Research and Development Station for Cattle Breeding Dancu, Iasi</i> <i>Iasi University of Life Sciences</i>
<b>Patent no.</b>	
<b>Description</b>	<p>Yoghurt is one of the most popular fermented milk products consumed worldwide, not only for its perfect sensory properties but also for its high nutritional as well as therapeutic values. Simple recipes, identifiable ingredients, and no artificial aromas or colors are a few of the core elements of an "ideal clean label" yogurt," together with the functionally enhanced properties that have health benefits.</p> <p>The objective of this invention was to design and develop on an industrial scale a clean-label functional yogurt prototype for diabetic consumers enhanced with <i>Rhododendron</i> spp. powder flowers and to describe its technological parameters together with the final product's chemical and sensory indices. For this purpose, the flowering plant belonging to the Ericaceae family was chosen due to its medicinally beneficial properties (especially anti-diabetic properties and the ability to combat diabetic nephropathy; antidiarrheal and antimicrobial properties, as well as anti-inflammatory effects; it can help with dyspepsia, reduce pain sensitivity, and protect the liver; it has activity against fungal infections, eliminates free radicals, and also has anti-allergy properties); The obtained clean label enhanced with 2% <i>Rhododendron</i> spp. powder flowers [PFW] was characterized by a smooth and creamy texture, with a good balance of aroma, 0.3% syneresis, and a total content of <math>7.9 \pm 0.3</math> % sugars, (considered that 10 g carbohydrates content / serving unit is ideal for people with diabetes).</p>



## National Research and Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)

### RO.352.

<b>Title</b>	<b>Compound feed for broilers containing sage as a natural feed additive</b>
<b>Authors</b>	VLAICU Petru Alexandru, UNTEA Arabela Elena, PANAITE Tatiana Dumitra, OLTEANU Margareta, TURCU Raluca Paula, SARACILA Mihaela, CORNESCU Gabriela Maria
<b>Institution</b>	<b>National Research and Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)</b>
<b>Patent no.</b>	Patent application No. A 00726/ 03/12/2021

<b>Description</b>	<p>The invention refers to a new compound feed for broilers, in the growth and finishing phases, which contains sage as a natural feed additive. Due to the numerous bioactive substances present in sage, which act as growth promoters in chicken and which can improve the nutritional and sensorial qualities of the meat, makes this invention an alternative to antibiotics. In addition, sage is rich in numerous substances with antioxidant potential, which protect the lipids in the meat against oxidation, increase the antioxidant capacity and lead to a decrease of cholesterol content in the meat, which represents a very important aspect for chicken meat consumers.</p> <p>Applications: research project; product (compounds feed); scientific paper.</p>
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### RO.353.

<b>Title</b>	<b>Compound feed for broilers</b>
<b>Authors</b>	UNTEA Arabela Elena, PANAITE Tatiana Dumitra, PANAITE Cristinel, OLTEANU Margareta
<b>Institution</b>	<b>National Research and Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)</b>
<b>Patent no.</b>	Patent decision 4.2/87 din 30.06.2022

<b>Description</b>	<p>The invention refers to a combined feed supplemented with prebiotics, probiotics and organic acids for broiler chicks raised in an intensive system. By using the combined feed presented in broilers diets, a delayed effect is obtained in the</p>
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oxidation of lipids from the muscular structure, leading to foods of animal origin (chicken meat) with increased nutritional quality.

Applications: research project; product (compounds feed); scientific paper.

**RO.354.**

<b>Title</b>	<b>Compound feed for chickens (28-42 days) whose structure contains compounds with antioxidant potential</b>
<b>Authors</b>	SARACILA Mihaela, UNTEA Arabela Elena, PANAITE Tatiana Dumitra, VARZARU Iulia, TURCU Raluca Paula, VLAICU Petru Alexandru, OANCEA Alexandra, ROPOTA Mariana
<b>Institution</b>	<b>National Research - Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)</b>
<b>Patent no.</b>	Patent application No. A/00348/ 20.07.2022

<b>Description</b>	<p>The invention refers to a innovative compound feed (28-42 days) for broilers containing the addition of 2% sea buckthorn leaves and 0.00002% Chromium. The compound feed provides consumer health benefits by increasing the concentrations of long-chain polyunsaturated fatty acids (DHA), lutein and zeaxanthin in chicken meat under conditions of increased oxidative stability.</p> <p>Applications: research project; product (compounds feed); scientific paper.</p>
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**RO.355.**

<b>Title</b>	<b>Compound feed for broilers, enriched in PUFA and natural antioxidants</b>
<b>Authors</b>	UNTEA Arabela Elena, PANAITE Tatiana Dumitra, VARZARU Iulia, TURCU Raluca Paula, SARACILA Mihaela, OANCEA Alexandra
<b>Institution</b>	<b>National Research - Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)</b>
<b>Patent no.</b>	Patent application No. A/00348/ 20.07.2022
<b>Description</b>	<p>The invention refers to a new feed recipe for broilers, enriched in polyunsaturated fatty acids and antioxidant compounds by including two phytoadditives: walnut meal and cranberry leaves. The feed composition offers the possibility of obtaining food products rich in omega 3 (chicken meat) and with an extended shelf life.</p>

Applications: research project; product (compounds feed); scientific paper.

**RO.356.**

**Title** **Compound feed for the growth phase of chickens raised in high heat stress**

**Authors** CRISTE Rodica Diana, PANAITE Tatiana Dumitra, TABUC Cristina, VLAICU Petru Alexandru, SARACILA Mihaela, OLTEANU Margareta, TURCU Raluca Paula, PAPUC Puia Camelia

**Institution** **National Research - Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)**

**Patent no.** Patent application No. A/00348/ 20.07.2022

**Description** The invention refers to a feed compound for the growth phase of broilers raised in high heat stress that contains 1% powder and 0.005% Artemisia annua oil. The feed compound represents a nutritional solution for mitigating the adverse effects of high heat stress on performance and on the balance of the intestinal microflora.

Applications: research project; product.

## Academy of Romanian Scientists AOSR-

**RO.357.****Title****Oil for skin photoprotection****Authors**

Stoica Cristina Nicoleta – Constanta.RO-Ovidius University  
 Jurcoane Stefana – Bucuresti.RO-USAMV-Bucharest  
 Petcu Lucian Cristian – Constanta.RO -Ovidius University  
 Rosoiu Natalia – Constanta.RO- Ovidius University

**Institution****AOSR-Academy of Romanian Scientists****Patent no.**

A/00278/23 May 2022

**Description**

The patent refers to a process for obtaining a product for skin protection containing a mixture of camelina oil (with demonstrated SPF capacity), carrot oil (known for its photoprotective effect), and grape seed oil (known for its antioxidants).

The patent refers to a method of evaluating the SPF of camelina oil that was been obtained under ecological cultivation conditions and purified.

By applying the invention, these benefits are obtained: a mixture of oils is obtained with a synergistic photoprotective effect; the product obtained with camelina oil has an emollient effect of softening the skin; by mixing carrot oil, with camelina oil, an increased effect of nourishing and regenerating the skin, uniform and prolonged, is obtained; by mixing camelina oil with grape seed oil a product with increased antioxidant capacity is obtained.

The obtained dermato-cosmetic product can be used in case of exposure to the sun to protect the skin from UVB and UVA radiation effects.

**Center for Study and Research for AgroForestry  
Biodiversity “Acad. David Davidescu”,  
Romanian Academy**

**RO.358.**

<b>Title</b>	The use of renewable bioresources generated from agriculture and from wastewater treatment plants in constructions purposes (BioBrick)
<b>Authors</b>	Gabriel POPESCU, Ioana Corina MOGA, Nicoleta Raluca JIANU, Aneta CHIVOIU, Mirela SIMION, Silvia MORARU
<b>Institution</b>	<b>Center for Study and Research for AgroForestry Biodiversity “Acad. David Davidescu” North Giurgiu Technological and Industrial Park (NGTIP)</b>
<b>Patent no.</b>	Research project code PN-III-P2-2.1-PED-2021-3175 The project proposes the use of waste from four major sectors of the economy, namely: agriculture, wastewater treatment, glass by observing the principles of bioeconomy, in order to obtain building materials (bricks). Also, the project aims to reuse the waste (bricks which finished lifecycle) in order to reintegrate them and make the same type of product.
<b>Description</b>	The main objectives of BIOBRICK refers to: increasing the degree of knowledge regarding waste management and their recycling; obtaining a reliable recipe for making bricks from waste; reducing costs in wastewater treatment plants related to waste management; broadening the portfolio of products marketed by NGTIP. Thus, within project activities will be designed new recipes for making bricks from different types of waste; will be created bricks from the proposed new recipes; the bricks made will be tested from physical-mechanical point of view and of the compliance with the environmental legislation; newly designed products that goes out of life will be recycled for obtaining similar products; a market research will be conducted analysing the possibility of introducing on the market the new innovative products.

## SC BIOTEHNOS SA

RO.359.

