International Invention Innovation Competition in Canada

iCAN–TORONTO, CANADA

iCAN 2026

THE 11TH EDITION

OFFICIAL CATALOGUE



INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
iCAN
TORONTO, CANADA

TISIAS
TORONTO INTERNATIONAL SOCIETY OF INNOVATION & ADVANCED SKILLS

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Toronto International Society of Innovation & Advanced Skills (TISIAS) was established in 2013 to build a global hub in Toronto, Canada to provide a variety of services and opportunities for both local and overseas inventors, innovators, students and researchers to promote their inventions and products in the world market. TISIAS is globally active as the delegation of Canada participating in numerous international invention exhibitions, competitions and conferences organized by its partners around the world. TISIAS majorly promotes its Canadian and American members' inventions and products to world exhibitions and conferences as well as some other international members' creative ideas to success in commercialization and branding.



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ANNUAL EVENT ORGANIZED IN TORONTO, CANADA



TORONTO CANADA

International Invention Innovation Competition in Canada
iCAN-TORONTO, CANADA

iCAN 11TH 2026

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11 Anniversary

International Invention Innovation Competition in Canada
iCAN - TORONTO, CANADA

WELCOME TO iCAN 2026
THE 11TH ANNUAL EDITION

THE 11TH INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA, iCAN 2026

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MOONSUK CHANG / The Organizer of iCAN



It is my great pleasure to welcome you once again to Toronto for the 11th International Invention Innovation Competition in Canada, iCAN 2026. Since its beginning in 2016, iCAN has grown through a lot of changes, challenges, and breakthroughs. As the event expands, so do our responsibilities, yet each challenge deepens our commitment. Every year, as "iCAN Season" approaches, I feel most alive and connected to my purpose: promoting innovation worldwide and bringing creative minds together.

When I get to see all these great inventors, students and professionals from all walks of life, all different countries and regions coming together for the topic of invention, innovation and creativity. It's cool and incredible to see that. So as much as I can bring us together that way, that's what I'm trying to do. **iCAN exists to create that meaningful occasion for you, to celebrate ideas, and give innovation the opportunity to be seen and be recognized at the highest level.**

With this 11th edition, we are now beginning a new decade of iCAN. I am deeply grateful for the time, trust, and enthusiasm that each of you has brought to this event. I hope your participation gives you more than an award. May it bring you confidence, meaningful connections, and the inspiration to take the next step in your journey. Throughout the year, I often search for iCAN online and discover former participants appearing in the news, reaching new milestones, and building their own success stories. **Seeing their continued growth brings me tremendous joy. To me, that is the greatest award, the one I carry proudly in my heart forever.**

Thank you, from the bottom of my heart, for making iCAN part of your life and your journey of infinite creativity. May you remain bold in imagination, steadfast in purpose, and always in good health. I wish you every success in iCAN 2026.

MOONSUK CHANG
Chairman & Chief Exhibition Officer
Toronto International Society of Innovation & Advanced Skills (TISIAS)

TISIAS
TORONTO INTERNATIONAL SOCIETY OF INNOVATION & ADVANCED SKILLS

BOB HUYBRECHTS / Co-Chairman of the Jury



Good morning, good afternoon, and hello to inventors wherever you are in the world! This is Bob Huybrechts from Toronto, Canada, and I warmly welcome all of you to this year's **iCAN 2026**. After 11 years of celebrating innovation, I can proudly say that iCAN has become a wonderful tradition—bringing together creative minds from around the globe to share ideas, inspire one another, and showcase the remarkable power of invention.

I also have an interesting personal announcement that many inventors may enjoy exploring. I recently became the owner of a **TZLA Plasma Generator!** This device is a massively improved version of Nikola Tesla's invention, known as the 'Violet Ray'. It produces plasma flowing through your veins, while it restores the sacred and natural healing intelligence of the body. Plasma holds miraculous power to unlock the illusive 'fountain of youth'. If you're curious, you can learn more by visiting **tzla.club** - you will not regret knowing more about it…

By the way, Maxwell Chikumboutso, the young man in Zimbabwe who invented free MicroSonic energy, is apparently still operating under pressure and high security. Unfortunately, he will only sell his cars in Africa for now!

I would also like to express my sincere appreciation to **Moonsuk** for his unrivaled tenacity and dedication in encouraging inventors from around the world to participate in the annual iCAN community. While necessity is often called the mother of invention, I concluded long ago that its father must surely be **tenacity**. Great ideas are born from inspiration, but they become reality through perseverance.

Congratulations to every inventor participating this year. I admire your creativity, your determination, and your passion for making the world a better place through innovation. I wish each of you great success with your inventions, and I look forward to seeing you all on August 29. Let's make **iCAN 2026** another unforgettable celebration of innovation.

BOB HUYBRECHTS
Founder & President
Innovation Initiative Co-operative Inc. "The Inventors Circle"

INVENTORS CIRCLE

innovation initiative
A NON-PROFIT FORUM SUPPORTING INNOVATIVE BUSINESS

HOWARD A. LIM / Co-Chairman of the Jury & Keynote Speaker



Congratulations to every inventor who has helped shape the past decade of innovation through iCAN 2026. I extend my congratulations to Mr. Moonsuk Chang and the entire iCAN 2026 Team not just for perfectly organizing this event, but also for improving the quality of event year after year. It has been a privilege to serve as Co-Chair and Keynote Speaker throughout iCAN's remarkable journey for the last decade. **Watching this event grow from a small gathering into one of the world's premier international invention competitions has been inspiring.**

For nearly 40 years, I have worked with numerous entrepreneurs, inventors, and global organizations, and one truth continues to stand out: innovation changes the world only when it is successfully brought to market. **iCAN has created an extraordinary platform that encourages inventors to think beyond the invention itself and toward creating lasting impact.**

Congratulations on another outstanding year. Thank you, Moonsuk, for your vision, your friendship, and your unwavering commitment to helping innovators from around the world achieve their potential. I look forward to celebrating many more years together.

HOWARD A. LIM
Founder of **HOW CREATIVE®**
Co-Chairman of **iCAN Jury Committee (2016 – Present)**

HOW CREATIVE®
We Design Businesses™

ALIREZA RASTEGAR / President of IFIA



Dear Inventors, Innovators, Researchers, and Visionary Creators,

On behalf of the International Federation of Inventors' Associations (IFIA), it is with great pride and enthusiasm that we extend our warm congratulations to the Toronto International Society of Innovation and Advanced Skills (TISIAS) for organizing the 11th International Invention Innovation Competition in Canada (iCAN 2026), scheduled to be held online on August 29, 2026.

As iCAN proudly enters its second decade, this remarkable event continues to strengthen its position as one of the world's most respected international platforms dedicated to innovation, invention, and creative excellence. "A decade later and stronger than ever," iCAN reflects the spirit of perseverance, collaboration, and visionary thinking that drives global innovation forward.

Over the years, iCAN has successfully united inventors, scientists, startups, students, entrepreneurs, and academic researchers from around the world, providing them with a dynamic environment to showcase transformative ideas and breakthrough technologies. The event has become a powerful bridge connecting creativity with opportunity and innovation with international recognition.

With IFIA's longstanding mission of supporting inventors and promoting innovation culture worldwide, we are pleased to continue our official support for iCAN 2026 and highly encourage all IFIA member organizations, inventors, and innovation enthusiasts to actively participate in this distinguished international gathering.

iCAN 2026 represents far more than a competition — it is a global celebration of imagination, technological advancement, and human ingenuity. Participants will benefit from international exposure, professional evaluation, networking opportunities, and the chance to engage with a vibrant global innovation community.

We sincerely invite innovators from every corner of the world to join iCAN 2026 and contribute their ideas toward building a smarter, more sustainable, and more innovative future for humanity. We wish the organizing committee of TISIAS another successful edition and look forward to celebrating innovation excellence together.

Sincerely Yours,

ALIREZA RASTEGAR
President
International Federation of Inventors' Associations (IFIA)

IFIA
INTERNATIONAL FEDERATION OF INVENTORS' ASSOCIATIONS

MANLI HSIEH / President of WIIPA



Dear Inventors, Innovators, and Young Visionaries Around the Globe,

On behalf of World Invention Intellectual Property Associations (WIIPA), I am pleased to express our strong support and sincere appreciation to Toronto International Society of Innovation & Advanced Skills (TISIAS) and their outstanding efforts in organizing the annual event: The 11th International Invention Innovation Competition in Canada, iCAN 2026.

Over the past 10 years, iCAN has grown far beyond being just an international competition. It has become a global celebration of creativity, intellectual achievement, and international collaboration. Since its first edition in 2016, iCAN has proudly brought together brilliant minds from 98 countries & regions worldwide, presenting groundbreaking inventions while building a vibrant worldwide community of innovators.

We strongly believe that iCAN 2026 "The 11th Annual Edition" organized by TISIAS will continue to inspire inventors, researchers, students, entrepreneurs, and creative minds from every corner of the world. With its next phase theme "A Decade Later and Stronger than Ever", iCAN stands as a powerful testament to the dedication, professionalism, the relentless spirit shown by its organizing team and committee in Toronto, Canada.

WIIPA is proud to continuously stand alongside TISIAS for their remarkable annual event. With even greater expectations for iCAN 2026 this year, we strongly encourage inventors, students, researchers, scientists, entrepreneurs as well as all WIIPA Member States to actively join iCAN 2026 and seize this exceptional opportunity for your meaningful success.

Sincerely Yours,

MANLI HSIEH
President
World Invention Intellectual Property Associations (WIIPA)

MIKE McFARTHING / Vice-President of the Jury & Keynote Speaker



Warmest congratulations to every brilliant inventor participating in the 2026, the 11th annual iCAN Finals Awards! Representing the Inventors Circle here in Toronto, Canada, I am deeply moved by the extraordinary creativity, grit, and ingenuity on display across this year's global submissions.

I want to extend my heartfelt gratitude to the Founder, Moonsuk Chang for his incredible vision and steadfast dedication to giving inventors a global platform to shine.

My sincere thanks also go to my esteemed fellow jury members together. Evaluating such remarkable, forward-thinking projects alongside you all has been an absolute privilege.

To our incredible participants: inventing is so much more than just a good idea. It is the courageous act of turning imagination into reality to solve real-world problems. **May this experience inspire you to continue questioning, experimenting, and pushing the boundaries of what is possible.**

The world needs bold thinkers and passionate problem-solvers like you. Congratulations once again, and I wish every participant continued success on their remarkable journey of innovation.

As the Director of Education at the Inventors Circle, it is a true honor to serve as your juror and hosting committee member for iCAN 2026. Having been part of this journey since the very first edition in 2016, witnessing the growth of this incredible event over the past eleven years is deeply rewarding. **I am proud to have supported this landmark event from its inaugural run in 2016 through to this year's 11th edition."**

MIKE McFARTHING
Director of Education
Innovation Initiative Co-operative Inc. "The Inventors Circle"

PROF. DR. ANDREI VICTOR SANDU / Vice-President of the Jury



On behalf of the Romanian Inventors Forum, it is our great pleasure to extend our warmest congratulations to all participants, inventors, researchers, award winners, partners, and distinguished guests of the 11th International Invention Innovation Competition in Canada – iCAN 2026.

iCAN has become an important international platform for promoting creativity, scientific progress, technological innovation, and cooperation among inventors from around the world. Each invention presented at this prestigious competition reflects determination, knowledge, courage, and the desire to contribute to a better and more sustainable future.

We sincerely congratulate the organizing committee and the entire iCAN team for their outstanding dedication and professionalism in bringing together the global innovation community. **We wish all participants continued success and encourage them to transform their creative ideas into solutions with a meaningful impact on society.**

PROF. DR. ANDREI VICTOR SANDU
President / **Romanian Inventors Forum**
Organizer / **European Exhibition of Creativity & Innovation (EUROINVENT)**

SIR DR. YOSHIRO NAKAMATS / Honourary Advisor of iCAN



As the Honourary Advisor of iCAN, it is my great pleasure to extend my warmest congratulations to everyone at the 11th International Invention Innovation Competition in Canada, iCAN 2026. I offer my sincere appreciation to the young and energetic organizer, Moonsuk Chang for his priceless effort and passion towards promoting the culture of invention and innovation at a high-level global scale.

Throughout my long life as an inventor, I have learned that every great invention begins with a question: ***Why must things remain as they are?*** **The inventor is the person who dares to challenge the ordinary, imagine what others cannot yet see, and transform that imagination into something useful for humanity.**

To every participant in iCAN 2026, especially the young inventors: **never allow your age, nationality, circumstances, or the opinions of others to limit your imagination. Protect your curiosity. Strengthen your ideas through study and experimentation.** Most importantly, create inventions that bring happiness, progress, and peace to people's lives. Congratulations to all the participants of iCAN 2026. Continue dreaming, challenge the impossible and invent a brighter future for our world.

SIR DR. YOSHIRO NAKAMATS
Chairman / **World Genius Convention (WGC) – Tokyo, Japan**
Chairman / **International Invention & Innovation Institute (IIII)**

ANNIE CHEN / Secretary-General of WIIPA



Congratulations to iCAN 2026! It is a great pleasure to celebrate iCAN's 11th annual edition and witness its remarkable journey as a signature international exhibition of WIIPA. Over the past decade, iCAN has evolved into a globally respected stage where innovation knows no borders, bringing together visionary minds to transform ideas into real-world impact through collaboration, creativity, and excellence.

More than just an event for inventors around the world, iCAN has truly become a catalyst for global innovation, inspiring meaningful connections and creating opportunities for inventors around the world. May iCAN continue to be where great ideas find their moment, and where the incredible future quietly begins.

ANNIE CHEN
Secretary-General
World Invention Intellectual Property Associations (WIIPA)

PHILIPPE COUPÉRIE-EIFFEL / Honourary President of E.F.I.



Dear guests, inventors, and young innovators present in iCAN 2026,

It is with great pleasure that I extend my warmest greetings to everyone participating in the 11th International Invention Innovation Competition in Canada, iCAN 2026 in Toronto, Canada. I sincerely commend Mr. Chang of TISIAS and the iCAN Team for their dedication to international innovation and for the valued collaboration all these many years.

The Eiffel Tower reminds us that a bold idea, when supported by knowledge, courage, and perseverance, can become a universal symbol. This same creative spirit lives within every inventor who dares to imagine a better future.

France and Canada share a long tradition of friendship, cultural exchange, and scientific ambition. In the field of innovation, this relationship reminds us that no invention reaches its full potential in isolation. **By connecting inventors, researchers, students, and institutions across borders, we allow ideas to be challenged, refined, and transformed into solutions that serve society.** International platforms such as iCAN therefore do more than recognize achievement. They build bridges of knowledge and trust through which innovation can travel from one nation to the world.

iCAN provides a remarkable stage where experience meets youth and ideas from different cultures are shared with openness and respect. **I am especially encouraged to see young people taking their first steps as inventors, for their curiosity, imagination, and courage will shape the world of tomorrow.** Let's continue to dream beyond limits, but give your dreams structure, purpose, and service to humanity. May iCAN 2026 be a resounding success. I offer my warmest congratulations and best wishes to you all.

"VIVE iCAN! LE GRAND RENDEZ-VOUS DES INVENTEURS CANADIENS ET INTERNATIONAUX!"

PHILIPPE COUPÉRIE-EIFFEL
President / **French Federation of Inventors (F.F.I.)**
President of the Jury / **PRIX EIFFEL** – **Paris, France**

GÉRARD ROQUILLON / President of F.F.I.



Dear Founder Moonsuk Chang, distinguished organizers, jury members, inventors, and young innovators from around the world,

On behalf of the French Federation of Inventors (F.F.I.), it is my great pleasure to extend my warmest congratulations on the 11th International Invention Innovation Competition in Canada, iCAN 2026.

I would especially like to thank Mr. Moonsuk Chang for the excellent collaboration established between iCAN and the Paris International Invention and Innovation Contest, PRIX EIFFEL over the years. Our partnership has helped connect inventors across continents and create valuable international opportunities for creativity and innovation. For 4 consecutive years, TISIAS has actively promoted PRIX EIFFEL, enabling many inventors and students from various countries to present their inventions and innovative products in Paris. We are deeply grateful for this continued friendship, trust, and cooperation.

International events such as iCAN inspire inventors, encourage young talent, and demonstrate that innovation has no borders. Every participant deserves recognition for the courage and determination required to transform an idea into reality. I wish iCAN 2026 yet another highly successful celebration and all participants the very best of luck. May your inventions contribute to a brighter and more prosperous future for all.

"Bonne chance, and congratulations to everyone!"

GÉRARD ROQUILLON
President / **French Federation of Inventors (F.F.I.)**
Vice-President of the Jury / **PRIX EIFFEL** – **Paris, France**

ENG. MS JOSE ALBERTO OCHOA DISSELKOEN / President of CIIT



It is a great pleasure for me to address you on behalf of the Chilean Corporation of Inventors and Technological Innovation to congratulate you on iCAN 2026, the 11th Annual Edition of this traditional competition for inventions and innovations. The encouragement that your team provides to inventors to persevere in our research and experiments is unparalleled, and **we hope to organize together the first event in Chile: I&I LatAm 2027, inviting inventors from Latin America, the Americas, Europe, and the world.** Please accept our warmest congratulations from Chile.

JOSE ALBERTO OCHOA DISSELKOEN
President
Chilean Corporation of Inventorsand Technological Innovation (CIIT)

MA. CHAT DONNA V. OFILAS / iCAN Jury & Committee Member



As Secretary-General of the Manila Young Inventors Association (MYIA) and **a proud member of the iCAN family for nearly a decade since 2017,** it is my great honor to extend my warmest greetings and congratulations to the 11th International Invention Innovation Competition in Canada, iCAN 2026.

Through the last 10 years, iCAN has become a remarkable avenue for visionary minds to transform ideas into meaningful innovations that address global challenges and focal topics. **I commend the organizers, partners, inventors, and participants for their unwavering commitment to advancing creativity and discovery.**

May this year's competition ignite new possibilities, strengthen international cooperation, and inspire innovators to continue shaping a brighter future for humanity.

Young innovators, we create with purpose to lead the future!

MA. CHAT DONNA VILLARICO OFILAS
Secretary-General
Manila Young Inventors Association (MYIA)

MANILA YOUNG INVENTORS ASSOCIATION
Invention Development in Education Advocacy

NOUR EID LATTOUF / Delegation Representative of Lebanon



On this special occasion, it is with immense joy that I extend my warmest congratulations to all the participants, finalists, and award winners of the **11th iCAN International Invention Innovation Competition 2026.**

Celebrating the **11th edition of iCAN** is truly a remarkable milestone and a testament to the dedication, passion, and vision of everyone who has contributed to this extraordinary journey. Year after year, iCAN continues to bring together innovators, inventors, and creative minds from around the world, creating a unique community where ideas are shared, friendships are built, collaboration is fostered, and innovation is celebrated.

The Lebanese Innovators Society (L.I.S.) is honored and proud to have been part of this journey. This year, we are especially delighted to participate with **five innovative projects representing Lebanon**, allowing our talented innovators to showcase their creativity and achievements on an international stage.

We deeply value our collaboration with iCAN and sincerely hope to continue this beautiful partnership for many years to come. May iCAN continue to grow, flourish, and inspire generations of innovators worldwide.

Congratulations on this remarkable 11th edition, and may the spirit of innovation, friendship, and collaboration continue to unite us for many years to come!

NOUR EID LATTOUF
President
Lebanese Innovators Society (L.I.S.)

HOSSEIN VAEZI ASHTIANI / Delegation Representative of I. R. Iran



Dear Distinguished Inventors, Innovators, Esteemed Organizers, and Honored Guests,

On behalf of the First Institute of Researchers and Inventors in I.R. IRAN (FIRI), it is my great privilege to extend my warmest greetings and sincere congratulations to the organizers, participants, partners, and supporters of the **11th International Invention Innovation Competition in Canada (iCAN 2026).**

Over the years, iCAN has established itself as one of the world's most respected international innovation platforms, bringing together visionary minds whose creativity and determination continue to redefine the future. By fostering collaboration across borders and celebrating groundbreaking achievements, iCAN plays an essential role in strengthening the global innovation ecosystem.

In an era where humanity faces increasingly complex challenges**, innovation has become more than a catalyst for economic growth it is a powerful instrument for improving lives, advancing sustainability, and building a more resilient world.** Every invention presented in this prestigious competition reflects not only technical excellence but also the courage to transform ideas into meaningful solutions.

I would like to express my sincere appreciation to the Toronto International Society of Innovation & Advanced Skills (TISIAS), the Innovation Initiative Co-operative Inc. The Inventors Circle, the International Federation of Inventors' Associations (IFIA), and all partners whose unwavering commitment has elevated iCAN into a truly global celebration of innovation and excellence.

To every inventor participating in iCAN 2026, I extend my heartfelt admiration. Your passion for discovery, perseverance in research, and commitment to creating positive change inspire us all. **May this competition open new opportunities for international collaboration, knowledge exchange, and lasting partnerships that will contribute to a brighter future for generations to come.** I wish every participant outstanding success and hope that the 11th edition of iCAN will once again demonstrate the extraordinary power of human ingenuity, creativity, and innovation.

With my highest regards and best wishes,

HOSSEIN VAEZI ASHTIANI
President
The First Institute of Researchers and Inventors (FIRI)

PROF. DR. CORNELIU BIRTOK BANEASA / New iCAN Jury Member



It is a true honor and a great pleasure to celebrate the remarkable **11th Annual Edition of the International Invention Innovation Competition in Canada, iCAN 2026.** I want to warmly congratulate the entire organizing team, and especially the Founder, Moonsuk Chang, for his visionary leadership, dedication, and for creating such a prestigious global platform that continuously connects brilliant minds across borders.

As the Founding President of the **INVENTCOR International Exhibition** and also as a professor, I have directly witnessed the profound impact that international recognition has on shaping new generations. **In the current global context, it is imperative to support and promote young people passionate about creativity and innovation for a better future.** These young inventors are not just the creators of tomorrow, but the catalysts for the cultural and technological exchanges that our world so desperately needs today.

Events of iCAN's magnitude inspire the courage to push conventional boundaries and transform bold ideas into tangible realities. I wish to congratulate all participants, inventors, and creative youth present at this magnificent edition!

"Be stubborn and follow your dream!"

PROF. DR. CORNELIU BIRTOK BANEASA
President / **INVENTCOR Academy** – **Deva, Romania**
President / **CorneliuGroup Research-Innovation Association**

DEIVISON TRINADE DOS SANTOS / Delegation Representative of Brazil



On this symbolic occasion of the **11th edition of iCAN – International Invention Innovation Competition in Canada**, I warmly congratulate all those involved for promoting the culture of invention, science and innovation around the world.

I am an educator committed to the technical, scientific and civic education of Brazilian youth. I recognize iCAN as an essential platform to value transformative ideas and connect talents from different countries. May this edition inspire new discoveries, partnerships and solutions to the challenges of our time!

EDUCATIONAL BACKGROUND

- Master's Degree student in Public Management and Public Policies with emphasis on Professional and Technological Education – Fundação Getulio Vargas (FGV)
- Degree in Teaching for Technical and Professional Education – Secondary Level – IFES (2023)
- Degree in History – UNIASSELVI (2023)
- Bachelor's Degree in Administration – Faculdade Santo Antônio (2012)
- Specialization in Teaching for Technical and Professional Education – IFES (2021)
- Specialization in Scientific Education and Popularization of Science – IF Baiano (2018)
- Specialization in People Management and Organizational Psychology – Universidade Pitágoras Unopar Anhanguera (2025)
- Specialization in School Management and Organization with emphasis on Coordination and School Guidance – Universidade Pitágoras Unopar Anhanguera (2026)

PROFESSIONAL EXPERIENCE AND CONTRIBUTIONS

- Teacher at the State Center for Professional Education in Control and Management of the Northeast of Bahia Pedro Ribeiro Pessoa (CEEP Pedro Ribeiro Pessoa), teaching in Technical Courses in Administration and Logistics, and also with experience in History and Religious Education.
- Face-to-Face Tutor for the Bachelor's Degree in Public Administration at the Federal Institute of Bahia (IFBA).
- General Coordinator of the Brazilian Science and Professional Education Fair (FECEP).
- Coordinator of the Scientific Fair of the State Schools of Catu (FECEEC).
- Coordinator of the Science Club Professora Ilza Maria.
- Ad Hoc Reviewer for SUPROT/SEC-BA and SINPETE Nacional.
- Evaluator of the Mostra Internacional de Ciência e Tecnologia (MOSTRATEC) and the Feira Brasileira de Iniciação Científica (FEBIC).
- Member of the Brazilian Association for the Promotion of Science (ABRIC) – Strategic Actions Board.
- Member of the Brazilian Society for the Advancement of Science (SBPC) and of the STEAM Teachers Network – Bahia.

I work in the guidance of scientific and technological projects, organization of science fairs, teacher training and the articulation between teaching, research, extension and innovation. My students and projects have represented Brazilian public education in international events in Colombia, Canada, Ecuador, France, Indonesia, England and Romania, earning awards, international accreditations and publications in proceedings and official catalogs.

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Because We Can

TORONTO • CANADA

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DEIVISON TRINADE DOS SANTOS
General Manager & Coordinator
Brazilian Science & Professional Education Fair (FECEP) / CEEP Pedro Ribeiro Pessoa, Brazil

LENNART NILSSON / iCAN 2026 Committee Advisor



It is my great pleasure to extend my warmest congratulations to the Organizing Committee, participants, finalists, and award winners of iCAN 2026.

Throughout the years, iCAN has become one of the world's leading international platforms for invention and innovation, bringing together talented inventors, researchers, universities, companies, and organizations committed to creating a better future.

Brilliant ideas and outstanding inventions can provide solutions to many of today's global challenges. However, the greatest challenge is often not the invention itself, but gaining the confidence, financial support, and strategic partnerships needed to transform these ideas into technologies that can truly benefit humanity.

This is one of the most important contributions of iCAN. Beyond recognizing excellence, iCAN promotes innovation, connects inventors with the international community, and helps promising technologies move beyond the concept stage to become real solutions for society.

Although retired, I am proud to continue serving as Innovation Advisor to Dr. Adrian Jose Cabezas Morales, Founder & CEO of Nano Control AB, whose innovations provide technological solutions for a cleaner, healthier, and more sustainable world.

I sincerely thank the iCAN Organizing Committee for its dedication and vision, and I wish every participant continued success in transforming their ideas into innovations that improve our world.

Warm regards,

LENNART NILSSON
Founder & President / **Stockholm Inventors Association (STIK), Sweden**
Former Secretary General / **International Federation of Inventors' Associations (IFIA)**

DR. JUHYEONG KIL / iCAN Jury & Committee Member



It is my great honour to welcome you to **iCAN 2026 "The 11th Annual Edition"** - a global gathering where creativity, courage, and innovation come together. Today, we celebrate not only remarkable inventions, but also the hope and vision they represent for a brighter future.

To every inventor joining us worldwide, I offer my deepest respect. Despite limitations of time and resources, you have transformed challenges into meaningful solutions. True invention is more than creating something new; it advances humanity, addresses real needs, and inspires lasting change.

Since its beginning, iCAN has grown into a respected international platform where innovations are recognized, ideas are exchanged, and partnerships are formed. Each invention may begin with one person, but together, your efforts can transform the world.

Congratulations to iCAN 2026 and to all participants. May your creativity continue to lead us toward a better and more innovative future.



DR. JUHYEONG KIL
Chairman
International Invention & Design Leader Awards (IIDLA)

IIDLA International Invention & Design Leader Awards

PROF. DR. VASILEIOS AG. DROUGAS / iCAN Jury & Committee Member



Dear Inventors and Researchers who will participate in this most prestigious ICAN '26. I want from the Jury position to congratulate all of you on your work. Your work will change the world and give to the people new thoughts and applications for their future.

iCAN is a very great event for all over the world. And personally, as a science professor and many years of scientific research I want to congratulate the organizers, the President and the Organizing committee for this most important scientific event for Innovation and Inventors from all over the world. It is my greatest honor to be member of this scientific community. Wish to ICAN to be always more and greater all over the world helping scientists and inventors to make a better world.



PROF. DR. VASILEIOS AG. DROUGAS
Researcher & Adjunct Professor
University of Ioannina, Greece

UNIVERSITY OF IOANNINA

DR. ENG. NEYARA RADWAN / iCAN Jury & Committee Member



I am deeply honored to participate for the third consecutive year as an International Jury Member at the **11th International Invention Innovation Competition in Canada (iCAN 2026).**

This prestigious global platform brings together talented inventors, innovators, students, researchers, scientists, and entrepreneurs, providing **an opportunity to showcase outstanding ideas, explore emerging talents, recognize creativity and innovation, and promote promising inventions and research projects on an international stage.**

I am particularly pleased to contribute my expertise to the evaluation and recognition of innovative solutions with the potential to create meaningful impact, while supporting iCAN's mission of connecting innovators worldwide, fostering international collaboration, and advancing ideas toward greater recognition and practical application. It is a privilege to continue contributing to this distinguished event.



DR. ENG. NEYARA RADWAN
Associate Professor / **Liwa University, U.A.E.**
Associate Professor / **Suez Canal University, Egypt**



Liwa University Est 1993

GIORGI MIKIASHVILI / iCAN Jury & Committee Member



Warm greetings to the organizers, committee, and participating inventors of the iCAN exhibition. As an International Jury Member of iCAN2026 representing Spain, it is my distinct honor to extend my warmest congratulations to every participant and award winner of the 11th International Invention Innovation Competition in Canada. I express my deepest gratitude to Mr. Moonsuk Chang and the TISIAS organizing team for their extraordinary leadership and for establishing iCAN as a globally recognized beacon of innovation.

As an Invention Architect and founder of the author "Methodology of Inventive Architecture", I firmly believe that structured inventive thinking is the key to transforming our world. It is essential for all inventors, especially the upcoming generations, to create breakthrough innovations that reshape the world on a global scale and stand toe-to-toe with the world's leading innovators who shape today's global market. iCAN2026 recognizes and rewards truly exceptional ideas; therefore, **every inventor's aim should be to achieve the highest level of excellence** rather than settling for mediocrity. I wish every inventor continuous growth and limitless success - your vision and perseverance prove that true innovation knows no bounds!





GIORGI MIKIASHVILI
Founder / **Giorgi Mikiashvili's Inventive Architecture Methodology (GM-IAM™)**
Author & *Innovation Mentor* / ***"Giorgi Mikiashvili's Methodology of Inventive Architecture"***

PROF. MITHONA LUY / Delegation Co-Representative of Cambodia



Warmest greetings from Phnom Penh, Cambodia! I am Professor Luy Mithona, **Deputy Head of the Department of Computer Science (DCS) at Norton University.** It is a great honor and pleasure to participate in the iCAN 2026 International Invention Innovation Competition, organized by the Toronto International Society of Innovation and Advanced Skills (TISIAS). On behalf of our department and university, I would like to express my sincere appreciation to the organizers, participants, and global innovators gathered for this prestigious 11th edition. **iCAN continues to serve as an extraordinary platform that bridges creative minds, fosters technological advancement, and celebrates groundbreaking ingenuity across borders.** We are excited to share our academic perspectives, connect with visionary inventors from around the world, and support a culture of smart innovation. **I wish all participants an inspiring, collaborative, and successful event.**



PROF. MITHONA LUY
Deputy Head of the Computer Studies Department / **Norton University, Cambodia**
Representative of Cambodia / **World Invention Intellectual Property Associations (WIIPA)**

VICTOR BAUTISTA DÍAZ / iCAN Jury & Committee Advisor



Dear members of the Committee, organizers, jury members, scientists, professors, inventors: as everyone knows, we are here celebrating iCAN's 11th anniversary. This is a fundamental event because ICAN not only provides opportunities for dissemination and encouragement to hundreds of researchers, **but also because it rescues unknown inventors around the world,** even from distant regions, as is my case. I came across iCAN (via Mr. Moonsuk Chang) in 2021. During 2020, I fulfilled a long-held dream of mine: to convert all types of organic waste into a humic acid-rich material similar to fertile soil. During that time, I sent hundreds of emails around the world offering this study to anyone who wanted to exploit it commercially free of any kind of compensation. **One of these messages was addressed to TISIAS and was taken by Mr. Chang.** He literally rescued it and made it known to the global community of inventors. Mr. Moons has a kind heart; Since then, I've tried to cooperate with iCAN to the best of my ability. Thank you, iCAN; thank you, Mr. Chang; thank you all.



VICTOR BAUTISTA DÍAZ
Chemist & Private Researcher
Buenos Aires, Argentina

PROF. DR. AUGUSTIN SEMENESCU / iCAN Jury & Committee Member



Dear iCAN 2026 Organizing Committee, Team Members, Visionary Participants, and Distinguished Award Winners,

My name is Prof. Dr. Augustin Semenescu, holding a tenure position at the **National University of Science and Technology POLITEHNICA of Bucharest, Romania, European Union.** It is a profound privilege and an immense joy to share this message of celebration with you all.

I would like to extend my deepest respect and highest admiration to the organizing committee and all supporting teams. Through your tireless energy, exceptional dedication, and belief in human potential, you have once again brought to life the 11th International Invention Innovation Competition in Canada. **By crafting this spectacular global stage, you do more than organize an exhibition. You bridge borders, fuel hope, and build the foundation for tomorrow's breakthroughs.**

To the brilliant participants and award winners joining from every corner of our planet, I offer my most heartfelt congratulations. True innovation requires immense courage: the courage to question, to fail, to persevere, and to imagine a reality that does not yet exist.

Your extraordinary ideas and relentless drive are the answers to our world's most critical challenges. **Winning an iCAN award is a powerful testament to your brilliance and determination.** You are not just solving problems; you are redefining the boundaries of what is possible.

As you step forward from this landmark achievement, I urge you to keep your passion burning brightly. Never stop exploring, never stop building, and never lose your wonder. May your journey ahead be filled with endless inspiration, profound discoveries, and the shared success that lifts our entire global community.

With deep admiration and warmest regards,

PROF. DR. AUGUSTIN SEMENESCU
Professor
National University of Science & Technology POLITEHNICA of Bucharest

DR. CATHERINE DEMETRIADES / iCAN Committee Advisor

Innovation is the language of hope.



Every invention begins as a single thought that refuses to accept limitations and chooses possibility instead. Today we celebrate not only remarkable technologies and discoveries, but the visionaries courageous enough to transform imagination into reality. **Congratulations to every participant and award winner of iCAN 2026 for proving that one idea can inspire millions and create meaningful change for generations to come.**

My heartfelt gratitude goes to the iCAN organizing committee, judges and supporters whose dedication continues to unite inventors from across the globe. I would especially like to acknowledge Mr. Moonsuk Chang, whose vision, passion, and unwavering commitment gave birth to iCAN and created a world-class platform where innovation transcends borders and inventors are recognized, encouraged, and empowered. **I believe our greatest inventions are those that elevate humanity through science, compassion, and purpose.**

Together we are building a future where collaboration outweighs competition, where innovation serves humanity, and where the impossible simply becomes tomorrow's breakthrough. Congratulations to the entire iCAN family, and may your inspiring legacy continue to illuminate the path for generations of inventors to come and above all ***because, we can.***

DR. CATHERINE DEMETRIADES "CATATRIX"
Founder & CEO
CXAI Technology, Cyprus

PROF. AUREL MIHAIL TITU / iCAN Jury & Committee Member



As a university professor and PhD supervisor, **as an inventor and European expert in Intellectual Property at European Patent Office,** it is a great honour to participate and collaborate with great inventors from all over the world.

Thank you for inviting me to be part of the International Jury of iCAN 2026. I would like to congratulate the organizers on the successful making of the 11th edition. **Behind this event there is a lot of hard work and sleepless nights.** There is a special person that has a key role in the making of this event, Mr. Moonsuk Chang & his team of professionals who managed this great event. Kind thoughts go to the heads of delegations worldwide and those who lead the organizations of Intellectual Property Protection. I thank all of them for the unique collaboration and for the support they have offered me in my professional training **in the field of Intellectual Property at the International level in the last 33 years.** Congratulations to all participants for the inventions presented at iCAN 2026.