Title

**Associative carrier complexes supporting vascular homeostasis**

Authors

**Laura Olariu<sup>1,2</sup>, Brindusa Dumitriu<sup>1</sup>, Marius Vasile Bardan<sup>3</sup>, Dan Eduard Mihaescu<sup>4</sup>**

Institution

<sup>1</sup>Biotechnos SA, <sup>2</sup>Association of Romanian Scientists University of Life Sciences, <sup>3</sup>Doctoral School of Engineering Sciences, Entomology, Iasi<sup>4</sup> Polytechnic University of Bucharest

Patent no.

Description

Environmental changes or internal disruptions on cell signaling dramatically impact on the vascular system function, leading to disease expressed at different organ /tissues levels. The heterogeneity of vascular molecular mechanisms that regulate cellular function is subject to be targets for different therapeutically complexes, the medical research trying to bring new perspectives in drug design. It combines structure – activity profile, active substances release and maximizing the biological effect through synergistic associations. In respect with this concept we propose a novel approach targeting vascular inflammation and permeability key factors: VEGF, CAM's family molecules: ICAM/ VCAM, IL6 and IL8 cytokines. The complexes formed by entomological actives and aescine inhibit the expression of VCAM-1, by up to 40% and by 30% in endothelial cells stimulated pro-inflammatory with TNF $\alpha$ +PMA and by up to 55% in those in which the bacterial attack is mimicked by stimulation with LPS. As well as, through the inhibitory action on ICAM-1, and the anti-angiogenic action on VEGF, blocking the IL6 / IL8 signaling in vascular endothelium, these complexes show an important vascular anti-inflammatory effect.

Based on innovation of advanced silica-organic materials and derived entomological /vegetal actives, following a complex algorithm of characterization and testing, we innovate the pharmaceutical design through associative carrier complexes (ex. entomological polypeptides, aescin immobilized in mesoporous matrix and encapsulated, saffron extract, etc). This concept will substantiate the change of topical products with vascular impact formulation (eg. varicose veins, phlebitis, hemorrhoidal disease, etc) Research was carried out within the SMIS 122027 / CTR 257/2020 project.

**RO.360.**

**Title** Innovation in osteoporosis therapy induced by a marine bioactive complex that activates bone homeostasis mechanisms

**Authors** Laura Olariu<sup>1,2</sup>, Brindusa Georgiana Dumitriu<sup>1</sup>, Diana Manuela Ene<sup>1</sup>, Mihai Bojinca<sup>3</sup>, Natalia Rosoiu<sup>2</sup>

**Institution** 1. Biotehnos S.A., Otopeni, Romania  
2. Academy of Romanian Scientists, 3 Ilfov 0301670094, Bucharest, Romania  
Cantacuzino Hospital

**Patent no.**

**Description** Osteoarthritis is a progressive non-inflammatory condition characterized by gradual erosion of articular cartilage until it disappears, accompanied by osteophilic bone remodeling, subchondral sclerosis, inflammatory changes in the synovial membrane and joint capsule. Bone loss progressively occurs as a consequence of decreased osteoblast synthesis, accelerated bone resorption and disturbed homeostasis due to both extrinsic (hormones, growth factors) and intrinsic factors. At present, in the management of articular cartilage lesions a wide range of pharmaceuticals are administered that are effective in stabilizing bone mass by acting on estrogens, selective estrogen receptor modulators (SERMS) and RANKL inhibitors but significantly reduce bone resorption in the remodeling process. Thus, the pathology and treatment of cartilage damage is an important area of pharmaceutical innovation, and the identification and establishment of new techniques to rebuild articular cartilage through hyaline tissue formation is a challenge for surgery and research. From this perspective, polypeptide fractions were isolated and purification from by-products resulting from the GMP technological flow of manufacturing concentrate from marine organisms and evaluated in terms of biological actions on in vitro models that followed: osteoclast differentiation processes and their activation, and osteoarthritic osteoblast synthesis and mineralization. The experimental data revealed an ability to stimulate osteoblast mineralization, externalize alkaline phosphatase, and inhibit osteoclast differentiation. By acting on both of these important mechanisms of bone homeostasis make the polypeptide fraction of particular interest in the therapy of osteoarticular diseases. Studies developed through SMIS 122180/CTR. 256/ 2020 project.

**RO.361.**

<b>Title</b>	Innovation in circular agriculture developing bio-fungicides with bivalent activity: protection against pathogens and bio-stimulation of germination and growth.
<b>Authors</b>	Brindusa Dumitriu <sup>1</sup> , Stelica Cristea <sup>3</sup> , Diana Manuela Ene <sup>1</sup> , , Mirela Calinescu <sup>4</sup> , Mihaela Doina Niculescu <sup>5</sup> Laura Olariu <sup>1,2</sup>
<b>Institution</b>	<ol style="list-style-type: none"> <li>3. Biotehnos S.A., Otopeni, Romania</li> <li>4. Academy of Romanian Scientists, 54 Splaiul Independentei 050094, Bucharest, Romania</li> <li>5. University of Agricultural Science and Veterinary Medicine from Bucharest, Romania</li> <li>6. Research Institute for Fruit Growing, ICDP-Maracineni, Pitesti, Romania</li> </ol> <p>Bucharest National Research-Development Institute for Textiles and Leather, Leather - Footwear Research Institute Branch</p>
<b>Patent no.</b>	
<b>Description</b>	<p>Food security and healthy food for the entire population of the globe represent a major challenge for humanity. Research in the agricultural field discovers and implements sustainable solutions by developing the degree of innovation, both in terms of agricultural crops increased productivity, preserving biodiversity, as well as protecting against pests through products with negative impact on the environment or human health. Reducing the use of synthetic pesticides is possible only by maintaining the productivity and quality of crops. Integrating into this background, our focus was on a multivalent solution for crop protection, based on natural compounds, including waste from leather industry. The inter-dependent studies regarding the structure-activity ratio in anti-fungal and bio-stimulating will target the synergistic association between vegetal actives in biofungicide conditioning formulas/variants, as well as inclusion of bio-stimulatory protein hydrolysates in the product formula or individually, in the treatment scheme. The anti-fungal action was refined by a structural design of actives from <i>Tagetes patula</i> and <i>Trigonella foenum-graecum</i> associated with steroid glycoalkaloids and camelina oil. The fertilizer results from protein hydrolysates from leather industry's by-products. The research results will be capitalized in innovative bio-fungicide and bio-stimulator prototypes, with enhanced effectiveness through associated active compounds profile and ratio, with an extended spectrum of action. The research was conducted as part of the project BIO-PLANT-PROTECT 262 / 2021.</p>



## DFR Systems

**RO.362.**
**Title**

The implementation of CMOS multiplexers in a water quality control station to reduce costs in recirculating aquaculture (RASCONTROL)

**Authors**

Radu POPA, Vily Marius CIMPOIAȘU, Ioana Corina MOGA, Vasile GHERMAN, Elena Laura TROANCĂ, Iulian PETRIȘOR, Silviu SĂRARU, Petru NEGREA, Narcis DUȚIANU, Cornelia PETRESCU

**DFR Systems SRL**

**Institution**

**University of Craiova**

**Politehnica University of Timisoara**

**Patent**

Research project code PN-III-P2-2.1-PTE-2021-0189

**Description**

Water control automation is economically sustainable mostly in large recirculating aquaculture farms (RAS). In order to increase the economic efficiency of small RAS farms, while also maintaining environmental quality, we have developed a novel ecotechnology - a multiplexer switch for the analysis / monitoring / management / control of water properties. This multiplexer is the heart of a measurement and control system and will have two primary functions: (1) simplification of the system, by coupling various electrodes with a single measuring device; and (2) automation by connecting the central computer to water composition correction equipment (including biofilters). The novelty is the use of "solid state" CMOS electronic multiplexers / switches, which digitally select electrode combinations for various measurements. Other novelties are the realization of a new multielectrode probe and the software upgrade for measurement, control and communication. This ecotechnology will be validated in an experimental RAS to verify its performance in controlling chemical parameters that are essential in aquaculture (pH, O<sub>2</sub>, NH<sub>3</sub>, NO<sub>2</sub>, etc.).

The RASCONTROL system will work autonomously, with corrective actions according to a decision tree in the software and with online supervision.

Aquaculture will benefit from this system by controlling water chemistry and by reducing operating costs. Coupling with water treatment equipment will also increase the quality of wastewater from aquaculture farms. The project proposes to improve the sustainability of RAS farms by technological transfer toward a company producing water treatment equipment. This implementation will also extend the range of potential users to environmental agencies, water treatment plants, and monitoring / treatment in industrial effluents, ports and canals.

## SC Doctor Tech SRL

RO.363.