PROF. DR. AUREL MIHAIL TITU
Professor / **"Lucian Blaga" University of Sibiu, Romania**
President / **Romanian Association for Alternative Technologies (A.R.T.A.) Sibiu**

ABDALBASIT ADAM ABDALLA / iCAN Committee Member & TISIAS Partner



Warmest greetings to all distinguished participants and international delegations of the **11th International Invention Innovation Competition in Canada, iCAN 2026.**

I first discovered iCAN during its second edition in 2017, and the experience in Toronto left a lasting impression on me. Since then, I have watched this remarkable event grow into a truly global platform where visionary minds connect, bold ideas gain recognition, and future possibilities take shape. **As a long-standing friend of Moonsuk Chang and the iCAN Team, I am delighted to witness this exciting new chapter in their journey.** I extend my heartfelt congratulations and best wishes to everyone joining iCAN 2026 from around the world. ***"May this year's edition inspire new discoveries, meaningful partnerships, and innovations that lead humanity toward a brighter future."***

ABDALBASIT ADAM ABDALLA
Founder & CEO
Vasi Oli Trading & Investment Ltd., Uganda

DR. YIN HOR / Delegation Co-Representative of Cambodia



My name is Dr. Yin Hor, Head of the Civil Engineering Department at Norton University. It is my great honor to extend our sincere congratulations to the Toronto International Society of Innovation & Advanced Skills (TISIAS) on the celebration of the **11th annual iCAN 2026.**

This is the first time that our Civil Engineering Department has participated in iCAN. Although several of my colleagues have been involved with this prestigious competition for nearly a decade, this year marks a significant milestone for our department. We are truly delighted to become part of this outstanding international platform for innovation. **We believe that iCAN provides an excellent opportunity to strengthen international collaboration, exchange innovative ideas, and showcase the creativity and technical capabilities of students as well as researchers, and innovators from around the world.**

Once again, congratulations to the organizing committee for hosting this remarkable event and for your continued dedication **over the past ten years to promoting innovation and invention worldwide!**

DR. YIN HOR
Head of the Civil Engineering Department
Norton University, Cambodia

GENERAL INFORMATION

TITLE OF EVENT

The 11th International Invention Innovation Competition in Canada, iCAN 2026

MAIN DATE(S)

iCAN 2026 ***"The Preliminaries"*** (January 15 – July 15)
iCAN 2026 ***"The Finals"*** (August 30)

ORGANIZED & BROUGHT TO YOU BY

Toronto International Society of Innovation & Advanced Skills (TISIAS) & INVENTOR SOUND®

SUPPORTED BY

Innovation Initiative Co-operative Inc. "The Inventors Circle"
International Federation of Inventors' Associations (IFIA)
World Invention Intellectual Property Associations (WIIPA)

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American Society of Inventors (ASI) – Philadelphia, USA
American Society of Sciences and Arts Convergence (ASSAC) – USA
Angolan Association of Inventors and Innovators (A@ii)
Arabian Invention and Innovation Company (AIIC)
Association for the Promotion of Polish Science, Technology and Innovation (SPPNTI)
Association of Congolese Inventors and Innovators (@Cii)
Association of Polish Inventors and Rationalizers (SPWiR)
Association of Thai Innovation and Invention Promotion (ATIP)
Belgrade Association of Inventors – Serbia
Brazilian Science and Vocational Education Fair (FECEP) / CEEP Pedro Ribeiro Pessoa Science Fair
Bright Inventors Association – France
CORNELIUGROUP Research-Innovation Association & INVENCOR Academy – Deva, Romania
Corporación de Inventores e Innovacion Tecnológica de Chile (CIIT)
Croatian Inventors Network (HSI) / Zagreb Inventors Association
CXAI Technologies – Cyprus
Education University of Hong Kong (EDUHK)
Ellison Institute of Technology (EIT) – United Kingdom
EUROBUSINESS & Haller Pro Inventio Foundation – Poland
Europe France Inventeurs (E.F.I.)
First Institute of Canadian Inventors (FICI)
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German Invention Association (KIT-DEV) / IFIA STEM
Giorgi Mikiashvili's Inventive Methodology (GM-IAM™) – Spain
Global Science Journey (GSJ) – Vietnam
Greek Innovation Forum
Highly Innovative Unique Foundation (HIUF)
Hong Kong Dream Technology and Innovation Society (HKDTIS)
HOW Creative – USA
Indonesian Invention and Innovation Promotion Association (INNOPA)
Innovative Business Solutions (IBS Global) – Poland
Innovative Minds Malaysia Association (IMMA)
Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOPI)
International American University (IAU) – USA
International Invention & Design Leader Awards (IIDLA) – Korea
INVENTARIUM SCIENCE – SRD Security, Research & Development – Portugal
InventIBERIA – Spain
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Inventors College Organization (ICO) – Canada
Inventors' Association of Bosnia and Herzegovina (AIBIH)
Korea Invention News (KINEWS) & Korea Invention Academy (KiA)
Korea University Invention Association (KUIA)
Latin America Society for Science and Technology (SOLACYT)
Lebanese Innovators Society (L.I.S.)
Liwa University, United Arab Emirates & Suez Canal University, Egypt
Lodz University of Technology – Poland
Lucian Blaga University of Sibiu – Romania
M24 Labs GmbH – Germany
Macao Innovation and Invention Association (MIIA)
Macedonian Association ,,Doza srekja,, / National Association of Inventors of Macedonia (NAIM)
Manila Young Inventors Association (MYIA) – Philippines
Maple AI Innovation Foundation – Canada
National Association for Science and Research (NASR) – Lebanon
Norton University – Cambodia
Nova Vista Education Inc. – Waterloo, Canada
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Organization for Creativity, Innovation and Invention Promotion (OCIIP) – Nigeria
Ötlet Club 13 Egyesület (Idea Club 13 Association) – Hungary

Patent Invention Magazine – Italy
Qatar University (QU)
Romanian Association for Alternative Technologies Sibiu (A.R.T.A. - SIBIU)
Romanian Inventors Forum (FIR)
Satit Chula Innovation Society (SCIS) – Thailand
Shun Tak Fraternal Association Yung Yau College (S.T.F.A.) – Hong Kong, China
Siava, Ideas Accelerated – Canada
Sri Lanka Inventors Commission (SLIC)
Stockholm Innovators Association (STIK) – Sweden
Taiwan Invention Products Promotion Association (TIPPA)
Technofest Institute of Technology (TITU) – Belgium
Tunisian Association for the Future of Sciences and Technology (ATAST)
Turkish Inventors Association (TÜMMİAD)
Uncle Bugs Inventor Academy & ViTrox Academy – Malaysia
Union of Arabian Academics (TUOAA) – Yemen
United Inventors Association (UIA) – U.S.A.
Universiti Sains Malaysia (USM)
University of Ioannina – Greece
University POLITEHNICA of Bucharest – Romania
VASLI OLI Trading & Investment Ltd. – Uganda
World Genius Convention (WGC) / International Invention and Innovation Institute (IIII)
World Women Inventors & Entrepreneurs Association (WWIEA)

INTERNATIONAL JURY COMMITTEE

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Mirko Mitić Beograd Belgrade Association of Inventors, Serbia	**Mithona Luy** Norton University, Cambodia
Babak Khodaparast The First Institute of Canadian Inventors (FICI)	**Dragan Jovanov** National Association for Inventors of Macedonia (NAIM)
Victoria Ramzy Habib Attia Invention Education Specialist	**Wagdy Rizk Ghali Rizk** Invention Education Specialist

ABOUT iCAN 2026 "THE 11TH ANNUAL EDITION"

International Invention Innovation Competition in Canada (iCAN) is Canada's premier, globally recognized event for inventors, demonstrating remarkable growth and advancement since its inaugural edition in 2016. Over the past decade, iCAN has welcomed participants from **98 countries and regions across North, Central, and South Americas, Asia, Europe, Africa, the Middle East, and Oceania.**

This extensive international presence has elevated and redefined iCAN as a true global stage for uniting creativity and innovation from around the world in Toronto, Canada. **As we move onto the next decade of our event, we continuously welcome you all to the refined version of iCAN 2026 "*The 11th Annual Edition*": *A Decade Later and Stronger than Ever*!**

The 11th International Invention Innovation Competition in Canada, iCAN 2026 will be held online, and we are honored to once again invite you to participate. This is your opportunity to present your exceptional ideas, create meaningful impact, and gain recognition for outstanding creativity and innovation at the heart of Canada's vibrant multicultural community. iCAN offers a dynamic platform featuring multiple programs, including the **invention competition, keynote presentations, The Finals Movie, and the iCAN Awards.** Inventors, innovators, students, professors, researchers, scientists, designers, entrepreneurs, and all individuals with remarkable ideas are welcome to apply for iCAN 2026, take part in all program activities, and enjoy the full range of participant benefits.

THE PRELIMINARIES

iCAN 2026 ***"The Preliminaries"*** was held open for a 6-month period from January 15 – July 15 where applicants registered to the competition by submitting their application forms by email. The Preliminaries served as the selection process for **Gold, Silver and Bronze Medal Award** Winners based on the jury's screen evaluation of the text/visual contents that the applicants have provided in their application forms to express their projects. Following the initial evaluation in the Preliminaries, the applicants proceeded to the optional Finals to further articulate their ideas through creative video presentations.

THE FINALS

iCAN 2026 ***"The Finals"*** is the advanced phase of the Preliminaries as the final stage of the competition where the Finalists are required to present their projects' video presentations for the jury & organizing committee members' assessment for the opportunity to win the **iCAN 2026 "The Finals" Awards**.

The Finals is a privileged stage that is exclusively offered for those who have passed the competition Preliminaries stage of the event. All Finalists who decide to proceed to the Finals can enjoy the benefits of the programs offered below. This year's **iCAN 2026 "The Finals" will be progressed virtually by through content uploads of the following items online on August 29th** on iCAN Finals webpage:

iCAN 2026 "THE FINALS" ONLINE PROGRAMS **August 29th @ 10:00AM (EST) – Toronto, Canada on www.tisias.org/ican-finals2026**	
CONTENT UPLOAD I	**iCAN 2026 "The Finals" Award Winners Announcement**
CONTENT UPLOAD II	**iCAN 2026 Keynote Speakers' Presentations (2):** **Howard Lim** *(HOW Creative)* **& Mike McFarthing** *(The Inventors Circle)*
CONTENT UPLOAD III	**iCAN 2026 "The Finals" Movie Showcase**
CONTENT UPLOAD IV	**iCAN 2026 Official Catalogue Online**

THE AWARDS

*** iCAN 2026 "The 11th Annual Edition" Awards Program & Nomination Categories ***

iCAN 2026 *"The Finals"*		
THE GRAND PRIZE	**THE SEMI-GRAND PRIZE**	
TOP 10 BEST INVENTION AWARDS	**TOP 20 BEST INVENTION AWARDS**	
BEST YOUNG INVENTOR AWARDS	**BEST WOMAN INVENTOR AWARDS**	
BEST INVENTION VIDEO AWARDS	**BEST INVENTION DESIGN AWARDS**	
ORGANIZER'S CHOICE AWARDS	**JURY'S CHOICE AWARDS**	
CANADIAN SPECIAL AWARDS	**INTERNATIONAL SPECIAL AWARDS**	
ACHIEVEMENT AWARDS	**iCAN SPECIAL AWARDS**	**EXCELLENCE AWARDS**
iCAN 2026 *"The Preliminaries"*		
GOLD MEDAL AWARDS	**SILVER MEDAL AWARDS**	**BRONZE MEDAL AWARDS**


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COMPETITION IN CANADA
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www.tisias.org
iCAN 2016
2016 International Invention Innovation Competition in Canada
North York Memorial Community Hall - Toronto
Preliminary Registration Period
JANUARY 15 - JUNE 15
Final Round and Award Ceremony
AUGUST 27
FOR MORE INFORMATION www.tisias.org | icanstisias.org
Organized by Toronto International Society of Innovation & Advanced Skills (TISIAS)
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World Invention Intellectual Property Associations (WIIPA)


THE 2ND ANNUAL iCAN 2017
2017 INTERNATIONAL
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COMPETITION IN CANADA
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EXHIBITION - SEMINAR - AWARDS
AUGUST 26
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THE 3RD ANNUAL iCAN 2018
2018 INTERNATIONAL
INVENTION INNOVATION
COMPETITION IN CANADA
EXHIBITION · SEMINAR · AWARD CEREMONY
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North York Memorial Community Hall - Toronto, Canada
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SEPTEMBER 1
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PRELIMINARIES REGISTRATION PERIOD
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EXHIBITION - SEMINAR - AWARDS
AUGUST 24
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THE 5TH ANNUAL iCAN 2020
2020 INTERNATIONAL
INVENTION INNOVATION
COMPETITION IN CANADA
EXHIBITION · SEMINAR · AWARD CEREMONY
iCAN-TORONTO, CANADA
NORTH YORK MEMORIAL COMMUNITY HALL - TORONTO, CANADA
Because We Can
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AUGUST 29
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THE 6TH ANNUAL iCAN 2021
2021 INTERNATIONAL
INVENTION INNOVATION
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THE PREMIER EVENT OF CANADA FOR WORLDWIDE INVENTORS
iCAN-TORONTO, CANADA
SPECIAL ONLINE EDITION - TORONTO, CANADA
Because We Can
PRELIMINARIES REGISTRATION PERIOD
JANUARY 15 - JUNE 15
THE FINALS PROGRAM & AWARDS
AUGUST 28
THE 4TH EDITION
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THE 7TH ANNUAL iCAN 2022
2022 INTERNATIONAL
INVENTION INNOVATION
COMPETITION IN CANADA
THE PREMIER EVENT OF CANADA FOR WORLDWIDE INVENTORS
iCAN-TORONTO, CANADA
SPECIAL ONLINE EDITION - TORONTO, CANADA
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THE FINALS PROGRAM AND AWARDS
AUGUST 27
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2023 INTERNATIONAL
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COMPETITION IN CANADA
THE PREMIER EVENT OF CANADA FOR WORLDWIDE INVENTORS
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AUGUST 26
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THE 9TH ANNUAL iCAN 2024
2024 INTERNATIONAL
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COMPETITION IN CANADA
THE PREMIER EVENT OF CANADA FOR WORLDWIDE INVENTORS
iCAN-TORONTO, CANADA
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AUGUST 24
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2025 INTERNATIONAL
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COMPETITION IN CANADA
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THE 11TH ANNUAL iCAN 2026
2026 INTERNATIONAL
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COMPETITION IN Canada
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SPECIAL ONLINE EDITION - TORONTO, CANADA
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2016 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2017 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2018 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2019 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2020 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2021 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
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2023 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2024 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
2025 INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA
THE 11TH ANNUAL iCAN 2026
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International Invention Innovation Competition in Canada
iCAN-TORONTO,CANADA

11 Anniversary

THE 11TH INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA

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WORLD GENIUS CONVENTION

WWICA

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INNOVATION WITHOUT BORDERS

International Invention Innovation Competition in Canada
iCAN - TORONTO, CANADA

11 Anniversary

THE 11TH INTERNATIONAL INVENTION INNOVATION COMPETITION IN CANADA

iCAN 2026

PARTICIPATING COUNTRIES & REGIONS

55 COUNTRIES & REGIONS

AFGHANISTAN	ALGERIA	BANGLADESH	BELGIUM	BRAZIL
CAMBODIA	CANADA	CHINA	CYPRUS	ECUADOR
EGYPT	ESTONIA	FINLAND	FRANCE	GEORGIA
GREECE	HONG KONG, CHINA	HUNGARY	INDONESIA	IRAN
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KUWAIT	LEBANON	MACAU, CHINA	MACEDONIA	MALAYSIA
MEXICO	MONGOLIA	OMAN	PERU	PHILIPPINES
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UNITED KINGDOM	UNITED STATES OF AMERICA	UZBEKISTAN	VIETNAM	ZAMBIA

TORONTO · CANADA

INNOVATION WITHOUT BORDERS

International Invention Innovation Competition in Canada
iCAN-TORONTO, CANADA

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AFGHANISTAN

AF-01 **NAME(S): Reza Ebrahimi**
ORGANIZATION: N/A
TITLE **Smart Photonic Beam Steering System Based on Plasmonic Nanoantennas with Thermal Waveguide Control**
This invention presents a novel approach for optical beam steering and control in advanced photonic systems, based on plasmonic nanoantennas and thermally tunable waveguides. Addressing the limitations of conventional methods such as optical phased arrays and mechanical steering systems— including high losses, significant power consumption, and slow response times— the proposed structure enables precise phase and beam direction control without the need for mechanical components. By leveraging plasmonic interactions and thermally induced refractive index modulation, the system achieves high angular resolution, reduced energy loss, and faster dynamic response. The proposed technology is suitable for applications such as LiDAR, optical communications, and advanced imaging, and can serve as an efficient alternative for next-generation beam steering systems.

ALGERIA

DZ-01 **NAME(S): Rahmani Hocine (main inventor) / Rahmani Ahmed (co-inventor)**
ORGANIZATION: Badji Mokhtar Annaba University / Freelance
TITLE **Respiratory Protection Masks Testing Chamber Unit**
It is a low-cost, modular test chamber for PPE (masks and respirators) that measures filtration efficiency and then directing the penetrated dust through a mask into a second compartment where it is collected on a pre-weighed filter; an electronic dust sensor in the first compartment measures the initial dust concentration, and the filter is then re-weighed to determine how much dust passed through the mask. This design includes electronic sensing and filter outlet weighting, improving the design's credibility, traceability, calibration, and can be used as a low-cost prescreening tool or as an official testing device when certified to standards.

BANGLADESH

BD-01 **NAME(S): NASIF YOUNUS**
ORGANIZATION: MANARAT DHAKA INTERNATIONAL SCHOOL & COLLEGE
TITLE **An Open-Source, Edge-AI Wearable Platform for Real-Time Sign Language Translation**
Communication barriers profoundly isolate the non-verbal and speech-impaired community, particularly in environments lacking digital infrastructure. Current assistive technologies are either prohibitively expensive, ergonomically restrictive (such as sensor-laden gloves), or cloud-dependent. This project presents a completely self-contained, wearable, and non-contact Edge-AI device designed to bridge this gap. Utilizing a Raspberry Pi 5 coupled with an ultra-lightweight MediaPipe computer vision pipeline, the device performs real-time hand-tracking and gesture translation completely localized on the edge—requiring zero internet connectivity. Enclosed in a custom, ergonomic 3D-printed chassis that attaches to a standard shirt pocket, the device outputs instant text/visual translations to an integrated 3.5-inch TFT display. Validated by sweeping multiple national engineering competitions and receiving official national government recognition, this device serves as an open-source, modular hardware platform capable of running any Python-based sign language model, offering an affordable, scalable, and dignified solution to global accessibility.

BELGIUM

BE-01 **NAME(S): Dr.Mehrdad fojlaley / Dr Alireza Afzali / Alireza Jafari Alireza chaei / Haleh Hamidpour**
ORGANIZATION: Technofest Institute of Technology
TITLE **Non-Destructive Detection System for Reinforcement Bars Inside Concrete Using Electromagnetic Induction**
This invention relates to a non-destructive testing (NDT) system designed to detect and estimate the amount of reinforcing steel bars (rebars) embedded inside concrete structures by using electromagnetic waves and magnetic induction principles. The system operates based on the fact that steel reinforcement inside concrete behaves similarly to the iron core of a transformer. The device consists of two specially designed coils: a primary coil and a secondary coil. During operation, the primary coil is positioned on one side of the concrete structure while the secondary coil is placed on the opposite side. When an electromagnetic signal is applied to the primary coil, the magnetic field passes through the concrete and interacts with the steel reinforcement inside. The embedded rebars act as a magnetic core, affecting the transfer of magnetic flux and induced voltage between the coils. By analyzing the voltage transfer and electromagnetic response received by the secondary coil, the system can determine the presence, quantity, and density of reinforcing steel within the concrete.

BRAZIL

BR-01 **NAME(S): Cauan Eduardo Rodrigues Rabelo / Letícia Mattos Santana /**
Prof. Deivison Trindade dos Santos (Advisor) / Juliana Bacelar Souza Estrela (Co-Advisor)
ORGANIZATION: Pedro Ribeiro Pessoa State Center for Professional Education in Control and Management of the Northeast of Bahia (CEEP Pedro Ribeiro Pessoa), Bahia, Brazil
TITLE **R&S 360 – Intelligent Competency-Based Recruitment**
R&S 360 is an innovative platform that leverages Artificial Intelligence, gamification, and competency-based assessment to modernize recruitment and hiring processes. The system integrates technical and soft skills evaluations, AI-powered avatar interviews, and automated candidate-job matching, making talent acquisition faster, fairer, more efficient, and more inclusive for both companies and job seekers.

CAMBODIA

KH-01 **NAME(S): Savat CHHAN / Sovanmonynuth HENG**
ORGANIZATION: Norton University – Phnom Penh, Cambodia
TITLE **Knowly**
Knowly is an AI-powered conversational knowledge platform designed to transform fragmented enterprise documents into an interactive, trustworthy intelligence engine. Built with Retrieval-Augmented Generation (RAG), dynamic text chunking, and cross-encoder re-ranking, Knowly ingests multi-format files and web URLs to provide instant, precise answers with verified inline citations. By grounding responses directly in private organizational data, Knowly eliminates AI hallucinations, enforces role-based access control, and ensures enterprise privacy. The system streamlines institutional knowledge sharing, significantly reduces search time, and boosts workforce productivity.

KH-02 **NAME(S): Sokun DEVID / Chansreynich HOUT / Sovanmonynuth HENG**
ORGANIZATION: Norton University – Phnom Penh, Cambodia
TITLE **Smart Attendance**
Smart Attendance is a web-based facial recognition system that helps schools and organizations record attendance quickly, securely, and without physical contact. Users look at the camera, and the system verifies their identity before recording check-in or check-out. It uses OpenCV, liveness detection, and anti-spoofing to prevent false attendance using photos or videos. The system also tracks late arrivals and absences, provides real-time monitoring, and generates accurate reports. It works across computers, tablets, and mobile devices, reducing manual errors, saving time, and improving attendance management.

KH-03 **NAME(S): Kin Koem / Chhorvoeurn Sat / Panhat Laun / Hiek Sreng**
ORGANIZATION: Norton University – Phnom Penh, Cambodia
TITLE **TIED-ARC TRUSS SYSTEM**
Truss is a structural framework built from a series of straight members connected at their ends to form a network of triangles. Types of truss includes the Pratt, Warren, Howe, and Fink trusses. Keys concepts of truss are triangular framework, loads are applied at the joints, members are carrying only tension or compression, and zero bending. In addition, the advantages are high strength to weight-ratio, long span, and structural efficiency.

CANADA

CA-01 **NAME(S): Shutang Zhang / Ken Cheng**
ORGANIZATION: Collingwood School & Mulgrave School
TITLE **A Novel Low-Cost Machine Learning Approach for Screening Aflatoxin Risk in Peanuts Using UV Fluorescence**
Aflatoxin contamination in peanuts caused by Aspergillus flavus poses serious food safety risks. Conventional methods such as HPLC, ELISA, and hyperspectral imaging are accurate but costly for rapid screening. We developed a low-cost portable prototype using UV fluorescence imaging and machine learning for aflatoxin risk assessment. The prototype and peanut models were fully 3D printed to reduce biological risks in youth research settings, while the control system used an Arduino circuit. Samples were imaged under 370 nm UV light using a smartphone camera and analysed with YOLO and machine learning models, achieving 75% classification accuracy for highly contaminated peanuts.

CA-02 **NAME(S): Aaron Bai**
ORGANIZATION: St. George's School
TITLE **GOGreen: A Novel Biodegradable GO-PLA Composite As A Sustainable Alternative for Water Filtration**
Our innovation is a low-cost, reusable, and modular water purification system designed specifically for decentralized treatment contexts. We developed a biodegradable, 3D-printed PLA scaffold with immobilized graphene oxide that removes organic pollutants through surface adsorption and can be regenerated and reused multiple times. Initially inspired by the efficiency and shape of the human glomerulus, further generative design optimized internal flow to maximize surface contact while operating at low energy. Laboratory tests confirm reliable performance across repeated reuse, reducing material waste. Our innovation reimagines water filtration as ab environmentally friendly system rather than a consumable and harmful product.

CA-03 **NAME(S): Hajin Cho**
ORGANIZATION: The Hill School
TITLE **Youth-Focused Integrated Hockey Neck Protection System: A Compression-Shirt-Based Cervical Protection Device for Players Aged 8-18**
In January 2022, 16-year-old high school player Teddy Balkind died from an on-ice neck laceration. Following this and similar tragedies, USA Hockey and Hockey Canada mandated neck protection for approximately 1.1 million youth players. Yet existing youth products are scaled-down adult designs with poor compliance — one study found 27% of injured youth weren't wearing one. This invention is the first youth-specific compression-shirt-integrated cervical protection system. It redistributes impact across a 12-fold expanded contact area (40 to 500 cm^2), reducing peak pressure by ~91.8%, while enabling 8-second self-donning and achieving ANSI A9 cut resistance.

CA-04 **NAME(S): Seyed Mohammad Hosseini Tafreshi Hosseini**
ORGANIZATION: New Vision University (Georgia) / NeuroSync8 Project (Canada)
TITLE **NeuroSync8: Multimodal Non-Invasive Neurostimulation System for Brainstem-Thalamocortical Modulation**
NeuroSync8 is a non-invasive multimodal neurostimulation concept designed to support arousal, attention, and brainstem-thalamocortical modulation through synchronized vibration, light, and sound stimuli. The system is envisioned as a wearable research prototype with EEG-based feedback to personalize stimulation patterns and monitor neurophysiological responses. It aims to provide a low-cost, accessible platform for studying sensory neuromodulation and potential future applications in fatigue, attention regulation, rehabilitation, and neurological education.

CA-05 **NAME(S): Prof. Daniel T.L. Shek (Project Leader) / Assoc. Prof. Dr. Peng Liu (Project Leader) / Prof. Hasan Hariri (Project Leader) / Assoc. Prof. Dr. Lei Mee Thien (Project Leader) / Richelle Gerong / Alif Luthvi Azizah / Diah Ayu Sucitra / Joko Triyantoro**
ORGANIZATION: Hong Kong Polytechnic University / University of Manitoba / Universitas Lampung / Universiti Sains Malaysia / University of Science and Technology of Southern Philippines
TITLE **Gamifying Local Wisdom for Youth Behavioral Competency: *Piil Pesenggiri-Pancasila Values***
"Gamifying Local Wisdom for Youth Behavioral Competencies" is an innovative and self-paced HTML learning module for Indonesian 8th graders under the Positive Adolescent Training through Holistic Social Programs (P.A.T.H.S.) curriculum. It integrates local *Piil Pesenggiri-Pancasila Values* to transform passive behavioral competence into active moral rehearsal. This module utilizes a four-phase progressive pedagogy, including the H5P branching narratives. It provides high-engagement mastery. Students experience consequences of personal choices, while teachers gain pressure-free diagnostic insights, establishing a symbiotic learning ecosystem. Highly scalable and offline-capable, this platform-agnostic framework ensures equitable urban-rural access and serves as a sustainable nationwide reference for interactive digital education.

CA-06 **NAME(S): Kenneth Brown**
ORGANIZATION: LaserSeed Inc.
TITLE **BarNone Window Guard**
Many window-security products available protect closed windows, but do not effectively secure an open window for ventilation or safeguard from falling incidents and break-ins. Our innovative product – BarNone – protects open windows, and balcony/ patio doors. Patented designs limit the opening to 10 cm (4") with a rigid telescoping bar that is secure, tamper-resistant, and quick release.

CA-07 **NAME(S): Mohadeseh Zamani Khorasgani / Dr. Ali Kalateh (Aliasghar Kalateharabi)**
ORGANIZATION: Mazdak Atlantic AgriAqua Inc., University of New Brunswick (UNB)
TITLE **Nano Chelated Iron Fertilizer: Innovative process and innovative product**
Mazdak Atlantic AgriAqua Inc. presents a nano chelated iron fertilizer produced via a proprietary microwave-UV-assisted chelation process that cuts the main reaction time from hours to approximately 20 minutes, significantly lowering energy use, cost, and CO_2 emissions. This product directly addresses iron chlorosis, the primary challenge for farmers. The nano-scale chelate, confirmed by DLS analysis, improves uptake, boosts yield and quality. Field trials on pomegranate, olive, sweet corn, hybrid rose, and additional crops confirmed strong agronomic results. This technology delivers affordable, eco-friendly micronutrients for sustainable agriculture in Canada and globally.

CHINA

CN-01 **NAME(S): Zheng Jiaying**
ORGANIZATION: The University of Manchester / Nanyang Technological University
TITLE **A Method for Analyzing Key Functional Regions of Proteins Based on Electronic Interaction Characteristics**
This invention belongs to the interdisciplinary field of computational biology and structural biology. Proposed by a master's student from Nanyang Technological University, Singapore, this project introduces a novel method for analyzing key functional regions of proteins based on electronic interaction characteristics. The approach aims to overcome the limitations of conventional protein function studies, which mainly rely on amino acid sequences and spatial conformations while providing limited understanding of molecular-level electronic interactions.

CN-02 **NAME(S): GUO Junwen / GUO Junqi / GUO Junyao**
ORGANIZATION: Suzhou Zigang Jewelry Co., Ltd.
TITLE **A Zigang Cutting Plan Suitable for Colored Diamonds (Including Lab-Grown Diamonds)**
This invention proposes a Zigang cutting plan for colored diamonds, including lab-grown colored diamonds. Conventional round brilliant cuts are optimized mainly for colorless diamonds; their strong refraction and high material loss can dilute the visible color of colored diamonds and reduce yield. The proposed plan broadens the table facet, allows adjustable crown and pavilion facet heights, and adopts a pavilion structure of three or more layers so that the middle pavilion section can bulge outward. By changing the internal light path, the design helps preserve and enhance color saturation while reducing rough material loss. It is especially suitable for flat CVD lab-grown diamond rough and colored lab-grown rough, supporting higher gem value, more flexible cutting, and more environmentally friendly use of diamond materials.

CN-03 **NAME(S): Chen Sizong / Chen Liangzhuo / Ying Tianquan / Wang Naiji / Chen Zhongchun**
ORGANIZATION: Quanzhou Weidun Electric Co., Ltd.
TITLE **A high-pressure cleaning machine**
This invention belongs to the field of high-pressure cleaning equipment technology and was developed by Quanzhou Bingde Electromechanical Equipment Co., Ltd. and its research team. The patent number is ZL 201810860202.1. In response to the existing problems with high-pressure cleaning machines, such as the need to stop the machine to add water, which results in low operational efficiency, and the risk of pipeline rupture due to the pump group continuing to pressurize after the nozzle is shut off, this invention has innovatively designed a highly intelligent and safe high-pressure cleaning machine.

CN-04 **NAME(S): Wu Jianchu / Wu Zhiliang / Wu Zhixuan / Wu Jianjun / Ye Liuxuan**
ORGANIZATION: Hong'an (Fujian) Machinery Co., Ltd.
TITLE **A molding process and apparatus for carbon fiber plate bodies**
This invention belongs to the field of carbon fiber material forming and processing technology. It was developed by Hong'An (Fujian) Machinery Co., Ltd. and its research team, and the patent number is ZL 202511369238.6. In response to the industry challenges of the existing difficulties in disassembling the integrated structure of carbon fiber thermal pressing molds, the need for replacing damaged parts as a whole, high maintenance costs, low cooling efficiency, and difficulties in clearing excess material, this invention innovatively proposes a modular, high-efficiency carbon fiber plate body forming process and associated equipment.

CN-05 **NAME(S): Chen Sizong / Chen Liangzhuo / Ying Tianquan / Wang Naiji / Chen Zhongchun**
ORGANIZATION: Quanzhou Bingde Mechanical And Electrical Equipment Co.,Ltd
TITLE **A trolley-mounted high-pressure washer**
This invention belongs to the field of high-pressure cleaning machines and innovatively designs a cart-style high-pressure cleaning machine structure, effectively addressing industry pain points such as the inconvenience of moving traditional high-pressure cleaning machines, their limited functionality, and the difficulty of cleaning the roof. Key features and innovations: 1. Integrated mobile water delivery platform: Through the integrated design of a connection frame and a mobile water delivery and cleaning component, the cleaning machine is upgraded to a mobile operation platform, significantly enhancing maneuverability and operational radius. This component combines water storage and positioning functions, allowing water to be steadily stored on the frame surface as an energy supply for cleaning the steel structure's surface. It is equipped with dual water outlets to enable efficient multi-angle spraying for cleaning. 2. Elevating auxiliary roof cleaning mechanism: An innovative setup of an elevating auxiliary roof cleaning component enables the movement of a standing support platform for vertical adjustment, significantly expanding the user's field of view, allowing operators to easily cover the top area of vehicles, thereby effectively resolving the technical challenges associated with traditional cleaning machines' inability to reach the roof and their large cleaning blind spots.

CN-06 **NAME(S): Wang Weiqing**
ORGANIZATION: PLATO TECHNOLOGY (GROUP) CO., LTD.
TITLE **AVR Flexible Distributed Multi-Source Power Integration Control Technology**
The PlatoAVR series dynamic voltage regulator is an effective solution for voltage dips and swells. As a next-generation active high-speed networked compensation device utilizing the latest international technology, it represents an upgrade over traditional DVRs. It employs extremely rapid voltage correction to address voltage swells and dips in industrial production or office power supplies, ensuring uninterrupted operation of connected loads without power interruptions. AVR offers multi-tier solutions to address all temporary power dips/surges and interruptions in factories and equipment.

CN-07 **NAME(S): Jiang Changming / Xie Zhaozhan / Huang Tengzhao / Zhang Qinghua**
ORGANIZATION: Fujian Hengjin Technology Co., Ltd.
TITLE **An Automatic Production Process and Automatic Production Line for Shaft Heads**
This invention belongs to the technical field of intelligent manufacturing equipment, developed by Fujian Hengjin Technology Co., Ltd., with the patent number ZL 202110275725.1. It innovatively designs an automatic production process and production line for shaft heads, realizing the full-process intelligent manufacturing upgrading of shaft head parts, and effectively solving industrial problems of traditional shaft head processing such as high labor dependence, low production efficiency, unstable product quality and high defective rate.

CN-08 **NAME(S): GRACE CATHERINE XU**
ORGANIZATION: Bishop Louis Reicher Catholic High School, Waco, TX, USA
TITLE **An intelligent food freshness reminder device for household refrigerators**
This project has designed an intelligent food preservation reminder device suitable for household refrigerators. This product is installed inside the refrigerator and automatically manages the expiration dates of different foods by scanning or recording the storage time of the foods. It uses display screens, indicator lights or mobile phone alerts to remind users to consume the foods that are about to expire first, reducing waste caused by forgetfulness. At the same time, the system can categorize and manage foods based on their types, helping users quickly understand the refrigerator inventory and improving the efficiency of food management. When the expiration date of the food is detected, the system can also combine the existing foods to intelligently recommend corresponding recipes or cooking plans, helping users quickly consume the foods that are about to expire, further reducing food waste and improving the convenience of family diet. This project has a simple structure, is easy to install, and has a low cost. It can be adapted to existing household refrigerators and has strong practicality and promotion value.

CN-09 **NAME(S): Lihaonan / Huangankang / Chengmingzi / Zhoushaolong / Zhaoziyi**
ORGANIZATION: THE NEW DISTRICT SCHOOL OF NO.1 HIGH SCHOOL.PDS
TITLE **CarbonE Ledger — Campus Carbon Neutrality Energy Consumption Statistics System**
Under the national dual-carbon strategy, campuses are major urban energy consumers, making energy conservation and carbon reduction an essential demand for school operation. However, most campuses are currently facing three core pain points. Blind spots in energy data: Traditional electric meters only record monthly total power consumption, failing to track real-time energy usage of different floors, classrooms, or individual electrical devices. Schools cannot identify where electricity is actually consumed, resulting in ambiguous energy management. Disconnection between energy consumption and carbon accounting: Current carbon emission inventory relies on manual filling and statistics, lacking real-time linkage with actual power consumption data. This leads to delayed, inaccurate and inconsistent carbon ledgers. High renovation cost: Mature Building Management Systems (BMS) usually cost hundreds of thousands of RMB, which is unaffordable for primary and secondary schools as well as aging campus buildings. To solve the above problems, we propose CarbonE Ledger, an intelligent campus energy and carbon accounting system. This low-cost solution effectively breaks data barriers and realizes refined campus carbon and energy management.

CN-10 **NAME(S): Tao Hongxun / Peng Yu / Liang Ying / Wang Yuxiao / Wang Zixuan / Bao Yulong**
ORGANIZATION: Jiangsu University / Dalian University of Technology / Shandong Agricultural University
TITLE **Construction and Optimization of Multidimensional Coupled Analysis System for Medicinal and Edible Resources and Mechanism Analysis of Their Active Substances**
This project addresses the prevalent issue that research on chemical profiling and pharmacological mechanisms of medicinal and edible resources operates separately, leading to fragmented research data and ineffective interpretation of the correlation between bioactive ingredients and efficacy. Integrated technologies including chromatography-mass spectrometry, microfluidic in vitro screening, serum pharmacochemistry and network pharmacology are adopted to establish and optimize a multidimensional coupled analytical platform. The platform attains a trace detection limit of 0.02 μg/mL and enables simultaneous qualitative and quantitative analysis of over 80 characteristic active constituents in one test run. Supported by cellular verification and target pathway prediction models, high-throughput parallel testing for 30 batches of samples can be realized per round. The integrated system systematically clarifies molecular pathways and regulatory mechanisms of typical medicinal-edible active substances, breaking constraints of single research approaches. It delivers standardized technical support for quality control, rational development and scientific application of medicinal-edible homologous raw materials.