<b>Title</b>	<b>"Survival Therapy Kit" – Kit for the treatment of ailments, through therapies based on classical acupuncture (TCM – Traditional Chinese Therapy), applied with the help of passive resonant devices "EMCOPAD Doctor Tech"</b>
<b>Authors</b>	VELCEA Marian, MOLDOVAN Ion-Corneliu, PLOTOG Ioan, MIHĂILESCU Bogdan, HIDEG Cătălin, CARACAS Eugen
<b>Institution</b>	<b>SC Doctor Tech SRL (<a href="http://www.DoctorTech.ro">www.DoctorTech.ro</a>)</b>
<b>Patent no.</b>	RO132423A2 / WO2018037379
<b>Description</b>	<p>The "Survival Therapy Kit" contains a "Practical Guide" for recommending therapeutic procedures (organized alphabetically for more than 100 common conditions), a set of 200 pieces of EMCOPAD devices (Doctor Tech passive resonant electromagnetic patches) and adhesive rolls for attaching the devices to the body of the treated person. The devices are applied periodically on the acupuncture points recommended in the therapy of the diagnosed condition. The application period is 21 days and is followed by a 10-day break. The procedure is repeated, if necessary, twice more. EMCOPAD Doctor Tech devices are used indefinitely. It is recommended to disinfect them with alcohol before each use. The advice of a doctor or acupuncturist is recommended.</p> <p>(TCM is officially approved by the WHO)</p>

## SC Electro Optic Systems SRL

### RO.364.

<b>Title</b>	<b>RO-SIMS - Integrated Mobile Surveillance System</b>
<b>Authors</b>	POPESCU Emil, JURBA Mihai, STROE Dănuț
<b>Institution</b>	<b>SC Electro Optic Systems SRL, office@elop.ro</b>
<b>Patent no.</b>	Research Project with Series Products
<b>Description</b>	<p>System design to integrate a various range of sensors in order to collect, process, store and transmit data regarding surveillance of hostile actions to the environment, influence of traffic over the environment, management of prevention and mitigation the environmental risks, weather, climatic change, fauna surveillance.</p> <ol style="list-style-type: none"><li>1. Environment – ecology, ecological management, environmental protection and monitoring</li><li>2. Security, protection, safety – antiterrorism, disasters and accidents</li></ol>

**CESAL SA Oradea****RO.365.****Title****GEL TECHNOLOGY USED TO CREATE INNOVATIVE CERAMIC ADHESIVES****Authors**

Alexandru SIMA, Andrei Teodor MARIAN, Tudor Panfil TOADER, Anamaria Cătălina MIRCEA

**Institution****CESAL SA Oradea / NIRD URBAN-INCERC, Cluj-Napoca Branch****Patent no.**

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**Description**

This research aims to highlight the physical-mechanical performances of adhesives with the addition of silica gel, used for gluing ceramic tiles. By using silica gel in the composition of the adhesive matrix, the main advantage is highlighted, namely the increased capacity to store water in the cementitious matrix, i.e. the hydration of the cementitious matrix is complete in different environmental conditions, compared to the application conditions of classic adhesives. In order to highlight the performance of using silica gel in the cementitious matrix of adhesives, five types of adhesives from the market were chosen for this research, namely three types of adhesives without silica gel content and two types of adhesives with silica gel content.

Following the determinations made to characterize the physical-mechanical performances of the five types of adhesives that were used, the following are highlighted: the adhesives with silica gel content prepared with the addition of 0,30 liters of water/ kg of adhesive respectively 0,36 liters of water/ kg and applied on a concrete support layer have an average difference of 9% of the value of tensile adhesion resistance achieved after 2 and 4 days, compared to classic adhesives where the average difference of tensile adhesion is 17%.

Due to this property of the adhesives with silica gel content, they can be applied at higher temperatures of the support layer and by using a larger amount of water in their preparation, it does not significantly influence the adhesion resistance of the adhesives on the concrete support layer.

## A BETTER LIFE SOLUTIONS

**RO.366.**

**Title**

**iSentinel® BUSINESS - Integrated Earthquake Resilience Solution**

**Authors**

Mircea MANOLESCU

**Institution**

A BETTER LIFE SOLUTIONS

**Patent no.**

RO135410

**Description**

**iSentinel® BUSINESS** is an all-inclusive earthquake resilience solution that combines the features of the QuakeGuard Proactive Earthquake Resilience System and the iSentinel® IMMO into a single, cohesive system. This advanced solution is specifically designed to protect non-structural building components, facilities, equipment, assets and infrastructure, ensuring enhanced business continuity during earthquakes.

Benefits:

1. Enhanced non-structural protection: The hybrid protection system and dynamic damping offer superior seismic protection for non-structural components, minimizing damage and associated costs.

2. Early warning capabilities: The iSentinel® IMMO integration provides businesses with valuable lead time to take precautionary measures before an earthquake strikes, further reducing potential damage.

3. Real-time data and intelligent decision-making: **iSentinel® BUSINESS** offers real-time structural health monitoring and AI-driven analytics, enabling businesses to make informed decisions during and after an earthquake.

4. Proactive risk mitigation: The system's tools and resources help businesses identify and address potential vulnerabilities, ensuring long-term resilience to seismic events.

5. Scalable and customizable: **iSentinel® BUSINESS** can be tailored to meet the unique needs of different industries, building types, and risk profiles, making it a versatile solution for earthquake-prone areas.

In conclusion, the **iSentinel® BUSINESS Integrated Earthquake Resilience Solution** offers a comprehensive approach to protecting non-structural building components, facilities, equipment, assets, and infrastructure, ensuring enhanced business continuity during earthquakes by combining iSentinel® advanced seismic protection technologies, real-time monitoring, intelligent decision-making, and proactive risk mitigation strategies.

**Mazarom Impex S.R.L.****RO.367.****Title****Small-size artificial satellite (CARD-SAT)****Authors**PhD. Eng. Adrian Totu, Eng. Marius-Constantin Simion,  
Eng. Cosmin Gogu**Institution****Mazarom Impex S.R.L.****Patent no.**

European Patent: EP3755628

OSIM Patent: 133557

**Description**

- CARD-SAT Concept emerged from the need of creating smaller, lighter and more affordable satellites that could provide support for an easier and more sustainable access to space. The concept follows the trend of miniaturization of electronic components;
- CARD-SAT is new type of pico and nano satellite that has a thin panel shape. With all elements included, the thickness range of this type of slim parallelepipedic-shaped satellite starts from 1 cm;
- CARD-SAT structures can have different sizes from one unit (1U) to three units (3U) size and can have different thicknesses in the range of 10 mm to 40 mm;
- The CARD-SAT Solution is based on the use of a thin aluminium structure with a complex design. The aluminium frames developed are complex in order to fix mechanical elements that will simplify the design and development process for further personalised applications;
- CARD-SAT structures are equipped with micro switches, antennas with deployment mechanism and passive attitude system. The developers will get a real support for their fast design for new projects;
- **Gold Medal Award** at the Salon International des Inventions Geneve;  
Card-Sat is a trademark registered to EUIPO: 017790072

**RO.368.****Title****Antenna deployment system for small-size artificial satellite****Authors**

PhD. Eng. Adrian Totu, Eng. Marius-Constantin Simion

**Institution****Mazarom Impex S.R.L.****Patent no.****Description**

- The antenna deployment system was developed to fit on CubeSat nanosatellites 1U, 2U or 3U;
- The system has a double purpose: the primary one is the releasing of antennas that works on two different frequencies and the second purpose of locking and releasing of the hinged side solar panels;
- The antenna deployment system is made out of anodized aluminum alloys for electrical insulation and carbon fiber panels to reduce the total weight of the system;
- The deployment of the antennas is made using two conical springs that when compressed has a thickness not bigger than the diameter of the wire that the spring is made of (0,5 mm to 1 mm thickness);
- The fixing interface with CubeSat is represented by 4 through holes for M3 screws, positioned on the corners of a square with a 72 mm side length;
- The antenna deployment system is fully equipped, including the electronic board with necessary connectors needed to connect the system to the CubeSat controller and power source;

The complete system has a thickness of 9.5 mm which represent under 10% of the total volume of a CubeSat.

**RO.369.****Title****Orbital Deployer for artificial satellite****Authors**

PhD. Eng. Adrian Totu, Eng. Marius-Constantin Simion,  
Eng. Cosmin Gogu

**Institution**

**Mazarom Impex S.R.L.**

**Patent no.**

Romanian Utility Model Certificate: 2019 00028

**Description**

- CARD-SAT Orbital Deployer can be used for launching CARD-SAT 1U, 2U, 3U;
- Orbital Deployer is made out of aluminum alloy, precisely machined, anodized and hard anodized, fully equipped and space-ready;
- The orbital deployer is equipped with a flat spring, used for pushing the nanosatellite, alongside the railways, in the outer space;
- The orbital deployer is equipped with two redundant pyrotechnic realeaseing systems that will cut through a nylon wire that keeps the spring actuated door locked;
- The orbital deployer is equipped with a microswitch that will give a signal when the door is in OPEN position;
- The orbital deployer has acces ports for the Remove Before Flight (RBF) pin of the nanosatellite, and the microUSB connector;
- One side of the deployer is made of ISOGRID aluminum alloy and the other side is made of carbon fiber to reduce the total wheight of the deployer;
- The footprint of the deployer is 420 mm x 55 mm;
- Fixing on the launch vehicle made with 6 x M6 screws;

**Silver Medal Award** at the Salon International des  
Inventions Geneve



**DRUGON International SRL****RO.370.****Title****Surface HARDening and highly wear-resistant nanocomposite COATtings for woodworking tools****Authors**

Spiridon Dragomir, Diana M. Vranceanu, Claudia P. Dragomir

**Institution****Drugon International SRL****Patent no.**

COFUND-M-ERANET-3-HardCoat-2 (312/2022)

**Description**

Through this project the development in surface modification of cutting tools used in wood industry as well as the optimization of methodologies for investigation of mechanical, physico-chemical, surface and interfacial properties like wear and corrosion performance of this materials is intended. One objective of this research is the development of a variety of new super-/hard nanocomposite coatings based cutting insert, using Cr, Fe, Ti, or W based nanocomposites, with high hardness, good adhesion to substrate, low internal stress, resistance against wear, corrosion and oxidation, low friction coefficient, high fracture toughness. The coatings are specially designed to be used as protective coatings against wear for parts and tools subjected to severe working conditions for industrial woodworking.

## EFB NATUR HAUS S.R.L

### RO.371.

**Title** **Intelligent housing buildings with mixed structure**

**Authors** Alexandru Stănilă, Alexandru Vlad, Toma Ionuț

**Institution** **EFB NATUR HAUS S.R.L.**

**Patent no.** CBI phase.

**Description**

The load-bearing structure is made up of metal columns and diaphragms + monolithic reinforced concrete slabs. Semi-fabricated, gabaritic (e.g. 2500/6050/2900mm), atypical, factory-made spatial modules are used.

It transports simultaneously, lost frameworks, reinforcements, thermosystem, electrical and plumbing installations, with a fast and economically efficient assembling. This eliminates material wastage and a considerable amount of manpower labor.

### RO.372.

**Title** **Mobile home, camper type, extendable on the parking place**

**Authors** Alexandru Stănilă, Perino Baraga, Alexandru Vlad, Raluca Fecioru

**Institution** EFB NATUR HAUS S.R.L.

**Patent no.** CBI phase.

**Description**

Mobile home concept, with basic functionality, suitable living for a family of 4-5 people, has become a necessity nowadays. The gabaritic mobile home meets a wide range of possible uses in the social and holiday field. Equipping desired locations with centralized utilities platforms efficiently solves basically all social or leisure purposes, site organization, etc. at affordable prices.

The experimental parallelepipedic model with intelligent facilities has a variable surface area.

### RO.373.

**Title** **Eco-friendly EBF (Energy Beneficial Fundamentals) & EOP (Evolved Occupants Protection) homes**

**Authors** Alexandru Stănilă, Ana Maria Toma, Oana Neculai

**Institution** **EFB NATUR HAUS S.R.L.**

**Patent no.** CBI phase.

**Description**

The EBF & EOP concept (with Fundamental Beneficial Energies and Evolved Occupant Protection) is a combination of technologically advanced building solutions with minimum investment and maximum benefits. The constructions are built on the principles of modern sustainable development with positive energy effects on the environment and residents.

## ECOHORNET SRL

**RO.374.**
**Title**
**REACTOR FOR THERMAL TREATMENT OF  
UNUSED SOLID AND LIQUID ORGANIC WASTE**
**Authors**

Hornet Iuliean

**Institution**
**ECOHORNET SRL**
**Patent no.**

Patent No. 133850

This reactor is an ecological solution to process organic waste in a commercially efficient manner.

It allows multiple processes like; drying, torrefaction, pyrolysis at low temperature 150-450°C, pyrolysis at medium temperature 450-650°C, pyrolysis at high temperature 650-900°C.

The ecoHORNET pyrolysis installations use for the pyrolysis process thermal energy produced with the ecoHORNET multisystem burners, which operate on pellets from any biomass.

Combustion at high temperatures of over 1200°C of the pelletized biomass ensures temperatures up to 900°C in the reactor. The ecoHORNET burner allows the use of excess pyrolysis gas simultaneously as well as individually.

The ecoHORNET reactor works with continuous flow feeding, thus ensuring the permanent filtering of gases, their cooling before condensation below 400°C to eliminate the danger of reformation of dioxins, furans and other unwanted chemical compounds.

It processes solid organic matter chopped to 5-20 mm or pelletized with a maximum humidity of 10% or liquid organic matter.

The large range of temperatures 150°C to 900°C and constant at any temperature level, allows thermal and/or thermo-chemical treatment of any type of biomass, household waste, sewage sludge, plastic and rubber waste, hydrocarbon sludge, infested land, etc.

ecoHORNET pyrolysis installations allow:

- complete processing of waste without polluting emissions.
- the production of electricity and thermal energy
- low operational costs due to maximum use of own resources and residual heat;
- high productivity and economic efficiency

**Description**

**ROSMARH INVENTOR CENTER ASSOCIATION****RO.375.****Title****SYSTEM FOR INCREASE ADHERENCE TO THE ROAD****Authors**ROSCA ADRIAN, BICLEA SEBASTIAN,  
CIUPERCOVICI DANIEL, POPA MARIAN**Institution****ROSMARH INVENTOR CENTER ASSOCIATION****Patent no.**

Patent application No. A/00673/08.12.2022

**Description**

The invention relates to a system for increasing road adhesion for the tires of a motor vehicle. The technical problem that the present invention solves is that of increasing the adhesion to the road for the tires of a motor vehicle, the system according to the invention has the advantage of increasing by 20% (compared to the known solutions) the adhesion of the tire to the road, both when the vehicle is at rest and during its movement. This invention will have a major impact in saving human lives and an important contribution to combating the pollution on our planet.

**Gabriel Petre GORECKI****RO.376.**

**Title** **ALGORITHM FOR EARLY DIAGNOSIS OF SEPSIS / SEPTIC SHOCK BY ORAL VIDEOCAPILARYOSCOPY**

**Authors** Gabriel – Petre GORECKI, Elena RUSU, Cosmin MOLDOVAN, Lucian-Florin DOROBANȚU, Romina-Marina SIMA, Liana PLEȘ, Dana-Rodica TOMESCU, Daniel COCHIOR

**Institution** Titu Maiorescu University of Bucharest, Faculty of Medicine

**Patent no.** A00285 / 2018

The research project is based on a prototype device called "Digital Videocapilaroscopy" which was the subject of patent number A00285 / 2018. Videocapillaroscopy allows the visualization of microcirculatory alterations that appear early in patients with sepsis and thus a prompt treatment can be instituted for the benefit of patients with these diseases, avoiding the evolution towards critical forms. The methodology involved the following steps: image acquisition (videoclip of a predetermined length of 60 seconds), image processing for software interpretation (selection of frames considered relevant for examination) and uploading frames to the CVAT online platform (Computer Vision Annotation Tool) which follows the process of semi-automatic capillary marking, software analysis and interpretation of images.

**Description** The analyzed parameters were those that the prototype device had at its disposal to be able to identify: cap-vector (orientation of capillaries in relation to the mucosal surface), cap-microhem (presence or absence of microhemorrhages), cap-density (number of capillary loops visible per mm<sup>2</sup>) and cap-calibre (capillary loop diameter).

Revendications:

-identification of pathognomonic parameters (microcirculatory alterations) in patients with sepsis/septic shock;

-implementation of an early diagnosis protocol for septic shock based on video capillary examination;

-making the map of oral (sublingual) microcirculation in patients with sepsis / septic shock in various stages of evolution.

**Vasile LUPU****RO.377.**

**Title** **DEVICE FOR SANIZITATION**  
**Authors** LUPU VASILE  
**Institution** **INDIVIDUAL**  
**Patent no.** 119812B1

**Description** The device performs sanitization, ozonation and aerosols. By means of a compressor, the air is sent into a vessel (with alcohol) provided with a rod that reaches the bottom of the vessel. There is a bubble inside the liquid, the air from the vessel exiting at the top of the vessel in the atmosphere producing sanitization, ozonation and aerosols.

**RO.378.**

**Title** **SHOWER HOLDER APPLIED ON TOILET BASIN  
FOR WASHING INTIMATE AREAS**  
**Authors** LUPU VASILE  
**Institution** **INDIVIDUAL**  
**Patent no.** PATENT APPLICATION SUBMITTED

**Description** It is a plastic device that is attached to the toilet lid fastening system in which the existing shower head is fixed in our bathroom. It is used for intimate hygiene.

**Alexandru VLAD & Ileana VLAD****RO.379.****Title****Electricity microgenerator based on electricity extraction from biofields****Authors**

Author: Alexandru Vlad, Ileana Vlad

**Institution****NA****Patent no.**

Patent application Ro no. A00147 / 2023

**Description**

Electricity microgenerator based on the extraction of electrical energy from biofields using Vlad-type elements that have the ability to convert the biofield energy of any living element into electrical energy, which can be stored in batteries and used in various electrical circuits. Vlad-type elements are component parts of microgenerators based on the transformation of biofield into electricity. The method of producing electricity is new and is based on transforming the biofield energy of any living element in any type of environment into DC electricity.

With our invention it is possible to generate DC electricity directly from soil, air and water. The circuits are scalable to increase the amount of energy generated.