CN-11 **NAME(S): Ningqian Sun**
ORGANIZATION: Shenghua Zizhu Academy
TITLE **Design and Research of a Bionic Post-Disaster Rescue Robot Based on the Movement Patterns of Snakes**
In the search and rescue efforts during earthquake disasters, conventional manual search and rescue operations are not only time-consuming and labor-intensive, but also suffer from issues such as low accuracy, slow speed, and limited operational scope. Therefore, robots have long been introduced into search and rescue operations. Based on the information I have reviewed, I believe they still have various loopholes. Hence, I believe it is necessary to design a robot that can approach trapped individuals and provide protection. Considering the complex environment of earthquake disaster relief, robots can adopt a bionic snake-like movement. This limbless movement is more suitable for some narrow spaces, and the cylindrical structure of the snake body is also well-suited for installing functional components and storing items. Moreover, snake-like movement enables robots to be used in a wide range of scenarios, such as in water, trees, and swamps, where they can still achieve good results.

CN-12 **NAME(S): Xierongcheng / Songenbo / Zhangxinpeng / Wangyaozu / Fanxichen**
ORGANIZATION: THE NEW DISTRICT SCHOOL OF NO.1 HIGH SCHOOL.PDS
TITLE **Device for Preventing Exterior Wall Falling and High-altitude Objects**
In August 2024, a tragic incident occurred in a residential community in Kunming when exterior-cladding fragments fell from a height, fatally striking a food delivery rider. This prompted our team to develop this protective device. While the market offers fixed safety canopies, protective nets, and manual surveillance, these conventional measures often compromise aesthetics and, if left in place permanently, result in resource waste. There are also sunshades on the market, but they serve only to block sunlight and feature a flexible canopy that cannot reliably intercept high-speed falling debris. To address these limitations, we integrated infrared distance sensors, vibration modules, a vibration-detection module, servo motors, and a K10 microcontroller into our design. By predefining a danger zone, the infrared sensors detect when a pedestrian enters and transmit a signal to the controller. The controller then rapidly deploys the canopy via the servos; once the pedestrian leaves the zone, the canopy retracts, achieving an “open-when-present, close-when-gone” effect—conserving resources and avoiding unnecessary energy use. The vibration module simulates the tremors generated by hollowed-out or loose sections of exterior walls and facades, while the detection module precisely identifies such vibrations.

CN-13 **NAME(S): Xuchun Wang / Wei Li / Junming Chen / Xiangju Ye / Xuemei Zhang**
ORGANIZATION: Anhui Science and Technology University
TITLE **Efficient, green and environmental friendly extinguishing agent and preparation method thereof**
An efficient, green, and environmentally friendly fire extinguishing agent and its preparation method are disclosed. Sodium dihydrogen phosphate, ammonium bicarbonate, and a crushing aid are thoroughly ground and mixed; then white carbon black is added and thoroughly ground and mixed; finally, silicone oil is added, stirred while heating, and maintained at a constant temperature for a period of time, to obtain a white carbon black fire extinguishing agent coated with a silicone oil film. The fire extinguishing agent prepared by this method exhibits significantly improved comprehensive fire extinguishing performance, with excellent fire extinguishing effects. Its fire extinguishing efficiency is more than doubled compared to ordinary dry powder fire extinguishing agents, and its moisture resistance, anti-caking properties, resistance to reignition, and environmental friendliness are superior to other fire extinguishing agents currently on the market. It is a fire extinguishing agent that combines high fire extinguishing efficiency, wide applicability, environmental friendliness, and good economic benefits, and has a promising market environment and development prospects.

CN-14 **NAME(S): Yong Jiang / Junjie Cheng / Tianle Yang / Chaoyue Zhao / Chaoyue Zhao**
ORGANIZATION: Shanghai Nanhu Vocational &Technical College
TITLE **Electric Power Drive--Intelligent Battery Control System**
This project addresses the common industry pain points of slow charging, short driving range, and poor energy replenishment experience in China's electric two-wheeler travel sector. Targeting the existing market of 350 million electric two-wheelers nationwide, it focuses on serving core user groups including food delivery riders, intra-city delivery workers, and frequent short-distance commuters. We have independently developed an intelligent battery control system featuring "split-unit charging and combined discharge", creating a low-cost, highly compatible fast-charging solution that requires zero vehicle modification. This solution effectively solves the industry-wide problems of slow charging, long waiting time, and limited range for electric two-wheelers.

CN-15 **NAME(S): Su Binglong / Su Shuangquan / Su Yanhuan**
ORGANIZATION: GeoTegrity Ecopack (Xiamen) Co., Ltd
TITLE **GeoTegrity Ecopack (Xiamen) Co., Ltd;**
I. Advancedness and Novelty：This project is the first to introduce patented technologies for seamless cutting and pressure-free fastening. It employs built-in robotic transfer and thermal pressing drying processes, resulting in finished products directly from two stages, thereby revolutionizing the traditional cutting process. The raw materials are bamboo pulp, reed pulp, and other natural plant fibers. The process utilizes heating with 导热 oil and hydraulic molding technology featuring raised and recessed molds. The yield rate is 98.9%, and the product is heat-resistant, able to withstand sudden cold and heat, and is non-toxic and harmless. The entire process is integrated with digital control, achieving green production with zero wastewater, zero emissions, and zero solid waste

CN-16 **NAME(S): Panliang Gao / Dongdong Shi / Na Dong / Xinkai Cui / Qiming He**
ORGANIZATION: China Science Skyline Lightning Protection Co., Ltd.
TITLE **High-precision lightning location and thunderstorm warning system**
Current lightning positioning and early warning face critical bottlenecks: traditional technologies have kilometer-level errors, making it difficult to pinpoint strikes on specific targets, while existing networks provide only two-dimensional or fragmented data, lacking full three-dimensional channel imaging. Intra-cloud lightning electromagnetic signals can disrupt electronic equipment and compromise disaster investigation accuracy. Warning standards remain inconsistent, and electric-field instruments often generate false or missed alarms. To overcome these challenges, China Science Skyline Lightning Protection Co.,Ltd. developed the FALMA system, integrating AI, data, and services. It innovates positioning methods and 3D reconstruction, achieving hundred-meter-level accuracy—approximately 90% of return stroke errors are within 90 meters, with an average of 29 meters, 5–10 times better than operational networks. This fills the technical gap in 3D lightning channel imaging. The technology has secured over 10 invention patents, been incorporated into three national standards, and received seven international gold awards (2019–2026). Five papers (four SCI-indexed) have been published, and the system is widely applied in energy, heritage protection, and airports.

CN-17 **NAME(S): Yi Zhang / Xiangyu Zhang / Jiale Hou / Jie Xu / Ji Shi / Jiefa Ding**
ORGANIZATION: Southeast University
TITLE **IntelliScan: A Multifunctional Modular Robotic Platform for Intelligent Inspection and Maintenance of Marine Infrastructure**
IntelliScan is a multifunctional modular robotic platform designed for intelligent inspection and maintenance of marine infrastructure, including ports, wharves, offshore wind facilities, seawalls, marine platforms, and port roads. The system is built on a universal four-wheel-drive and four-wheel-steering chassis integrating LiDAR, GNSS/IMU navigation, environmental perception, edge computing, and remote communication. Through standardized mechanical, electrical, and data interfaces, the robot can rapidly switch between different task modules. The ground-penetrating radar module performs non-destructive detection of subsurface voids, debonding, and internal anomalies. The crack inspection and repair module uses a forward camera for damage triggering and a downward RGB-D camera for pixel-level crack segmentation, geometric measurement, and volume estimation. It can further generate repair bands, nozzle trajectories, and recommended repair-material quantities. Inspection results are linked with location, time, defect type, dimensions, volume, and maintenance status, forming traceable digital assets. The platform integrates inspection, quantification, decision support, and maintenance planning, improving operational efficiency while reducing manual workload and risks in complex marine environments.

CN-18 **NAME(S): Luping Xiang / Yue Wang / Kun Yang / Junshuai Sun / Yubo Peng**
ORGANIZATION: Nanjing University / China Telecom
TITLE **Intelligent Multimodal Underwater Semantic Communication System**
This invention addresses scenarios involving underwater surveillance, ocean exploration, and collaborative operations of UUV swarms by developing an intelligent multimodal underwater semantic communication system designed for complex underwater acoustic channels. Rather than seeking to transmit all raw bits in their entirety, the system extracts and transmits key semantic content from images, videos, sonar data, and location information based on mission requirements, prioritizing the reliable transmission of information regarding target areas, emergencies, and critical missions within the limited bandwidth of underwater acoustic channels.

CN-19 **NAME(S): Yuanyangkun / Guoshiyong / Wangyuheng / Lisiyu / Gaoxiling**
ORGANIZATION: NEW DISTRICT SCHOOL OF NO.1 HIGH SCHOOL.PDS
TITLE **LanShield · SmartBalance**
During a community volunteer activity, our team witnessed an elderly Parkinson's patient struggling severely with hand tremors while holding a water cup, causing water to spill everywhere. According to the nursing staff, many elderly people with hand tremors even avoid drinking water when going out for fear of spilling water, which greatly inconveniences their daily lives. Inspired by this scene, we decided to develop a dedicated water cup for people with hand tremor disorders. The cup can keep water stable without spilling despite hand shaking, enabling the elderly to drink independently and safely.

CN-20 **NAME(S): Juan Lin / Chun Chen / Wengui Zheng / Na Lin / Xinlong Chen**
ORGANIZATION: Quanzhou Huaguang Vocational College, Apparel & Footwear Carbon Footprint Research Institute
TITLE **Low-Carbon Manufacturing Process for Sports Shoes**
Low-Carbon Manufacturing Process for Sports Shoes is a low-carbon manufacturing technology system developed for the entire production workflow of sports shoes. Its core processes are carried out in two major directions: material formula innovation and process technology upgrading. By adopting the pioneering eco-friendly low-consumption mixed adhesive formula composed of water-based polyurethane and PU curing agent, in combination with the drying activation energy-saving technology based on precise infrared regulation, the total carbon emissions in the production phase are reduced at the source. Meanwhile, the long-standing industry pain points in traditional manufacturing, including high energy consumption, high pollution and unstable bonding, are resolved, so as to realize the dual promotion of environmental-friendly carbon reduction and product quality, and provide a fully implementable green manufacturing solution covering the entire industrial chain for the footwear manufacturing industry.

CN-21 **NAME(S): Xia Xiaodan / Wang Lei / Li Wenpeng / Wang Dong / Chen Haibo**
ORGANIZATION: Qingdao Haifa Environmental Protection Industry Holding Co., Ltd.
TITLE **Novel Intelligent Energy Storage Equipment**
Intelligent energy storage equipment is mainly applied to the industrial and commercial energy storage market. It supports energy management and dispatching for various types of power stations including microgrids, energy storage power stations, new energy power stations and charging stations. Combined with new energy power generation, it enables self-generation and self-consumption of electricity, saves energy and reduces carbon emissions, and facilitates the achievement of carbon peaking and carbon neutrality goals. During the energy storage systems, our company has achieved technological breakthroughs in all the above fields and developed core technologies with independent intellectual property rights. We have obtained an authorized invention patent titled Method and System for Balanced Regulation of Series-connected Energy Storage Systems Based on Temperature Data.By acquiring information on temperature performance variations of the energy storage system, the invention establishes the correlation between temperature and power of the series-connected energy storage system and realizes temperature prediction. Leveraging target power data of the series-connected energy storage system, its temperature performance influence model and temperature conduction model, the invention regulates the temperature of the series-connected energy storage system. This extends the service life of the entire energy storage system, and improves system efficiency and safety.

CN-22 **NAME(S): Zhou chucai**
ORGANIZATION: N/A
TITLE **Multifunctional Control System for High-Freedom Intelligent Temperature-Controlled Lamination Equipment**
This project proposes a multifunctional control system for a high-freedom intelligent temperature-controlled lamination device by integrating heating rods into upper and lower rollers, drive motors, temperature sensors, and a core microcontroller unit (MCU) equipped with a buzzer.Key innovations include: 1. Self-developed Key Logic and Program Algorithm: The system automatically recognizes any operational combination of the four functional keys—preheating, laminating, hot mounting, and cold mounting—based on the MCU and responds safely. This enhances equipment robustness while achieving greater operational freedom. 2. Innovative Over-Temperature Protection Mechanism: When the system detects that the motor is not operating, even if laminating or high-temperature settings are commanded, the heating temperature is maintained within a safe preheating range. This fundamentally prevents equipment dry-firing risks caused by operational errors. The device not only retains the stability of conventional lamination but also incorporates the flexibility of digital control, enabling full-process management from material handling to finished product output.

CN-23 **NAME(S): Yicheng Sun**
ORGANIZATION: Individual inventors
TITLE **MyDazzy AI-Buddy**
MyDazzy is an AI interactive product developed by our team, Ailingxin. Through extreme cost control (hardware cost under 15 USD), it achieves real-time AI voice interaction and image emotion feedback at a level close to human conversation. It integrates mainstream large models such as DeepSeek and ChatGPT, allowing users to customize the agent's personality, role, and voice to create a highly personalized AI companion experience. Equipped with a dual-microphone array, a 1.83-inch high- definition touchscreen, and 4G/WiFi dual-network support, MyDazzy can be used for emotional companionship, all-age education, life assistance, and smart home management, making AI accessible to every household.

CN-24 **NAME(S): Xia Xiaodan / Wang Lei / Li Wenpeng / Wang Dong / Chen Haibo**
ORGANIZATION: Qingdao Haifa Environmental Protection Industry Holding Co., Ltd.
TITLE **Novel Intelligent Energy Storage Equipment**
Intelligent energy storage equipment is mainly applied to the industrial and commercial energy storage market. It supports energy management and dispatching for various types of power stations including microgrids, energy storage power stations, new energy power stations and charging stations. Combined with new energy power generation, it enables self-generation and self-consumption of electricity, saves energy and reduces carbon emissions, and facilitates the achievement of carbon peaking and carbon neutrality goals. During the energy storage systems, our company has achieved technological breakthroughs in all the above fields and developed core technologies with independent intellectual property rights. We have obtained an authorized invention patent titled Method and System for Balanced Regulation of Series-connected Energy Storage Systems Based on Temperature Data.By acquiring information on temperature performance variations of the energy storage system, the invention establishes the correlation between temperature and power of the series-connected energy storage system and realizes temperature prediction. Leveraging target power data of the series-connected energy storage system, its temperature performance influence model and temperature conduction model, the invention regulates the temperature of the series-connected energy storage system. This extends the service life of the entire energy storage system, and improves system efficiency and safety.

CN-25 **NAME(S): WU Pei Shan / LEONG Chi Man / LUI Matthew Y. / WANG Xin Bo**
ORGANIZATION: Beijing Normal-Hong Kong Baptist University
TITLE **Novel Resource Recovery Technology for Regenerating Clogged Ultrafiltration Membrane via Insect-derived Microorganisms**
Textile and daily chemical industries are major sources of wastewater containing polyvinyl alcohol (PVA) microplastic pollutants. The global industrial wastewater ultrafiltration treatment market reaches USD 21.5 billion annually. Ultrafiltration membranes are the mainstream technology for intercepting PVA contaminants, yet PVA easily forms dense fouling layers, causing severe membrane clogging and continuous flux decline. Current industrial solutions rely solely on chemical cleaning or frequent membrane replacement, which leads to high operational costs, irreversible membrane damage, and fails to realize pollutant recycling. There is still a lack of low-cost and eco-friendly membrane regeneration technology in the industry. To solve these bottlenecks, this study proposes a novel resource recovery technology for clogged ultrafiltration membranes based on insect-derived microorganisms. The specific intestinal microbes secrete degrading enzymes to precisely degrade PVA pollutants without damaging membrane materials. Degraded products are reused as microbial carbon sources, realizing green membrane regeneration and pollutant resource utilization. This technology adapts to existing equipment and has outstanding industrial promotion value.

CN-26 **NAME(S): Xiaowu Pu / Ping Wang / Shaofeng Chai / Gaofeng Che / Lanmin Wang**
ORGANIZATION: Gansu Earthquake Agency (Lanzhou Institute of Seismology, China Earthquake Administration)
TITLE **Physical Simulation Equipment and Key Technologies for Multi-field Coupling Loess Landslides**
This project addresses the major national demand for landslide disaster prevention and control on the Loess Plateau, induced by multi field coupling of earthquakes, rainfall, and irrigation. To overcome three key technical bottlenecks in loess landslide physical simulation—namely, difficulty in undisturbed sampling, multi field coupling, and process quantification—we have, after over a decade of sustained research, originally developed a full chain physical simulation equipment and key technology system. This system integrates large scale undisturbed loess model sampling and preparation, refined modeling, high fidelity loading under multiple working conditions, and precise multi physical measurement and analysis.

CN-27 **NAME(S): Yu Peng / Hongxun Tao / Zixuan Wang / Ying Liang / Yingjie Wang**
ORGANIZATION: Dalian University of Technology / Jiangsu University
TITLE **Preparation of active components from Rhodiola plants and the development for application in ulcerative colitis**
This patent addresses the significant side effects of existing therapeutic drugs for inflammatory bowel disease (IBD) and the lack of mechanistic support for functional foods. It proposes the application of Rhodiola crenulata extract (RCE) in IBD functional foods. The preparation of RCE requires raw materials with a salidroside content of at least 0.8%, which are crushed to a 20-40 mesh size, extracted with 30%-50% ethanol using an ultrasonic method, and purified with AB-8 resin to obtain a powder with a flavonoid content of at least 15% and a salidroside content of at least 2.0%. It can be used to produce oral or topical IBD treatment drugs (0.3-0.6g per day for adults), or functional foods such as solid beverages (with an extract content of 5%-15%), suitable for IBD patients and high-risk groups. Experiments show that high-dose RCE reduces the DAI score of colitis mice by 62.3% and increases the abundance of Bifidobacterium by 2.1 times, exerting its effects through multiple pathways such as regulating the intestinal flora and bile acids. The patent protects the preparation, application, and products, which can complement the therapeutic deficiencies and promote the industrialization of food and medicine resources.

CN-28 **NAME(S): Yongchang Zhu / Danyang Zheng / Wenzhi Ling / Qian Ran / Yiyao Jiang**
ORGANIZATION: Guangdong Industry Polytechnic University
TITLE **Research and Application of Key Technologies for Amino Acid-Capped Polyetheramine Modified Silicone**
Silicones exhibit unique properties and are widely used in cosmetics, hair care, and hair styling products. This project innovatively introduces amino acid anchor groups with high keratin affinity at both ends of the molecule, which tightly bind to damaged hair cuticle keratin through strong hydrogen bonding, significantly enhancing active repair functions. The main chain is copolymerized with amino groups and polyethers: amino groups are evenly distributed along the polysiloxane main chain, exerting a synergistic effect of electrostatic adsorption and anchoring, promoting linear spreading of molecules, and imparting a smooth and silky feel through the twisted helix of the main chain; polyethers are hydrophilically modified to improve wettability and antistatic properties, maintain moisture balance, alleviate scalp dryness, and promote scalp health. In addition, the product is self-emulsifying, eliminating the need for surfactants, and does not break emulsion or agglomerate, fundamentally overcoming the defects of traditional amino silicones such as greasy feel and pore blockage.

CN-29 **NAME(S): Houxinyuan / Liuenze / Malinhan / Anruoxi / Lijiaxing**
ORGANIZATION: HE NEW DISTRICT SCHOOL OF NO.1 HIGH SCHOOL.PDS
TITLE **ShadowFun Intelligent Link — AI-powered Intangible Cultural Heritage Shadow Puppetry Interactive System**
Shadow puppetry is a precious intangible cultural heritage of China. However, after watching an on-site shadow puppetry performance at a rural market, we deeply perceived the bleak survival status of this traditional craft. Through communication with the elderly folk puppeteer, we found that shadow puppetry is extremely difficult to learn and inherit. Proficiency in basic puppet manipulation alone requires months of repeated practice, making it almost inaccessible for ordinary people. In addition, traditional shadow puppetry shows adopt a single performance mode with little audience interaction. Nowadays, fewer and fewer young people are willing to understand and learn this craft, which puts shadow puppetry at risk of gradual loss and extinction. Against this backdrop, our team participated in the Intelligent Manufacturing track of the Invention Convention China. We intend to innovate and upgrade traditional shadow puppetry by applying circuit design, mechanical structure and basic AI knowledge acquired in high school courses. Adhering to the principle of retaining the original artistic charm of shadow puppetry, we adopt intelligent mechanical modules to greatly lower the operation threshold, enabling students and ordinary people to experience and perform shadow puppetry easily, so as to pass on this valuable traditional craft.

CN-30 **NAME(S): Hu Ximeng, Chloe**
ORGANIZATION: Budapest British International School
TITLE **Smart Cat Care Station**
Smart Cat Care Station is an intelligent device for stray cat protection. Equipped with multi-sensor modules, it can identify individual cats, detect body weight and deliver customized food portions automatically. The whole feeding process is recorded to build a digital management archive. The system can recognize newly arrived stray cats and remind volunteers to carry out sterilization work to control cat populations humanely. It greatly reduces volunteers' daily work burden and realizes standardized, traceable and sustainable stray animal welfare management in communities.

CN-31 **NAME(S): Wan Ping / Chen Zongming / Lin Rongsheng / Liu Feng / Jiang Jinkun / Jia Dongxia**
ORGANIZATION: Quanzhou Weidun Electric Co., Ltd.
TITLE **Solar-powered online detection device and system for lightning strikes and leakage current in surge arresters**
This invention belongs to the field of power system lightning protection monitoring technology. It was developed by Quanzhou Weidun Electric Co., Ltd. and its research team, and its patent number is ZL 202511278826.9. The invention innovatively designs an online detection device and system for solar-powered lightning arrester strikes and leakage currents, effectively addressing industry pain points such as the reliance on manual power outage inspections for traditional lightning arrester testing, difficulties in obtaining power in the field, and lagging fault warnings.

CN-32 **NAME(S): Shengxian Sun / Shiyun Chen / Junjie Cheng**
ORGANIZATION: Shanghai Nanhu Vocational &Technical College
TITLE **Vehicle-mounted Anti-Drunk Driving Detection System**
This on-board anti-drunk driving system adopts face recognition, AI algorithms, high-precision sensors and infrared spectroscopy. It detects drivers' drinking status before vehicle startup to prevent drunk driving at the source. When drunk driving is detected, the system sends signals to the vehicle ECU to lock the ignition and disable vehicle startup, improving driving safety. The core detection module uses the MQ-3 breath alcohol sensor to measure alcohol concentration, together with OV5647 and IMX219 visual sensors to collect real-time driver facial status, blink frequency and fatigue information. It realizes dual detection of alcohol level and driver state, providing reliable data for system judgment. The data processing unit uses AI algorithms to analyze alcohol and facial data, accurately identifying drunk driving and fatigue driving. It provides reliable support for system early warning and vehicle control to ensure stable and accurate detection. The early warning and control module activates sound and light alarms once abnormal conditions are detected. If the alcohol concentration exceeds the standard, the system automatically cuts off the starting circuit and prohibits vehicle startup. This active intervention effectively avoids dangerous driving and ensures pre-start vehicle safety.

CN-33 **NAME(S): Jian Lin / Shuqi Lin / Xingqun Wu / Longxiang Luo / Weihong Chen**
ORGANIZATION: Quanzhou Huaguang Vocational College / Fujian Septwolves Industry Co., Ltd
TITLE **Vertical Carbon Footprint Model for Sports Wearables**
The Vertical Carbon Footprint Model for Sports Wearables is built on the Chinese invention patent "A Pair of Men's Sports Shorts with Health-care Function", which was granted on June 25, 2024. Its core feature is the development of a full-lifecycle digital carbon footprint accounting system specifically for the sports wearables category, addressing the pain point of poor adaptability of general carbon accounting tools in footwear and apparel sports scenarios. Centered on the BOM structure, production processes and supply chain links of sports wearables, the model integrates the exclusive material, process and logistics characteristics of the sports apparel industry, forming a full-process vertical solution from data collection to compliance report output.

CN-34 **NAME(S): Hanwen Zhang / Sirui Wang / Yuan Wu / Liping Qian / Zewei Jing**
ORGANIZATION: University of Macau / Sun Yat-Sen University
TITLE **Vision-Enabled and AI-Driven Personalized Contactless Radar System for Cardiac Health Monitoring**
This project presents a Vision-Enabled and AI-Driven Personalized Contactless Radar System for Cardiac Health Monitoring. By integrating visual perception, user profiles, and millimeter-wave radar, the system identifies the monitored individual and estimates or obtains information on body position, posture, motion state, age group, height, and body shape to construct a personalized health profile. These visual and individual features guide dynamic radar tracking of the chest region and support adaptive sensing and signal-processing parameter configuration under different physical and motion conditions. The AI module then separates respiratory and cardiac components from radar echoes, extracts radar cardiography signals, reconstructs electrocardiogram waveforms using a conditional diffusion model, and identifies potential arrhythmias through deep neural networks. By comparing real-time measurements with each user's historical physiological baseline, the system further supports personalized abnormality detection, risk assessment, and long-term health trend analysis. The proposed system provides a fully contactless, comfortable, and personalized monitoring solution for home healthcare, smart elderly care, rehabilitation monitoring, and remote medical services, particularly for users requiring continuous monitoring without wearable electrodes or body-attached sensors.

CN-35 **NAME(S): Yaoda Zhu / Shiqi Wang / Fangying Hua / Fangying Hua / Liheng Qi**
ORGANIZATION: Shanghai Nanhu Vocational & Technical College
TITLE **VisionDrive Precision — An Integrated Solution for Cleaning and Automated Calibration of Intelligent-Vehicle Surround-View Systems**
This invention targets the front, rear, left, and right fisheye cameras of intelligent-vehicle surround-view systems. It addresses three recurring engineering problems: image degradation caused by lens contamination, the time and site preparation required by conventional chessboard-based calibration, and insufficient geometric consistency in long-range areas. The proposed workflow closes the loop from input-quality assurance to natural-scene coarse calibration, cross-attention-based refinement, and dual verification.

CN-36 **NAME(S): Wangjingxuan / Liyuchen / Liumingcan / Yejiaze / Fanjunyu**
ORGANIZATION: THE NEW DISTRICT SCHOOL OF NO.1 HIGH SCHOOL.PDS
TITLE **Water Vein Sentinel – Full-domain Intelligent Monitoring and Early Warning System for Soil Erosion**
Soil erosion serves as an "invisible killer" threatening China's ecological security as well as people's lives and property. Taking the Loess Plateau as an example, around 100 million to 400 million tons of sediment are lost in this region annually, which easily triggers secondary geological disasters such as landslides and mudslides. At present, most mainstream detection devices on the market are limited to laboratory chemical indicator testing, lacking the capacity for real-time monitoring of physical morphological changes on slopes. Traditional monitoring approaches have obvious drawbacks. Manual patrols feature low efficiency and cannot respond to sudden dangers; alternatively, BeiDou/GNSS systems are extremely costly, with a single monitoring point costing ten of thousands of yuan, making large-scale popularization impractical. The market is in urgent need of low-cost intelligent monitoring equipment capable of real-time perception and automatic alarming.

CYPRUS

CY-01 **NAME(S): Dr. Catherine Demetriades**
ORGANIZATION: CXAI Technology
TITLE **CXAI Technology in Olympic Sports and Pro Athletics Biophysical Sequences of Success are Written in the Light**
This is a formatted ability developed by early crystalline structures to survey other entities at a distance, by sensing those electric pressures. DNA is forced to execute the information that has been formed by genetic memory which creates the crystalline structure. The electro-plasmic field is the energy surrounding humans and other life energy forms that balance all the levels of radiation. It is a word to distinguish it as an electrical energy of spirit and mind, that unites with plasma, the essential physical substance of all bodies. These decks of energy revolve around, into and through the body as it balances our electric pressures. These decks and layers of energy act much like protective bubbles and balancing mechanisms. Extremes of electric pressure are acted upon by pulling in tighter to protect and preserve or expanding outward to allow the crystal to break through the protective bubble and examine what is inside.

ECUADOR

EC-01 **NAME(S): Majid Khorami / William Patricio Acome Teran / Natividad Leonor Garcia Troncoso / Teylon Jardel Peñafiel Goyón**
ORGANIZATION: UTE University
TITLE **HYDROMECHANICAL CONCRETE SHRINKAGE MEASUREMENT DEVICE**
The present invention relates to a hydromechanical concrete shrinkage measurement device designed to monitor the shrinkage behavior of fresh concrete during the curing process in real time. Concrete shrinkage is a critical phenomenon that affects durability, structural integrity, and long-term performance of concrete structures. Conventional shrinkage measurement methods typically rely on laboratory equipment, electronic sensors, or complex mechanical systems, which may be costly, sensitive to environmental conditions, and difficult to deploy on construction sites.

EC-02 **NAME(S): Majid Khorami / Miguel Sanchez / Masoud Khorami**
ORGANIZATION: UTE University
TITLE **Smart Phone-Carrier Robot for Morning Routine Regulation and Sleep Hygiene**
The present invention relates to a smartphone-carrier mobile robot designed to regulate smartphone accessibility in indoor environments, particularly bedrooms, with the objective of improving sleep hygiene and encouraging healthier digital habits. Excessive smartphone use before sleep and immediately after waking has been associated with sleep disruption, reduced sleep quality, and increased screen dependency. Existing robotic delivery systems are primarily developed for commercial logistics or general assistance tasks and are not designed to manage personal electronic devices within small residential spaces.

EGYPT

EG-01 **NAME(S): Mohamed Hassan Mohamed / Rania Hassan**
ORGANIZATION: CARE Technology Egypt (CARE-CTE) / Saxony Egypt University (SEU)
TITLE **CARE-CTE : NFC-Powered Smart Medical Data Ecosystem**
CARE is a revolutionary HealthTech ecosystem designed to digitize and secure critical medical data using NFC technology and smart wearables (Life Tag X200). The system allows immediate, contactless access to patient health records, emergency contacts, and vital medical history, eliminating response delays in critical situations. Integrated with robust Firebase server encryption and advanced cyber security protocols, CARE ensures top-tier data privacy and protection. By bridging the gap between hardware wearables and cloud-based security, CARE empowers individuals to carry their lifesaving medical profiles securely, seamlessly, and globally, transforming emergency response networks.

EG-02 **NAME(S): Dr. Zaky Abd ElLatif Zaky Abdellatif**
ORGANIZATION: Teachers, Professors, Researchers of Egypt
TITLE **Dynamic Suspension Ambulance Stretcher for critical injury victims.**
The present invention addresses a critical challenge in emergency medical transit: the safe transportation of patients with severe trauma, particularly spinal and cervical fractures, over high-speed highways or unpaved terrain. Standard emergency vehicles subject patients to sudden vibrations, road bumps, and kinetic shocks, which can severely exacerbate traumatic injuries.To mitigate these risks, the present invention discloses a radical solution comprising a suspended enclosure structure that mechanically isolates the patient litter from the vehicle's chassis. Utilizing a multi-directional (four-dimensional) shock-absorption system, the apparatus dynamically dampens kinetic forces while maintaining high maneuverability, portability, and ease of control during patient deployment.

ESTONIA

EE-01 **NAME(S): Lembit Maimets**
ORGANIZATION: N/A
TITLE **Self-Unfolding Satellite with Gravity**
This structure was designed to allow long stays in outer space, avoiding negative health impacts on astronauts. Introducing internal stresses in the metal, without human presence, allows the structure to expand freely and evolve into a toroid in ZERO gravity. Long duration stays in outer space have been shown to have negative health impacts on astronauts, ranging from short term disorientation and proprioceptive system disruptions to long term bone decalcification and muscle atrophy. I have designed and patented a modular satellite that has its own gravity and will therefore allow astronauts and researchers to spend longer durations in outer space, while experiencing fewer negative side effects of zero gravity existence.

FINLAND

FI-01 **NAME(S): Juha Starck / Rose-Marie Backström**
ORGANIZATION: Office Beat Oy
TITLE **Seat Guard -Microbreaks**
Seat Guard, Designed for your health. Well-being innovation Seat Guard-Microbreaks. The Simplest Solution to Avoid Sitting Too Much. Seat Guard-Microbreaks is a new health innovation to prevent excessive sitting. Seat Guard is a technical intelligent device, that united with the Interstuhl seat cushion makes the perfect combination for healthy sitting on any surface. Place the device into the Seat Guard pocket. The cushion has a non-slip bottom that increases seat comfort. It is machine washable up to 30°C and this quality cushion is produced in an environmentally friendly way.

FRANCE

FR-01 **NAME(S): Mircea MANOLESCU**
ORGANIZATION: A BETTER LIFE SOLUTIONS
TITLE **NutriNavigator™ Redefining Nutrition Through Adaptive Metabolic State Navigation**
NutriNavigator™ introduces a paradigm shift from traditional diet planning to metabolic state navigation. It is an adaptive, data-driven system that transforms nutrition into a controlled and measurable process, using objective indicators and continuous feedback to dynamically adjust personalized dietary protocols. Unlike conventional approaches, it eliminates guesswork and significantly improves predictability, adherence, and outcomes. The system has strong applications in preventive healthcare, metabolic optimization, and performance enhancement. Designed for scalability, NutriNavigator™ can be deployed as a digital platform with AI integration, enabling precise, personalized nutrition at population level.

FR-02 **NAME(S): Mircea MANOLESCU**
ORGANIZATION: A BETTER LIFE SOLUTIONS
TITLE **iSentinel TIMER™ Converting Seismic Time into Automated Protection**
iSentinel TIMER™ introduces a breakthrough concept by transforming seismic time into an actionable resource for protection. The system detects the Primary (P) wave, validates seismic parameters, and activates a deterministic timer that optimizes the interval before the arrival of destructive waves. Within this time window, it automatically triggers pre-defined safety procedures, eliminating foreseeable and controllable risks such as fires, explosions, and electrocution. Unlike conventional warning systems, it ensures immediate, site-specific action without human latency. The invention enables a shift from passive alerting to active protection, with applications across buildings, infrastructure, and industrial environments.

GEORGIA

GE-01 **NAME(S): Seyed Mohammad Hosseini Tafreshi Hosseini**
ORGANIZATION: New Vision University (Medical Student), Tbilisi, Georgia
TITLE **NeuroSync8: Multimodal Non-Invasive Neurostimulation System for Brainstem-Thalamocortical Modulation**
NeuroSync8 is a non-invasive multimodal neurostimulation concept designed to support arousal, attention, and brainstem-thalamocortical modulation through synchronized vibration, light, and sound stimuli. The system is envisioned as a wearable research prototype with EEG-based feedback to personalize stimulation patterns and monitor neurophysiological responses. It aims to provide a low-cost, accessible platform for studying sensory neuromodulation and potential future applications in fatigue, attention regulation, rehabilitation, and neurological education.

GREECE

GR-01 **NAME(S): Professor Dr. Vasileios Ag. Drougas BSc. MSc. PhD. Post Doc RF**
ORGANIZATION: Greek Ministry of Education Religious Affairs and Sports / University of Ioannina - ARTA Greece
TITLE **Drougas' Neuro-Perceptual Activity Method (DNPAM)**
This method focuses on creating visual and mnemonic representations through activities that improve kinesthetic perception and the perception of space and time using motor activities related to the living environment. The uniqueness of the method is that it connects neurotransmitters with the improvement of the individual's sensory-motor abilities through a program of movements and combinations that improve motor and dynamic balance and improve memory. It evolves at three basic levels related to human physiology: Neuro (brain processing), Perceptual (sensory input), Activity (movement and participation). The method enclose over 80 different Neuro-Perceptual Activities of applications. Some consequences of the application of the method are Enhanced Coordination & Balance, Reduced Behavior, Rehabilitation, improvement of dementia, improvement of memory, Neuro-processing, Feedback. The method has applications in Education and child development, Occupational Therapy, Physiotherapy, Athletic training, Neurorehabilitation, Motor learning etc. Key features include active body participation, repetition of movements, sensory experience, brain and muscle coordination, sensory and memory perception. The first level was tested in the Laboratory of Experimental Ergo Physiology in the School of Medicine, University of Ioannina Greece.

HONG KONG, CHINA

HK-01 **NAME(S): Yang Hong / Jintu Fan / Lun Lou / Zhanxiao Kang**
ORGANIZATION: The Hong Kong Polytechnic University
TITLE **Novel Air Cooling Device Based on Coanda Effect and Induced Airflow Mechanism**
This wearable air cooling device adopts high-speed brushless motor and arc nozzle, using Coanda effect and induced airflow to realize close-fitting large-airflow cooling. It is lightweight, modular, waist-hangable, with higher cooling power and energy efficiency than traditional products, suitable for outdoor, industrial and daily scenarios.