**RO.380.****Title****Agricultural Production Process In Integrated Ecologic System With Major Autonomy Based On Bioeconomy Principles****Authors**

Authors: Alexandru Vlad, Ileana Vlad, Alexandru Stanila

**Institution****NA****Patent no.**

Patent application Ro no. A00282 / 2019

**Description**

Technological process that produces a set of food and non-food products by creating a production complex on an optimized technological scheme that integrates all waste and intermediate products.

This ensures the basic products needed for a community of 4500 people for a square kilometer surface area, maximizing productivity and minimizing environmental impact.

The invention is a technological process by which a set of food and non-food products is obtained with production costs and a much-diminished pollution compared to the processes used up to now.

The production process in an integrated ecological system with increased autonomy based on the principles of bio-economy eliminates the majority of the disadvantages of the production processes used at this time on a large scale.

The production unit can be located on any terrain, without the need for connections to existing networks of natural gas or electricity. The problem of unstable terrain is solved also.

**Ion CRISTESCU****RO.381.**

<b>Title</b>	<b>Nuclear reactor breeder isotopes</b>
<b>Authors</b>	Ion Cristescu
<b>Patent no.</b>	<b>Independent inventor</b>
<b>Description</b>	RO131002/2021

The invention refers to a nuclear reactor breeder isotopes heterogeneous system with recirculating thermal agent for production synthetic fissionable isotope 239-plutonium and a new generation nuclear fuel for CANDU nuclear power reactor system.



## Vladimir Ștefan VÎRZOB

**RO.382.**

**Title** *KN-9 Nuclear Battery*  
**Authors** *Vîrzob Vladimir Ștefan*  
**Institution** *Individual project*  
**Patent no.** -

### Description

The KN-9 nuclear battery represents a perpetual source of electricity for long periods of time. Its operating principle is based on the principle of irradiating an assembly of conductive piezoelectric material electroplated with metal conductors using a concentrated beam of electrically charged particles. Basically, a small nuclear fuel module (2 grams) emits a beam of electrically charged particles, which are converted into electrical potential according to the process described below.

A ceramic nuclear fuel capsule is placed in a cylindrical reflection sheath, which has properties of reflecting the beam of ionizing radiation emitted by the nuclear fuel, forming a closed active zone, which facilitates the bombardment of the fuel with the reflected particles and implicitly increases the activity of the material—following the activity increase of the emitting material, the secondary beams of electrically charged particles exit the active area through multiple micro-perforations designed at the level of the reflection sheath.

The reflection sheath is concentrically surrounded by a cylindrical polymeric film made of polymeric piezoelectric material, photoelectric cells, as well as high-grade semiconductors. This layer has the role of producing electrical potential by exposure to high-speed particles. Afterwards, the electric potential is collected by the piezoelectric material, which after overcharging discharges the electric potential in the form of electricity in a stabilising circuit.

Thus, the presented prototype represents a completely autonomous installation, which can work continuously for periods of up to 50 years without requiring additional maintenance, being able to develop up to 6Mw per day, equivalent to burning 21 tons of coal.

The battery is not only a considerable technological innovation, but also a radical improvement of nuclear safety measures. Thus, the KN-9 nuclear battery module will be placed in a 0.3 mm stainless steel container, and between the metallic enclosure and the module there is placed a tube made of thermosensitive polymeric film, which will decompose in the event of a malfunction, releasing *CHR-X Polymeric Decontaminating Agent®*, a potent nuclear decontaminating agent, which will encapsulate the battery assembly in an amorphous polymeric film, minimizing the consequences that its components have on the environment.

**Exhibition Project**  
**THE IDENTITY OF RESTORATION. CONCEPTS.**  
**PRINCIPLES. PRACTICES**

*Short description:*

The exhibition project “THE IDENTITY OF RESTORATION. CONCEPTS. PRINCIPLES. PRACTICES” was achieved by the team from the Restoration-Conservation Laboratory of Neamț National Museum Complex. The concept of the project draws the wide audience’s attention, as well as that of specialists from the Conservation of the Cultural Heritage field, through modern methods of revealing and presenting the laboratory specialists’ activity. Thus, the three panels present the results obtained from the study of metal artifacts, the restoration methodologies applied on metal and ceramic artifacts and the good practices from professional development courses of the novice restorers.

The artifact and the restorer have key roles within the exhibition project, as they constitute together a communication model through time and space, since the artifact has been brought to present from distant times and is transmitted as cultural heritage to the future. The IDENTITY OF RESTORATION takes on new meanings from the laboratory practice: it is the source of information concerning the historical, material and discovery context on the one hand, and an art of recovering the original form, on the other hand. Both as science and art, the restorer’s interventions are constrained by the state of the artifact, and the restoration methodologies are developed according to certain CONCEPTS AND PRINCIPLES.



## **THE PROJECT TEAM FROM THE NEAMȚ NATIONAL MUSEUM COMPLEX:**

### **INVESTIGATION:**

PhD. OTILIA MIRCEA, expert in physical-chemicals investigation

### **CERAMIC:**

Expert restorer DUMITRU BOSTAN

Restorer ANA LĂCRĂMIOARA BĂCĂOANU

### **METAL:**

PhD. OTILIA MIRCEA, expert in preserving and restoring metals

Practitioner LAVINIA ANA AXENTIOI

### **PAINTING:**

Practitioner GEORGE LUCIAN VASILIU

Restorer - Coordinator: REMUS IOAN POPA,  
Moldova National Museum Complex Iasi

### **Project realized with the support of:**

PhD. CIPRIAN-DORIN NICOLA, Director of the Neamț National Museum Complex

PhD. MIHAELA CRISTINA VERZEA, Deputy Scientific Director of the Neamț National Museum Complex

PhD. SILVIU CONSTANTIN CEAUȘU, Neamț National Museum Complex

CLAUDIA MAXIM, specialist marketing referent of the Neamț National Museum Complex

FLORIN GHIMIȘ, photographer of the Neamț National Museum Complex

### **Special thanks to the collaborators:**

Scientific researcher II PhD. VIORICA VASILACHE,  
"Alexandru Ioan Cuza" University Iași, Centrul  
ARHEOINVEST

## Centrul de Transfer Tehnologic « Polytech » Universitatea Tehnică "Gheorghe Asachi" din Iași



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  - ✓ mai mare credibilitate și vizibilitate a acestor organizații
- ❖ Societatea în ansamblul ei
  - ✓ finanțare crescută pentru educație și cercetare
  - ✓ mai mare atractivitate și competitivitate a regiunii

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## **Paradis International College**

### **David Grigore – Clasa a VI-a**

Numele proiectului meu este “Air Power”, iar scopul lui este să demonstreze cum funcționează energia verde și cum este generată.

Proiectul a fost creat folosind piese lego, panouri solare, sticle reciclate și componente electrice.

El este compus dintr-un compresor acționat de o morisca sau de panouri solare dintr-o unitate de stocare a aerului comprimat și dintr-un generator de energie operat de pistoane.

Pentru ca vrem sa salvam planeta ne-am gandit sa economisim energia electrica. Cei care consuma energie suntem noi oamenii, dar tot noi suntem cei care producem multa energie. Astfel, in timp ce te joci cu prietenii, plimbi catelul in parc, daca porti papucii viitorului vei reduce poluarea pentru ca nu vei folosi mijloace de transport si vei fi tu cel care vei produce curent.



**Clara Ioana Joacă-Bine – Clasa a VIII-a**

Pantoful viitorului poate incarca, in cazul nostru, telefonul mobil. El are pe talpa amplasate 6 piezoelectric. Cele 6 au format 2 perechi. Fiecare pereche este legata in serie, iar cele doua perechi in final sunt legate in paralel. S-au conectat la o punte de diode si un condensator, iar apoi au fost legate la un acumulator. Cand mergi acesta se incarca. Pentru ca pana acum putem scoate doar, 3,6 volti am legat totul la un reglator de tensiune si am montat un intrerupator. Acum papucul nostru ne ofera 5 volti, exact cat ne trebuie sa ne incarcam telefonul. Mentionam faptul ca in acest moment curentul merge intr-un singur sens, deci telefonul se poate incarca doar daca mergi.

**Clasa I B****Proiect 1 – Cum funcționează sateliții**

În cadrul acestui proiect elevii au construit o machetă cu ajutorul căreia au exemplificat modul de funcționare al sateliților. Pe lângă acest aspect s-au prezentat date privind anul în care au fost construiții primii sateliți, cum au fost trimiși în spațiu, tipuri de sateliți, componenete care alcătuiesc sateliții, dar și problema ecologică pe care o ridică resturile/componenetele rămase în spațiu.

Materiale utilizate :

- ✓ Plăci de polistiren
- ✓ Planeta Pământ realizată din polistiren și licheni
- ✓ Satelit realizat dintr-o sticlă de plastic, farfurii metalice, cartoane pentru panourile solare
- ✓ Figurine care simbolizează obiecte ce primesc semnale de la sateliți – avioane, rachete, telefoane mobile, vapoare, sateliți TV, tablete, etc.



### **Proiect 2 – Creierul uman /Neuronul**

Fascinați de modul în care funcționează creierul, *Creativii* au realizat o macheta prin care au arătat în mod artistic (cu ajutorul hârtiei creponate) felul în care arată creierul și au pictat și lipit imaginea unui neuron. Macheta a fost însoțită de prezentarea informațiilor generale despre creier, denumirea lobilor acestuia și funcțiile lor, plus câteva informații despre cerebel.

Materiale utilizate:

- ✓ Placă polistiren
- ✓ Instalație luminoasă
- ✓ Hârtie creponată
- ✓ Imagini despre creier și neuroni
- ✓ Biluțe colorate



Clasa a II-a



**Virgraful** acel pix verde pe care Legendarii îl folosesc ca să își pună tic, față veselă când înțeleg unde au greșit pentru că este important să învățăm din greșeli) sau subliniază datele importante.

Acest cuvânt a luat naștere după ce au citit o carte la ora de lectură și am aflat că și frații mai mari, Nemuritorii, au inventat Credierul.

Verdele este culoarea care creează un echilibru între minte și inimă, oferă o perspectivă nouă asupra vieții și inspiră .

În Legendele despre regele Arthur, verdele este înzestrat cu daruri magice, iar Legendarii doresc să ofere virgraful, care nu este doar un simplu cuvânt, ci este un dar pentru sinele autentic.

Necesar – conștientizare, îndrumare, răbdare, vorbe dulci, îmbrățișari+ **virgra**



### Simulator cutremur- constructii rezistente



Un cutremur (sau seism) este un fenomen natural caracterizat prin eliberarea bruscă a energiei acumulate în roci. Această energie se transmite sub formă de unde seismice care provoacă printre altele mișcarea solului.

Recomandam construirea clădirilor cu amortizoarea care estompează șocurile provocate de cutremur.

Necesar experiment:

- placă polistiren+ muschi + jucarii pentru decor
- 2 suporturi lemn cu roțițe
- 8 fâșii plexiglas pentru stâlpi bloc, grosime 4mm
- 8 plăci grosime 4mm pt nivel/bloc
- 4 amortizoare
- șuruburi
- colțare.

Mașinuța *Eco*



Autoturismele ecologice sunt fiabile, credibile și prietenoase cu mediul înconjurător.

Vă prezentăm mașinuța **IS-02-LPC**, o mașină construită special pentru aceste vremuri.

Necesar:

- panou solar fotovoltaic cu regulator 12/24 V - 10Ah
- motor electric 350 W, 24 V, cu reducere
- regulator turație motor electric
- lanș și roată cu pinion
- kit frână mecanică bicicletă + disc
- țevă plastic PPR
- roți poliuretan
- 2 baterii de 12 V
- sistem direcție mașinuță electrică + roți plastic
- scaun plastic (reciclat)
- șuruburi, adeziv, scânduri lemn

## Clasa a IX-a

**Tudor Androne, Dragoș Vorovei –**

**Balancing Pi**

Scopul proiectului este să calculăm numărul  $\pi$ .

Proiectul pornește de la premiza că adunând toate fracțiile unitare la pătrat, suma acestora este egală cu  $\frac{\pi^2}{6}$ .

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots = \frac{\pi^2}{6}$$

Exemplificăm această egalitate matematică, printr-un experiment ce implică echilibrarea unei bare pe un stabilopod și principiul momentului fortei (știm că  $\vec{M} = \vec{r} \cdot \vec{F}$ ).

Vom suprapune mijlocul barei pe mijlocul stabilopodului, împărțind bara în două părți egale ca măsură. Pentru a reprezenta suma  $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots$ , pe partea dreaptă a barei alegem ca unitate 1 kg de nisip și măsurăm distanța de la mijloc la capătul barei, iar apoi în virtutea momentului forței punem un sac de un kg cu nisip pe capătul barei, apoi jumătate de kg de nisip la jumătate din distanța față de mijloc, apoi o treime de kg de nisip la o treime din distanță și tot așa. Pe partea stângă agățăm la capăt un săculeț de nisip pe care îl umplem până când bara stă în echilibru. Astfel, masa de nisip din partea stângă este egală cu  $\frac{\pi^2}{6}$  și, calculând, obținem numărul  $\pi$  (o valoare apropiată).

Materialele folosite sunt: nisip, o bară, un stabilopod, cântar cu precizie ridicată, calculator științific, saci.

**MARIA SI TUDOR PAVEL**  
**MAZZY- ROBOTUL INTERACTIV REALIZAT DIN MATERIALE**  
**RECICLABILE**

In cadrul acestui proiect am urmarit construirea unui robot interactiv, realizat din materiale reciclabile care se poate deplasa cu usurinta, actionat de o tableta.

In cadrul proiectului am folosit urmatoarele materiale:

- Materiale reciclabile: doze din aluminiu de la diverse bauturi
- Un sistem de comanda si propulsie recuperate de la o jucarie
- O instalatie cu lumini
- Pistol de lipt.
- Spray cu vopsea acrilica
- Tableta penntu coordonarea robotului

Dozele din aluminiu au fost lipite intre ele cu ajutorul unui pistol cu lipici pentru a putea constitui in intregime corpul robotului.

In etapa urmatoare, am realizat sistemul interactiv si de deplasare al robotului, am introdus firele de legatura intre panoul de comanda montat pe partea superioara a robotului si sistemul de deplasare asamblat la partea inferioara a acestuia.

Dupa ce am terminat de asamblat in intregime mecanismul de comanda si corpul robotului, am facut cateva teste pentru a ne asigura ca toate acestea functioneaza corect.

Pentru a obtine o culoare uniforma pentru intreg corpul, am folosit un spray cu vopsea acrilica.

Am adaugat apoi cateva luminite pe exteriorul corpului si am facut ultimele teste.

Pentru a coordona robotul, toate comenzile se transmit prin intermediul unei tablete.

Am obtinut un robot interactiv, care se poate deplasa cu usurinta, actionat de o tableta si pentru care am folosit materiale reciclabile.

## EUROINVENT 2023



## Clasa a III-a A

**Sophia Iosub - Masina cu hidrogen**

Sophia: Domnilor, doamnelor vă prezint viitorul: mașina cu hidrogen.

S: Ei bine, mașina din fața voastră nu arată ca o mașină cu hidrogen adevărată, dar cele două au multe în comun. Ambele sunt alimentate de un dispozitiv de înaltă tehnologie numit pilă de combustie cu hidrogen, la noi pătratul albastru din mijloc. Și au chiar același componenete principale:

- În partea din față se află motorul electric
- În partea din spate rezervoarele cu hidrogen și oxigen
- Și ca la orice mașină totul este montat pe un șasiu

S: Începem experimentul. Va fi suficient timp să vă povestesc mai multe în timp ce pila de combustie va produce combustibilul necesar mașinii. Acum eu am puțină treabă.

*Prima dată ne asigurăm ca bornele de la motor sunt scoase și switch-ul mașinii este pe OFF.*

*Ne asigurăm ca cupolele sunt scoase din rezervoare.*

*Turnăm apă până la nivelul 0 al rezervoarelor.*

*Deconectăm tuburile de la cupole.*

*Montăm cupolele și ne asigurăm ca sunt bine fixate.*

*Reconectăm tuburile de la cupole.*

*Conectăm bateria la mașina și punem switch-ul bateriei pe ON*

S: De ce am dori să conducem o mașină cu hidrogen? Pentru că spre deosebire de o mașină cu benzină, o mașină cu hidrogen nu poluează. După cum știm mașinile cu benzină sau motorină poluează, datorită arderii combustibilului și astfel rezultă gaze toxice pentru atmosfera Pământului și pentru oameni. Această mașină cu hidrogen produce doar apă ( $H_2O$ ), care știm bine că o găsim peste tot pe Pământ și este sursa vieții. Chiar și corpul nostru conține 70% apă. După cum am învățat sau urmează să învățăm, nu îmi mai aduc bine aminte acum, formula apei este  $H_2O$ , deci conține suficient de mult hidrogen pentru a putea fi folosit. Hidrogenul, este cel mai răspândit element chimic din tot Universul. Totuși puțin hidrogen pur se găsește în stare pură pe Pământ.

S: O întrebare bună este cum producem hidrogen pentru a-l folosi la mașina noastră? Răspunsul este simplu, folosind o pilă de combustie, care este așa cum v-am spus, elementul principal al unei mașini cu hidrogen. Pila de combustie folosește hidrogen și oxigen pentru a produce curent electric, care poate fi folosit pentru a alimenta un motor precum cel dintr-o mașină.

S: Aceasta funcționează în două direcții. Când folosește apă și este conectată la o sursă de curent electric, aceasta împarte apa prin procedeul numit electroliză în hidrogen și oxigen.

S: Și invers, recombina hidrogenul și oxigenul pentru a produce energie electrică și apă. Curentul electric produs este folosit de motorul electric al mașinii pentru a o pune în mișcare.

S: Cum procedăm practic?