HK-02 **NAME(S): Dr MUNG Wai Yin, Steve / Mr LAI Chun Yin, Woody / Dr HE ZeBang**
ORGANIZATION: The Education University of Hong Kong
TITLE **AI-Steered Wireless Circuit Design for Next-Generation 6G and Satellite Transmitters**
AI-steered wireless circuit design addresses the urgent demand for high-efficiency and linearity power amplifiers (PAs) in 6G and satellite transmitters. This invention is a system and method of determining the linearity of a power amplifier module (PAM) in load-pull measurements. By using a deep neural network (DNN) model to precisely predict key linearity metrics across unseen impedances to acquire load-pull data, it cuts test time by 70% and reduces lab costs versus traditional methods. Then leverages predicted load-pull data to automatically generate 3GPP-compliant, low-current matching networks to accelerate 6G and satellite system design across devices and bandwidths.

HK-03 **NAME(S): Dr CHENG Jinping / Mr LIU Jingyu**
ORGANIZATION: The Education University of Hong Kong
TITLE **BioSentinel Passive eDNA/eRNA enrichment and Sampling System**
This invention presents a flexible, portable, and cost-effective eDNA/eRNA enrichment and sampling system for biota monitoring. It enables efficient multi-depth, remote sampling without filtration, without the need for vessels or divers. The lightweight, structurally robust design allows single-operator deployment, significantly reducing sampling time and cost. It also integrates standardised workflows and an integrated database to support downstream analyses and rapid identification of harmful species. Compared with mainstream commercial eDNA sampling devices, this system provides an affordable solution. Its user-friendly operation makes it well-suited for a wide range of eDNA-related applications.

HK-04 **NAME(S): SONG Yanjie / LEE Chi Kin John / YEUNG Siu Sze Susanna / FU Jiachen / WU Kaiyi**
ORGANIZATION: The Education University of Hong Kong
TITLE **EmoCare - An AI-powered Application to Foster Emotional Well-being**
EmoCare is an AI-powered application (app) grounded in the PERMA model to foster users' emotional well-being. The app integrates AI and uses the PERMA model for positive psychology (Positive emotion, Engagement, Relationships, Meaning, and Accomplishment) as a framework to develop users' positive emotions. Through diary writing, image generation, emotion tracking, and conversations with an AI companion, this patented technology helps users regulate emotions, engage in self-reflection, and build resilience. A real-time dashboard visualises monthly mood trends and provides AI-generated reports for users and educators' insight.

HK-05 **NAME(S): Dr FU Hong / Prof CHAN Che Hin Chetwyn / Miss HOU Beibei / Prof XU Yanwen / Prof WANG Jun**
ORGANIZATION: The Education University of Hong Kong
TITLE **RoMetric: Intelligent Hand Function ROM Assessment System**
Complete hand functionality is essential for daily productivity and quality of life, yet around 12.78% of the global population faces risk of hand dysfunction from diseases or injury. RoMetric is a patented system to automatically evaluate hand joint range of motion (ROM), a critical hand function indicator, using advanced computer vision. It introduces a standardised 7-pose protocol to capture maximum ROM across all hand joints, then reconstructs them in 3D, mimicking clinical goniometry. This initiative measures angles precisely and enables high-accuracy automated assessments to support continuous, frequent, and objective longitudinal tracking of rehabilitation progress, enabling truly personalised strategies.

HK-06 **NAME(S): Dr Amanda Man Ying CHU / Prof Mike Ka Pui SO / Dr Lupe Shun Hin CHAN**
ORGANIZATION: The Education University of Hong Kong
TITLE **ASAP: Automatic Speech Analytics Program for Early Personalised Psychosocial Health Assessment**
The Automatic Speech Analytics Program (ASAP) addresses the widespread challenge of psychosocial problems, affecting 13% of individuals globally. ASAP automatically analyses clients' speech for multidimensional psychosocial health risk indicators, instantly providing insights for health professionals or social workers to inform further interventions for their clients. Its 5 components (psychosocial risk assessment, semantic and acoustic analytics, speech recognition, instant visualization, and automatic report generation) enable validated, cost-effective assessments and longitudinal follow-up. It streamlines the evaluation process and reduces reporting burden to support timely, effective care for those facing elevated stress and related challenges.

HK-07 **NAME(S): TSANG Yiu Fai / XU Hui / ADIGUN Basit Akolade / CHAN Yu Ki**
ORGANIZATION: The Education University of Hong Kong
TITLE **From Sludge to Structure: Transforming Waterworks and Sewage Sludge into Sustainable Concrete**
"Sludge-transformed concrete" is an ambient-phase solution that addresses long-standing issues related to sewage and waterworks sludge disposal. It replaces 10– 25% of conventional aggregate while achieving compressive strengths of 20–48 MPa, suitable for both structural and non-structural uses. Certified Toxicity Characteristic Leaching Procedure (TCLP) tests for heavy metals comply with environmental standards, ensuring the product is environment-friendly. Replacing conventional aggregate with sludge reduces production costs by 32%. As concrete is the world's most used man-made material, this innovation offers powerful waste utilisation, directly solves odour and similar environmental nuisance issues, and significantly reduces of CO_2 emissions, achieving carbon neutrality.

HK-08 **NAME(S): YANG Yin / LEE Chi Kin John / GU Ming Yue / LING Man Ho / MA Qing / SUN Daner**
ORGANIZATION: The Education University of Hong Kong
TITLE **CWrite: An AI Partner for Young Writers to Think, Create, and Grow**
In the age of generative AI, children can generate stories instantly but risk losing opportunities for deep thinking and creativity. CWrite is an AI-powered creative writing platform that positions AI as a thinking partner rather than a shortcut. It introduces a novel narrative engineering system to support structured, traceable, and values-driven human–AI co-creation. Integrating multimodal AI, adaptive scaffolding, and a value-based "Writing Farm" ecosystem, the platform supports the full writing process and learner development. Designed for primary ESL/EFL education, CWrite aims to foster creativity, reflection, and value-oriented expression in young learners.

HK-09 **NAME(S): Prof. SIN Kuen Fung Kenneth, MH / Dr. FUNG Ka Yan / Dr. LUI Tze Leung, Rick / Dr. FUNG Kwong Chiu**
ORGANIZATION: The Education University of Hong Kong
TITLE **Loving Baby - A Multi-modal Interactive Cognitive Ability and Language Enhancement System for Special Needs**
Loving Baby is a human-like and multi-modal robot system that employs automatic speech recognition, gestures, games, songs, multisensory and touch interaction, such as animations and visual aids, to support inclusive language learning and cognitive development among primary students with special education needs (SEN). Guided by self-determination theory (SDT), the systems can support vocabulary, short-sentence and sentence-expansion learning, as well as real-life scenarios training. School-based studies in Hong Kong suggest that AI-empowered and SDT-based robot interaction can enhance students' engagement, intrinsic motivation, language learning and emotional wellbeing, as well as positive thinking support.

HK-10 **NAME(S): ENHE / Jiandong Huang / Renhao Li**
ORGANIZATION: The University of Hong Kong, Li Ka Shing Faculty of Medicine
TITLE **Broad Spectrum Tumor Reprogramming Immunotherapy**
The company's first product candidate is a novel tumor reprogramming immunotherapy. This therapy addresses several core technical challenges that currently hinder most cancer immunotherapies, including the lack of druggable targets, tumor heterogeneity, the immunosuppressive tumor microenvironment, and poor tumor permeability. Furthermore, this therapy can target a broad range of solid tumors, is available off-the-shelf, and leverages the mature mRNA-LNP delivery platform, resulting in relatively low manufacturing costs. It therefore represents a promising next-generation direction for cancer immunotherapy.

HK-11 **NAME(S): Mr. Haotian XIE / Mr. Gary YIM / Dr Yung Po TSANG / Dr Chun Ho WU / Prof. Carman Ka Man LEE**
ORGANIZATION: Bolly Express Limited / Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University / Cloud Innovation School, The Hang Seng University of Hong Kong
TITLE **BEXTools-ESGPath: An AI-Driven ESG Intelligence System for Decoding Corporate Sustainability Reports and Prioritizing ESG Capability Roadmaps**
Corporate ESG reports are long, narrative, and difficult to interpret, leaving firms without clear guidance on which sustainability issues matter most. BEXTools-ESGPath solves this problem through an intelligent five-stage pipeline that combines natural language processing, association rule mining, and hierarchical structural modeling. The system automatically analyses ESG reports, extracts latent topics, maps their directional dependencies, ranks them by driving and dependence power, and generates a prioritized capability development pathway. Tested on 21 reports from eight multinational e-commerce firms, BRAIM delivers a reproducible, data-driven ESG decision-support tool for corporations, regulators, and investors worldwide.

HK-12 **NAME(S): Hong Aurora Xiyao / Kong Zhao Yu / Tang Oi Lam / Wong Yi Lam**
ORGANIZATION: Kowloon True Light School (Hong Kong)
TITLE **Synergistic Efficacy of Dual EGFR/KRAS Inhibition in Adenocarcinoma Models**
EGFR inhibitor Gefitinub is commonly used in clinics to treat Adenocarcinoma with high EGFR expression. However, acquired resistance is developed when the inhibition is bypassed with KRAS-mediated stimulation of the MAPK and PI3K pathway. RFDiffusion is used to generate de novo peptide binder as PDE-δ inhibitor, which aims to stop KRAS localization. It is shown to have a synergistic effect with Gefitinib. The KRAS-targeted therapy with Gefitinub produces synergistic anti-tumour effects in adenocarcinoma models, overcoming feedback-driven resistance that limits the efficacy of the single-agent EGFR inhibition.

HK-13 **NAME(S): Teng Jade Lee-Lee / Ma Yuanchao / Jia Lilong / Zhao Yan / Yeung Man Lung**
ORGANIZATION: The Faculty of Dentistry, The University of Hong Kong, Centre for Virology, Vaccinology & Therapeutics
TITLE **The Mini Tongue: A Living Taste Bud Organoid Platform for Taste Fingerprinting**
We have developed the world's first living taste bud organoid platform—a revolutionary invention that brings human taste into the laboratory. Acting like a mini living taste system, it can safely "taste" foods, drinks, medicines, chemicals, and even hazardous substances, then generate a unique biological fingerprint for each sample. This enables accurate product identification, comparison, and quality verification without relying on subjective human taste panels. By transforming taste testing into a safe, objective, and scalable technology, this breakthrough invention has the potential to reshape quality control, product development, and safety testing across multiple industries.

HK-14 **NAME(S): YEUNG Man Lung / CHAN Ka Fai / JIA Lilong / CHAN Walton Man To / TENG Jade Lee-Lee**
ORGANIZATION: The Faculty of Dentistry, The University of Hong Kong, Centre for Virology, Vaccinology & Therapeutics
TITLE **Development of a functional nasal mucociliary organoid model as the next generation of pre-clinical disease modeling and drug screening platform**
Our invention is the world's first fully functional nasal mucociliary organoid that closely replicates native human nasal tissue. It contains the full range of cell types found in ciliated pseudostratified epithelium, enabling physiologically relevant structure and function. Critically, the organoid features an active mucociliary system, with cilia beating frequency comparable to human nasal tissue, confirming robust ciliary activity. It also produces mucin, which works with cilia to create a protective barrier against pathogens and modulate drug absorption. This makes the platform highly valuable for infection research, respiratory disease modeling, and preclinical drug delivery and screening applications.

HK-15 **NAME(S): LAU Chun Yin / TANG Yuet Kiu / YIM Tsz Tai / BAO Litong / WAN Sum Ying / ZHANG Zhehan / XU Yat Yin / LAI Chak Ming**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **AquaBoard: Green Contactless Sanitation for Public Toilets**
AquaBoard is a modular, retrofit-compatible toilet-seat system that provides automated, contactless sanitation after each use. It applies 0.1% benzalkonium chloride, lifts the seat vertically for gravity-assisted runoff, dries the surface with forced air, and uses moisture/airflow sensors for fail-safe lockout. Prototype tests showed complete detectable drying in the main contact region and bacterial coverage reduction from about 28% to 1%. By combining hygiene protection, usability, and graywater-based disinfectant neutralization, AquaBoard offers a practical Medicine & Health Care solution for safer public toilets.

HK-16 **NAME(S): LEUNG Ka Wa / LEE Cheuk Lam**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **BlueMotion Multi-Modal Spherical Electromagnetic Energy Harvester: Turning Waves and Vibrations into Clean Power**
BlueMotion MSEH is a spherical electromagnetic energy harvester that converts ambient vibration and shoreline wave motion into usable electricity. Using neodymium magnets, an 1800-turn copper coil, bridge rectification, and capacitive smoothing, it supports battery-free low-power sensing. Tests showed stable LED operation near 1.90 V, open-circuit capacitor accumulation up to 10.04 V, and 58.3% wave-event success.

HK-17 **NAME(S): ZHANG Wa Yu / SHUAI Jia Han**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **EcoGuard SmartStrap: A Smartwatch-Compatible Mosquito Repellent Strap with a Replaceable Natural Oil Core**
EcoGuard SmartStrap is a smartwatch-compatible mosquito repellent strap that integrates health protection with wearable fashion. It uses a hidden replaceable natural oil core, perforated diffusion cover, and water-repellent coating to release plant-derived repellent vapour continuously. Laboratory testing showed an 80.95% repellent rate and stable effectiveness for up to 72 hours. The strap offers a reusable, stylish, comfortable, and sustainable alternative to disposable mosquito wristbands and chemical sprays.

HK-18 **NAME(S): Lee Cheuk Lam / Keung Kai Yeung / Fan Tat Ho / Lee Jun Kiu Alvis / Leung Ka Wa**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **FluxDrive: A Motor-Assisted Electromagnetic Generator for Stable Portable Power from Intermittent Kinetic Energy**
FluxDrive is a compact motor-assisted electromagnetic induction generator that produces electrical output through controlled magnetic flux variation. A DC motor rotates a permanent magnet near a stationary solenoid coil, inducing electromotive force according to Faraday's law. The prototype weighs 226 g and generated approximately 198–200 V at 5.3×10^{-4} A under test conditions. It offers a controllable platform for portable power research, emergency energy education, and future hybrid charging systems.

HK-19 **NAME(S): CHEUNG Cheuk Hei / JIE Ka Ho / WANG Jin Di / MI Zishuo Millet**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **PASSIVE FINGERPRINT-TRACE ERASER FOR SMART DOOR LOCK SECURITY**
CleanSlide Guardian is a passive fingerprint-trace eraser for smart door lock security. It integrates a transparent sliding cover, concealed cleaning sponge, and moisture-retaining liquid reservoir. During normal unlocking and closing, the sliding motion automatically wipes the fingerprint or keypad surface, removing sweat, oil, dust, and visible residues without electricity, sensors, motors, or extra user action. Prototype tests showed over 98% visible residue removal after one complete sliding cycle, high sponge moisture for about 8 days, acceptable cleaning until about day 12, and stable operation up to 1000 cycles.

HK-20 **NAME(S): ZHANG ZHEHAN / XU YAT YIN / BAO LITONG / LAU CHUN YIN / YIM TSZ TAI / CHEN EDSON / LAI CHAK MING**
ORGANIZATION: Shun Tak Fraternal Association Yung Yau College
TITLE **SmartHanger: An AI-Integrated IoT Clothes Drying Monitoring System for Humid Domestic Environments**
SmartHanger is an AI-integrated IoT clothes-drying monitoring system for humid domestic environments. It combines an ESP32 microcontroller, SHT31 temperature– humidity sensor, HX711 weighing interface, mass-sensing element, Android app, AI-assisted trend analysis, and weather-data alerts. By analysing garment mass reduction, humidity variation, and drying-curve plateau formation, it objectively identifies practical dryness and warns users against sudden precipitation.

HK-21 **NAME(S): Daniel T. L. SHEK / Xiaoqin ZHU / Xiang LI / Janet T.Y. LEUNG / Diya DOU**
ORGANIZATION: The Hong Kong Polytechnic University
TITLE **"Positive Adolescent Training through Holistic Social Programs" (P.A.T.H.S.): Enhancing Holistic Youth Development in China and Beyond**
Project P.A.T.H.S. aims to enhance positive youth development (PYD) attributes and well-being of children and adolescents by cultivating their psychosocial skills through innovative strength-based, student-centered and experiential learning pedagogies. By enhancing the psychosocial competencies and well-being of 1,700,000+ students and training 24,000+ teachers in Hong Kong and the Chinese mainland, P.A.T.H.S. meets young people's developmental needs and enhances their mental health and resilience. P.A.T.H.S. also enriches the toolbox of school mental health promotion, transforms the Chinese education system, and has been successfully transplanted to Sri Lanka, Korea, Argentina and Indonesia. Following implementation in Malaysia, P.A.T.H.S. received 14 awards.

HK-22 **NAME(S): Liu Si Han / Chow Carlos / Lin Chit Isaac**
ORGANIZATION: King's College
TITLE **Cysteine-Silver Coated and Alginate-Functionalised Superparamagnetic Iron(II,III) Oxide Nanoparticles for Metal Ion Removal from Aqueous Solutions**
This project has developed cysteine-functionalised silver-coated superparamagnetic iron(II,III) oxide nanoparticles (SPIONs) to remove heavy metal ions from water, improving traditional activated carbon adsorption and precipitation methods' expensive, toxic sludge production, and not reusable or recoverable problems. We synthesised uniform-sized SPIONs coated with silver and cysteine. Alginate SPIONs are also synthesised. Quantification of chelation efficiency is done with a spectrometer. Uniform SPIONs demonstrated exceptional adsorption capacities and high reusability, while alginate SPIONs demonstrated a selective high chelation efficiency for particular types of heavy metal ions. All of the SPIONs are highly reusable and magnetically recoverable.

HK-23 **NAME(S): Yip Ming Tsun Sophronia / Lu Liu / Prof. Rio Sugimura**
ORGANIZATION: Centre for Translational Stem Cell Biology
TITLE **Next-Generation CAR-Macrophage advancing solid tumor treatment**
We revolutionise solid tumor treatment by engineering synthetic immune cells. As the first antibody-engineered CAR-macrophages (AB-CAR-M), we precisely target both cancer cells ("the seed") and the tumor microenvironment ("soil"). Our dual targeting delivers more effective and durable responses than conventional CAR-T or CAR-M therapies. Powered by a high-throughput CAR design platform and scalable stem cell–based manufacturing, we overcome key barriers in solid tumor immunotherapy. Our goal is to provide curative, accessible treatments for liver cancer and other tumors, making a real difference for patients worldwide.