S: Prima dată trebuie să producem hidrogen și pentru asta conectăm o sursă de curent electric la pila de combustie. Se poate utiliza panoul solar sau bateriile pentru a alimenta celula de combustie, conectând firele roșii și negre la prizele corespunzătoare de pe celula de combustibil. De unde știm că pila de combustie funcționează și că împarte apa în hidrogen și oxigen? Observăm bulele de gaz care se formează. Hidrogenul și oxigenul sunt sub forma de gaz și le observăm cu se adună sub cupolă.

S: Pasul doi este să alimentăm mașina noastră cu hidrogen. Pentru asta conectăm firele roșii și negre ale pilei de combustie la mașina noastră. Gata! Mașina a pornit!

(Mașina nu pornește pentru că nu am dat switch-ul pe ON).

S: Am uitat să pornesc mașina!

(Sophia pune switch-ul pe ON și mașina pornește)

S: Am plecaaaaat!

## Darius Manole

### 1) CEL MAI SIMPLU TRENULET ELECTRIC

Spirală de sârmă de cupru neemailată care permite formarea unui câmp electromagnetic ce deplasează o baterie care are atașată la capete magneti de neodim cilindrici, cu diametrul aproximativ egal cu al bateriei.

### 2) CEL MAI SIMPLU MOTOR ELECTROMAGNETIC

#### UNIPOLAR

Cum să facem un model complet funcțional al unui motor electric dintr-o baterie, un fir de cupru și un magnet de neodim

### 3. ELECTROLIZA APEI

Am introdus doi electrozi (creioane de grafit integral) într-un recipient în care se afla electrolitic (apă în care se dizolvase sare, pentru creșterea conductivității apei). Electrozii erau conectați la o baterie de 9 V. Se observa cum apa este descompusă în OH și H. Hidrogenul primește la catod (mina conectată la minusul bateriei) un electron și devine hidrogen gazos, care se depune sub forma de bule pe catod. Hidrogenul rezultat poate fi folosit ca și combustibil, arzând.

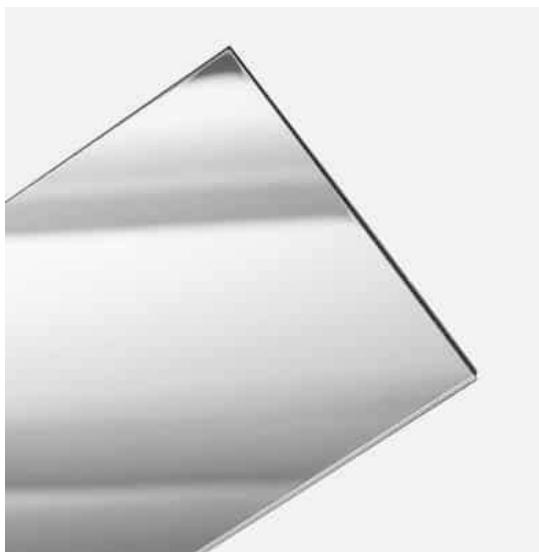
**Matei Stefan SANDU**

**Oglinda – Magia Chimiei**

**Materiale necesare:**

- **Mănuși de cauciuc/nitril**
- **Ochelari de protecție**
- **Detergenți**
- **Apă purificată**
- **Hidroxid de sodiu**
- **Azotat de argint**
- **Cantar de precizie**
- **Un ochi de sticlă**

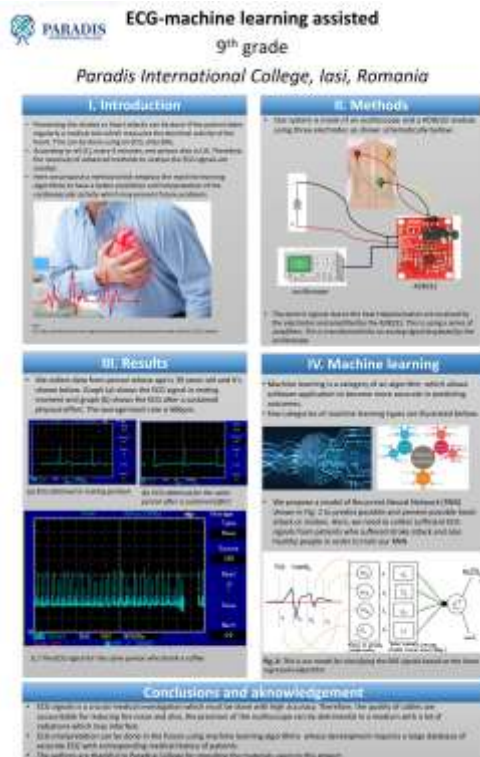
Intai se prepara un amestec de azotat de argint cu apa purificata care la o simpla agitare devine incolor. Inainte de aplicare, sticla trebuie curatata bine cu detergent si spalata cu solutie de hidroxid de sodiu. Azotatul se toarna cu grija pe sticla. Procesul trebuie realizat intr-o incapere incalzita si dureaza doar 2-3 minute, rezultatul final fiind o oglinda cu reflexie perfecta.





## ECG-machine learning assisted –

In aceasta lucrare prezentam o metoda de a crea un dispozitiv inteligent de clasificare si prezicere a posibilelor boli cardiovasculare asociate aritmiilor identificate in semnalele EKG/ECG preluate de la pacienti. Aceasta metoda deschide o noua perspectiva asupra monitorizarii activitatii cardiace, implementant un algoritm de *machine learning* capabil sa prezica posibile aritmii bazate pe un antrenament in prealabil. Acesta se face prin cumulara unei baze de date de semnale EKG de la un numar vast de persoane, atat bolnave cat si sanatoase. Ne propunem sa demonstram un aspect important in colectarea datelor consta in calitatea semnalelor EKG care joaca un rol crucial in performanta de clasificare a sistemului, unde zgomotul de fundal al semnalelor poate fi eliminat prin folosirea unor metode adecvate de achizitie.





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# Ripple water tank

Justinian Dumitriu, Radu Rares, Coriutan Briana, Nechita Alexis, Shalaifeh Maya

Paradis International College  
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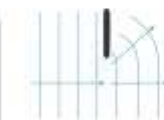
## Introduction

### What is diffraction?

- Diffraction is the spreading out of waves when they pass an obstruction.
- This obstruction is typically a narrow slit (an aperture).
- The extent of diffraction depends on the width of the gap compared with the wavelength of the waves.
- Diffraction is the most prominent when the width of the slit is approximately equal to the wavelength.



**Diffraction:** when a wave passes through a narrow gap, it spreads out.



When a wave goes past the edge of a barrier, the waves can curve around it.

### Set up

- Electricity source
- Mini DC motors
- Light
- Water tank
- Water
- Narrow tube
- Springs



## Conclusion



Our experiment shows how the wavelengths differ with frequency in a ripple tank.

- The higher the frequency, the shorter the wavelength.
- The lower the frequency, the larger the wavelength.

- When it comes to improving our experiment we noticed that using a more powerful light would have made the oscillations look clearer and easier to be measured.

For instance, the following are some real-life examples of diffraction:

1. Compact Disk
2. Hologram
3. Light entering a dark room
4. Crispular Rays
5. X-ray Diffraction
6. Water passing from a small gap
7. Solar Lunar Corona
8. Sound
9. Ring of light around the source
10. Signal Propagation

- If someone calls your name loudly, you are able to hear it if they hide behind a tall tree and call your name with the same intensity, would you be able to hear that? The answer is yes, but how come the sound is not blocked even when a huge tree is present in its pathway. The reason being sound travels and reaches your ear through the process of diffraction.



## Water Decor SRL

### RO.383.

**Title**                    **Ground heat exchanger and device to implement it**

**Authors**             Dan Ovidiu Cirjan  
**Water Décor SRL**

**Description**       RO131002/2021

3D ground heat exchanger and implementation installation  
 In the context of the need for energy production from the renewable source and energy efficiency for buildings, the geothermal energy is a solution. An innovative equipment is the 3D ground heat exchanger presented below.  
 The device is made of recycled plastic material, additiveted for mechanical strength and improved thermal conductivity, produced by thermoforming folil on robotic installation for high series production and low costs.

### RO.384.

**Title**                    **Water treatment plant**

**Authors**             Dan Ovidiu Cirjan  
**Water Décor SRL**

**Description**       RO131002/2021

The plant is based on several technologies: separation in thin layers, oxygenation, ozonization, nitrogen treatment, nanobubbles, ultrasound, zeolite filtration, UV.  
 Hydrocarbons are severely polluting and difficult to treat in classical conditions, but with the technologies mentioned above, the process is simple, being easy to drive, with important volume performances, energy efficient, without polluting components after treatment. The installation can be equipped with mobile means for moving on water or in the field, with digital communications for remote monitoring, operation and information. From the separated hydrocarbons, by pyrolysis, the synthesis gas feeds the cogeneration unit producing necessary electric and thermal energy, after cleaning the synthesis gas – sulfur, NOx, other pollutants.

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10-30 May 2023

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Expoziția va fi deschisă publicului în galeria "ALCHIMIA"  
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B-dul Profesor Dimitrie Mangeron, 73, Iași

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Miercuri, 10 MAI 2023, ora 15:00  
Prezintă: Dr. Maria Bîlașevschi, critic de artă

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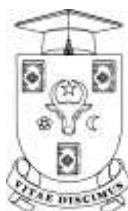
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# EUROINVENT INTERNATIONAL WORKSHOP

15<sup>th</sup> edition

**Scientific, Technological and Innovative Research  
in Current European Context**

Cercetarea științifică, tehnologică  
și de inovare în actualul context european

**> Scientific Inquiries through Elective Elaborations <**

> Cercetări științifice prin elaborări electiv <

12 May 2023

**Editors**  
**Ioan Gabriel SANDU,**  
**Ion SANDU**

**Technical editor**  
**Ioan Cristinel NEGRU**

editura pim

**CERCETĂRI ȘTIINȚIFICE PRIN ELABORĂRI ELECTIVE**  
**SCIENTIFIC INQUIRIES THROUGH ELECTIVE ELABORATIONS**

**Editors:**

Ioan Gabriel SANDU  
Ion SANDU

**ISSN 2668-3229**  
**ISSN-L 2668-3229**

**Technical editor:**

Ioan Cristinel NEGRU

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Volum editat sub egida  
**Academiei Oamenilor de Știință din România**



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## P R E F A Ț Ă

Brandul EUROINVENT, susținut de Forumul Inventatorilor Români și de Europe Direct Iași, reprezintă un proiect modern, care a permis în ultimii 15 ani realizarea unei manifestări complexe, cu multiple ținte, adresându-se tuturor creatorilor de bunuri materiale și spirituale (inventatori, universitari, cercetători științifici, artiști etc.). S-a dorit acest lucru, pentru a atrage atenția guvernanților asupra faptului că inventica este un segment al creativității naționale, care asemănător artei și științei, trebuie să fie subvenționată de stat, iar brevetarea să fie gratuită. Mai mult, proprietatea intelectuală și cea industrială să fie protejate prin legi diferite, să nu mai existe sistemul de re-brevetare a invențiilor, ci doar cel de transfer tehnologic, sub formă de Patent (licența de aplicare).

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Această sărbătoare a științei, tehnicii și artei românești, organizată sub sigla „Zilele Europei la Iași”, se desfășoară prin implicarea tuturor actorilor și vectorilor sociali: studenți, cadre didactice universitare, cercetători, artiști, mass media, mediul de afaceri, autorități etc. Un aport deosebit în aceste manifestări îl au cele cinci universități de prestigiu ale Iașului, care s-au remarcat prin performanță și tradiție de-a lungul istoriei lor, fiind recunoscute atât în țară, cât și în străinătate ca principalii formatori de inteligență românească și surse veridice ale cercetării fundamentale și tehnologice performante. Implicarea celor cinci universități în toate edițiile de până acum a condus la formarea și dezvoltarea de lideri ai creativității în domeniile lor de specializare.

Prin aceste manifestări se dorește o participare activă, printr-o bună conlucrare și dialog între inventatori, studenți, specialiști din diverse domenii, artiști, mediul academic și cel industrial.

EUROINVENT înseamnă un eveniment complex alcătuit din: Salonul European de Invenții și Cercetare Științifică, Salonul de Carte și Salonul de Artă, un rol important avându-l Workshop-ul organizat sub sigla „Cercetarea tehnico-științifică în contextul contemporan european”, unde se dezbate teme actuale de cercetare și aspecte moderne ale celor trei tipuri de proprietate: intelectuală, industrială și culturală, având în vedere printre altele, stimularea actului de creație și protecția dreptului de autor.

În ultimii șase ani acest workshop, având genericul **„Cercetări științifice prin elaborări electivă”**, s-a alăturat Conferinței Internaționale de Cercetări Inovative - componentă principală a EUROINVENT-ului, cunoscută sub titlul: International Conference for Innovative Research (ICIR).

Cu ocazia zilelor dedicate inventatorilor sau instituțiilor de cercetare și de învățământ din țările participante la aceste manifestări, se vor prezenta sistemele actuale de transfer tehnologic, dinamica brevetării și alte aspecte privind ingineria creativității, respectiv rezultatele deosebite obținute de către școlile de inventică în formarea tinerilor.

Volumul de față cuprinde lucrări elaborate de doctoranzi și masteranzi sub conducerea unor membri din comisiile de îndrumare a tezelor de doctorat și de dizertație, selectate de un grup de referenți, în acord cu direcțiile de cercetare din învățământul superior ieșean și cu evenimentele care vor fi marcate la a 15-a ediție a EUROINVENT.

Sub titlul **„Cercetarea românească în conext european”**, lucrările au fost grupate pe următoarele secțiuni: Știința Conservării Bunurilor de Patrimoniu Cultural și Natural, Științe Conex, Inventică și Istoria Neamului Românesc. Au fost acceptate lucrări în limba română și engleză, cu o bibliografie recentă și selectivă.

**Prof.univ.emerit dr. Ion SANDU,**

Președinte de Onoare al Forumului Inventatorilor Români  
Membru corespondent al Academiei Oamenilor de Știință din România







## **Book of Abstracts**

# **EUROINVENT** **ICIR 2023**

## **International Conference on Innovative Research**

**May 11<sup>th</sup> to 12<sup>th</sup>, 2023**

Iasi – Romania

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- **Romanian Inventors Forum**
- **Faculty of Materials Science and Engineering, The “Gheorghe Asachi” Technical University of Iasi, Romania**
- **ARHEOINVEST Platform, Alexandru Ioan Cuza University of Iasi**
- **Centre of Excellence Geopolymer and Green Technology CEGeoGTech), Universiti Malaysia Perlis (UniMAP)**
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6	Stefan cel Mare University of Suceava	4	361
7	„Grigore T. Popa” University of Medicine and Pharmacy Iasi, Romania	20	363
8	“Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania	6	379
9	University of Medicine and Pharmacy „Iuliu Hatieganu” Cluj-Napoca	3	382
10	“Alexandru Ioan Cuza” University of Iasi	2	384
11	Transilvania University of Brasov	1	386
12	University ”Valahia” from Târgoviște	4	387
13	Dunarea de Jos University of Galati	12	391
14	University of Agronomic Sciences and Veterinary Medicine of Bucharest	8	399
15	University of Life Science ”King Mihai I” from Timisoara	15	405

## RESEARCH INSTITUTES

16	National Research and Development Institute for Laser, Plasma and Radiation Physics – INFLPR	6	417
17	National Institute of Materials Physics	8	421
18	National Institute for Research & Development in Chemistry and Petrochemistry – ICECHIM Bucharest	15	427
19	National Institute for Research and Development in Electrical Engineering ICPE CA Bucharest	7	438
20	National Research and Development Institute for Cryogenic and Isotopic Technologies - ICSI Rm. Valcea	5	443
21	National Institute for Research and Development in Microtechnologies - IMT Bucharest	10	447
22	National Institute for Research and Development in Environmental Protection - INCDPM	10	456
23	National institute for Research and Development URBAN-INCERC	21	465
24	National Institute of Research and Development for Optoelectronics - INOE 2000	22	483
25	National Institute of Research & Development for Technical Physics, Iasi	1	498
26	National Research and Development Institute for Non-ferrous and Rare Metals – IMNR	6	499

27	National Institute for Research and Development in Electrochemistry and Condensed Matter	1	504
28	National Research and Development Institute for Textiles and Leather INCDTP	9	505
29	National Institute for Research - Development of Machines and Installations for Agriculture and Food Industry - INMA Bucharest, Romania	14	514
30	National Institute for Research and Development in Mine Safety and Protection to Explosion - Insemex Petroșani	5	520
31	National Research & Development Institute for Welding and Material Testing – ISIM Timisoara	8	524
32	Regional Institute of Gastroenterology and Hepatology Cluj-Napoca	2	530
33	Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering	2	531
34	National Research and Devel. Institute for Industrial Ecology – ECOIND	3	533
35	Research Development Institute for Plant Protection INCDPP	1	536
36	Research and Development Station for Cattle Breeding Dancu, Iasi	8	537
37	National Research and Development Institute for Animal Biology and Nutrition (INCDBNA-IBNA Balotești)	5	545
38	Academy of Romanian Scientists AOSR	1	548
39	Center for Study and Research for AgroForestry Biodiversity “Acad. David Davidescu”, Romanian Academy	1	549

COMPANIES & NGOs			
40	SC BIOTEHNOS SA	3	550
41	DFR Systems	1	553
42	SC Doctor Tech SRL	1	554
43	SC Electro Optic Systems SRL	1	555
44	CESAL SA Oradea	1	556
45	A BETTER LIFE SOLUTIONS	1	557
46	Mazarom Impex S.R.L.	3	558
47	DRUGON International SRL	1	561
48	EFB NATUR HAUS S.R.L	3	562
49	ECOHORNET SRL	1	563
50	ROSMARH INVENTOR CENTER ASSOCIATION	1	564
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	Gabriel Petre GORECKI	1	565
	Vasile LUPU	2	566
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**330 Registrations from 33 Countries**  
**+ 382 Registrations from Romania**