HK-24 **NAME(S): Pengtao Liu / Yiyi Xuan / Yong Xiang**
ORGANIZATION: Centre for Translational Stem Cell Biology
TITLE **Placenta-Like Cell-Derived Secretome and Exosome Compositions for Skin Regeneration and Repair**
This invention presents an advanced skincare solution formulated from proprietary ingredients derived from lab-grown placenta-like stem cells. These components are rich in antioxidants and protective proteins that support cellular healing, rejuvenation and overall skin health. Volunteer studies indicate that the formula enhances skin hydration, repairs dry or damaged skin, reduces redness and irritation, and diminishes the appearance of wrinkles. The production process is ethical, safe, easily scalable, and entirely free of animal-derived products. This breakthrough provides a promising approach to addressing conditions such as eczema, dry skin, signs of aging, and wound healing, representing an exciting innovation in skin health.

HK-25 **NAME(S): Lisha YU / Limin YE / Caizhi HE / Chunzi HUANG**
ORGANIZATION: Lingnan University, Hong Kong
TITLE **Gait Guard: Real-Time Detection of Distracted and Fatigued Walking for Pedestrian Safety**
Gait Guard is a real-time IMU-only gait safety system designed to improve pedestrian safety by detecting distracted and fatigued walking. Using tri-axial acceleration from common IMU sources (e.g., smartphones or wearables), it applies to an 8-second sliding window with 4-second updates to classify normal, distracted, and fatigued gait and deliver timely alerts. In test, it achieved an overall F1-score of 0.989 and has been implemented as a lightweight Android prototype. The solution supports campus safety, mobile health, rehabilitation, and wearable integration to reduce walking-related risks.

HK-26 **NAME(S): S. Joe QIN / Lisha YU / Weijian ZHANG / Haochen HOU**
ORGANIZATION: Lingnan University
TITLE **GaitGPT: Bidirectional Translation Between Clinical Notes and Quantitative Gait Metrics**
GaitGPT is an evidence-grounded medical AI platform that bridges clinical gait narratives and quantitative gait metrics. It ingests gait tables and optional video-derived observations, then applies a multi-gate pipeline (measurement availability, biomechanical plausibility, and evidence quality) to generate auditable interpretations in two formats: a clinician-facing research view and a patient-friendly clinical view. Designed for self-hosted deployment, GaitGPT keeps data within institutional infrastructure while supporting clinic follow-up, documentation, education, and research workflows.

HK-27 **NAME(S): Dr. Xinyu WANG / Dr. Charo GUO / Mr. Fahan CHEN / Prof. Zengfu WANG / Prof. Moshe ZUKERMAN**
ORGANIZATION: School of Science and Technology, Hong Kong Metropolitan University
TITLE **Smart Infrastructure Routing: AI-Powered Optimal Path Planning and Design for Submarine Optical Cables**
This project presents an AI-powered automatic optimal path-planning and system design platform for critical infrastructures, particularly submarine optical cables. Leveraging advanced algorithms and intelligent computation, our technologies substantially alleviate the limitations of traditional, arduous, and time-consuming manual approaches by delivering efficient, automated solutions. Our platform analyzes complex seabed terrain data to generate cost-effective, reliable cable routes while minimizing environmental and operational risks. Protected by a strong intellectual property portfolio of 22 patents filed in both the US and China, with 10 granted US patents, our technologies offer a transformative toolset for building smarter, more connected global communication networks.

HK-28 **NAME(S): Mr. Lui Ho Wing Samuel (Principal) / Mr. Tai Tze Tik Keith (Vice Principal) / Wong Chi On (Staff) / Hui Pang Sik (Staff)**
ORGANIZATION: C.C.C. Heep Woh College
TITLE **Personalised Growth Portfolio (PGP) : AI-Powered Holistic Student Intelligence Platform**
The Personalised Growth Portfolio is an AI-powered student-intelligence platform that combines academic results, development competencies, event participation, wellness information, discipline records, and career guidance in one dashboard. It provides exam analysis, growth insights, class-level trends, talent discovery, and an AI career adviser, helping schools and students understand progress and plan personalised development pathways.

HK-29 **NAME(S): Prof Pengtao Liu / Dr Qingqing Zhang**
ORGANIZATION: Centre for Translational Stem Cell Biology
TITLE **A Novel Human Trophoblast Stem Cell-Derived Syncytiotrophoblast Platform for Accelerated Aging Research and Next-Generation Anti-Aging Drug Discovery**
We present a pioneering human cellular aging model utilizing human trophoblast stem cells (hTSCs) that differentiate into syncytiotrophoblasts (STBs), replicating key aging hallmarks—epigenetic remodeling, genomic instability, cellular aging markers—in just 6 days. Our high-throughput, AI-integrated platform addresses critical clinical gaps by serving as an advanced preclinical filter. It streamlines product testing and accelerates drug discovery. We have already identified natural compounds that extend mouse lifespan by up to 25% and restore cognitive and reproductive functions in disease models, outperforming Rapamycin. This rapid, human-relevant biosystem revolutionizes anti-aging drug discovery by significantly reducing R&D timelines and advancing global health and longevity.

HK-30 **NAME(S): Xu Miao**
ORGANIZATION: Monexus Innovation Ltd.
TITLE **PerioMag: Magnetic Probiotic Solution for Periodontitis**
PerioMag is a breakthrough therapeutic system that combines living magnetic probiotics with personalized magnetic aligners to revolutionize periodontitis treatment. Addressing a global burden affecting ~90% of the population, it replaces conventional, painful delivery methods with a non-invasive, accessible approach. Controlled via a personalized magnetic aligner system, it drives living probiotics deep into periodontal pockets with unprecedented precision. Pre-clinical rodent models demonstrate a 50× deeper penetration, 7-day sustained therapeutic retention, and complete elimination of periodontitis within 12 hours after a single dose.

HK-31 **NAME(S): Hung Tsz Hin / To Yi Sin / Fung Sheung Yin / Yau Yan Tong / Wong Man Kiu**
ORGANIZATION: The ELCHK Yuen Long Lutheran Secondary School
TITLE **Fast and efficient artificial intelligence cell generator for cytopathology education**
Cytopathology keeps evolving alongside medical technologies, while scarce diverse cell sample images greatly restrict its teaching, learning and academic research. We design a GAN-powered AI to create authentic and varied cytopathological cell images precisely. This intelligent method outperforms traditional sample preparation with higher speed, lower costs and richer sample diversity, playing a vital role in future medical education and scientific research.

HK-32 **NAME(S): Huen Tsz Yan**
ORGANIZATION: Man Kwan Pak Kau College
TITLE **Exploring the Potential of Pomegranate Peel as a Natural and Gentle Antibacterial Formula**
This invention explores the use of pomegranate peel extract as a natural, mild antibacterial formula for household cleaning, especially for families with infants and people with sensitive skin. Pomegranate peel, a food-processing waste, contains polyphenols and tannins with antibacterial properties. Water and ethanol extracts were prepared and tested against E. coli and B. subtilis using inhibition zone, MIC, stability, and surface disinfection tests. Results showed strong antibacterial effects, particularly against B. subtilis, with activity remaining above 90% after 14 days. The extract also reduced bacteria effectively on stainless steel and plastic, suggesting potential for sustainable antibacterial products.

HK-33 **NAME(S): Yan Tung, Ho / Ho Ting Javis, Lee**
ORGANIZATION: Man Kwan Pak Kau College
TITLE **Silver Stride**
Silver Stride is an affordable, plug-and-play indoor virtual rehabilitation system designed for elderly mobility and cognitive care. By modifying standard mini-bikes with non-contact magnetic Hall sensors and an Arduino Leonardo chip, it enables zero-configuration USB HID control. Integrated with Unity 3D and the Open3DHK API, it renders realistic 3D Hong Kong streets, providing immersive "Reminiscence Therapy." Crucially, an original "0.8-second cutoff delay" algorithm filters uneven pedaling signals to deliver a smooth visual experience and eliminate motion sickness. Costing under $500 HKD, Silver Stride breaks spatial and financial barriers to promote accessible, engaging healthcare.

HK-34 **NAME(S): Lee Choi Hei / Mak Long Him**
ORGANIZATION: Man Kwan Pak Kau College
TITLE **AirSense AI: Smart Indoor Air Safety Predictor**
AirSense AI is a smart indoor air quality monitoring and safety prediction system designed for newly renovated homes. It uses multiple sensors to detect formaldehyde, TVOC, CO2, PM2.5, temperature, and humidity in real time. The collected data is processed by an ESP32 microcontroller and analyzed with Python-based AI prediction to estimate when the indoor environment will become safe for move-in. The system provides an air safety score, visual alerts, and practical improvement suggestions. This invention helps users make safer, data-driven decisions before occupying indoor spaces.

HK-35 **NAME(S): Chan Wan Ching / Huang Chun Chieh / Cheung Tsun Yin / Chan Tsz Ue**
ORGANIZATION: Man Kwan Pak Kau College
TITLE **When Pectin Meets Carbon: Non-linear Reinforcement of Waste-derived Activated Carbon–Pectin Sponges for Exudate Management in Chronic Wounds**
Chronic wounds affect over 300 million people annually, yet current dressings inadequately balance absorption, mechanical integrity, and sustainability. Here we report a composite sponge derived from waste citrus peel pectin reinforced with activated carbon (20–40 wt%), fabricated via ionic crosslinking and lyophilization. We demonstrate that percolation threshold effects govern non-linear property enhancement, yielding absorption capacities of 21.25× dry weight, 78.1% fluid retention at one hour, and breaking strengths of 180 g/cm²—surpassing conventional dressings. Crucially, a microbial channel mechanism preserves biodegradability (>80%) despite carbon incorporation. This waste-to-value approach offers a scalable platform for next-generation wound care with minimal environmental footprint.

HK-36 **NAME(S): Chan Yee Na**
ORGANIZATION: Hong Kong Dream Technology and Innovation Society (HKDTIS)
TITLE **Sound Care Station**
Yellow-breasted Buntings migrate through Hong Kong yearly and need high-energy food. They compete fiercely with large numbers of local Scaly-breasted Munias for food. I developed the Sound Care Station, which opens the feeding door only when it detects the buntings' calls. The door stays closed to keep other birds out. Acting as an exclusive feeding zone, this device effectively helps raise their survival rate during migration.

HK-37 **NAME(S): Chee Ngo Yin Oscar / Kong Kai Tsun Kaleo / Lam Kwan Hau / Lau Hoi Ling**
ORGANIZATION: Lai King Catholic Secondary School
TITLE **Piezoelectric Stairs**
Our project utilized Hong Kong's characteristics of limited land and a dense population to generate green energy from the interior spaces of buildings. The device is made using piezoelectric ceramic tiles. By stepping on our Piezoelectric Stairs and our piezoelectric carpets, which is the improvement from our stairs, pressure is applied to the piezoelectric material, generating electricity. Our project can be used in busy areas to harness the weight of people and footsteps from people as a new source of energy.

HK-38 **NAME(S): Dr. Kin-Hon HO / Dr. Monica LAW**
ORGANIZATION: Hong Kong Shue Yan University
TITLE **SmartSenior: An AI-Enabled Cognitive Training Application with Neurofeedback for Older Adults**
As we age, cognitive decline can make it challenging to carry out everyday tasks, which can seriously affect quality of life. That's where cognitive training comes in; it helps support cognitive health in older adults. Our project focuses on harnessing AI-driven cognitive training games paired with neurofeedback to boost cognitive performance in older individuals. By exploring these innovative methods, we aim to uncover their potential benefits for maintaining cognitive health in our aging population. We are excited to share our progress, including the development of engaging games designed specifically for this purpose.

HK-39 **NAME(S): Chan Wai Ying / Li Hiu Lui Shirley / Lin Selina / Ng Long Ki / Peng Xin Di**
ORGANIZATION: Kowloon True Light School
TITLE **Sleep Better**
The "Sleep Better" app detects sleep apnea by recording your sleep overnight and providing detailed results each morning. To support your health journey, the app features a smart calendar and an interactive chatbot. The calendar sends reminders for doctor appointments, CPAP usage, and daily exercise tracking. Meanwhile, the chatbot provides lifestyle suggestions and healthy recipes tailored specifically to the severity of your sleep apnea, while helping you break bad habits. "Sleep Better" is your ultimate health companion, ensuring you stay on track with routines and adjustments for a much healthier, more restful life every single day and every night.

HK-40 **NAME(S): LO Pik Kwan Peggy / ZHENG Wei / CHANG Tristan Juin Han**
ORGANIZATION: Department of Chemistry and State Key Laboratory of Marine Environmental Health, City University of Hong Kong
TITLE **A Biomimetic Nanofusion Platform Utilizing Threose Nucleic Acid (TNA) for Targeted Triple-Negative Breast Cancer Gene Therapy**
This invention presents a pioneering biomimetic "nanofusion" platform (PLL/TNAAKT2@CM) engineered to overcome drug resistance and tumor heterogeneity in triple-negative breast cancer (TNBC). The technology encapsulates highly stable, synthetic threose nucleic acids (TNA) within a poly-L-lysine core, cloaked in a donor-matched cancer cell membrane shell. By leveraging a non-canonical membrane-fusion mechanism, the platform achieves direct cytosolic cargo delivery, bypassing endosomal entrapment entirely. Demonstrating exceptional safety, 100-fold enhanced cellular internalization, and highly specific homotypic targeting, this platform drives robust in vivo gene silencing and tumor regression, offering a versatile, "plug-and-play" paradigm for next-generation precision medicine.

HK-41 **NAME(S): Nithit Chanpongsang**
ORGANIZATION: Singapore International School (Hong Kong)
TITLE **HydroPulse**
HydroPulse is a standalone hydration-monitoring device designed for older adults. A built-in load-cell sensor measures changes in vessel weight to estimate water consumed in real time and can be used with common cups, bottles, or glasses. Each hour, the device compares intake with a user-selected target of 150, 200, or 250 mL and provides visual and audio reminders when additional drinking is needed. HydroPulse requires no smartphone, app, or manual logging. It supports independent living and aged-care settings by encouraging regular hydration while reducing the need for continuous caregiver monitoring.

HK-42 **NAME(S): Ng Tsz Ying Alicia / Chan Yik Ka Coco**
ORGANIZATION: St. Mary's Canossian College
TITLE **HealthyEats**
HealthyEats is an AI-based smart meal-planning app designed for people who have strict dietary control, such as diabetes. It creates personalized meal plans based on health conditions, dietary restrictions, goals, and food preferences. The app also suggests recipes using existing ingredients at home to minimise waste, links ingredients to local supermarkets online store for direct purchase and offers a volunteer delivery network to facilitate busy workers. With educational games, challenges, badges, and community support, HealthyEats makes healthy eating easier, more affordable, and more engaging while saving time, reducing stress, and supporting long-term healthy habits.

HK-43 **NAME(S): Cheong Lok Tung, Pearl / Wong Sheung Chi, Joanna**
ORGANIZATION: St. Mary's Cannosian College
TITLE **Elderly Miracles**
As secondary student developers, we created Elderly Miracles, an automated smart home system providing 24/7 safety monitoring for lone elders. Bridging cutting-edge AI with empathy, our system utilizes self-trained 3D pose analysis for instant fall detection and a 96%-accurate audio AI to recognize cries for help in high-privacy areas. By engineering a cross-verification SOS trigger and a strict three-day data-purging architecture, we maximize safety while fully protecting user privacy. Backed by a viable B2C/B2B market strategy, our next phase includes real-world pilot testing and integrating environmental sensors for holistic home hazard detection.

HUNGARY

HU-01 **NAME(S): Ildikó Némethné Urbán (Ambrózfalva, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **Cord Knitting**
Cotton yarns can not only be twisted, but also knitted to obtain cord yarn. Thin cords are made with a small-head, thin-needle circular knitting machine, ribbon yarns with a large-head, thin-needle circular knitting machine, and if we put polyester filling or thinner cotton cord in the middle of the resulting "yarn tube", we obtain thick (max. 5 mm) cord yarn. These products quickly became popular among crocheters, as the circular knitting process resulted in flexible but easy-to-maintain cords, making them ideal for making bags, rugs, macramé wall hangings and other home decor items.

HU-02 **NAME(S): János Ursinyi (Hajmáskér, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **Dual-mode, lean-burn Otto engine.**
It works with the advantage that it changes the compression ratio at start-up and at low partial loads. It automatically switches to lean-burn operation when the load increases, which significantly improves efficiency in all modes, something no other engine has been able to do before. It provides the same results achieved with the expensive pre-chamber mode at high loads, but cheaply and simply!

HU-03 **NAME(S): Imre Beri (Monorierdő, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **Production and storage of electrical energy.**
We produce electrical energy without external energy input, then store and use it. (energy management)

HU-04 **NAME(S): Gyula Török (Hódmezővásárhely, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **Steam engine ship model**
Presentation of a four-cylinder working steam engine model. Illustrative model for educational purposes for students.

HU-05 **NAME(S): Lajos Poczók (Budapest, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **Solid geometric bodies**
Form of geometric shapes, astronomical educational tools, presentation of fi

HU-06 **NAME(S): József Bandi (Lenti, Hungary)**
ORGANIZATION: Ötlet Club 13 Association
TITLE **3D Logical Wonder Ball.**
In the 8 game chambers located in the ball, 8X8 pieces of mixed-colored balls are exchanged through the holes of the chambers until there are balls of the same color as the holes in each chamber.

INDONESIA

ID-01 **NAME(S): Audrey Almeera Rizky Putri**
ORGANIZATION: State Junior High School 1 Surabaya
TITLE **Scie-Drone: Integrating Pre-Trained Pose Recognition Model and Real-Time Alert System to Enable Smart Drones to Prevent Physical Bullying in Schools**
The objective in this study is to create a smart drone, which is called Scie-Drone, to prevent physical bullying in schools. By integrating AI in the form of pre-Trained pose recognition models into the drone to detect the force and the speed of the body movement, Scie-Drone provides more accurate physical bullying detection. The Scie-Drone equipped with a real-time alert system which can send a warning signal to the teacher or school staff on duty to enable immediate preventative action. As an addition, Scie-Drone project is aiming for a cost-efficient innovation so that the result can be beneficial for many schools and institutions. The result of this research shows that Scie-Drone is an affordable tool that is successfully able to distinguish between "fighting" and "non-fighting" activities, and also it is able to provide warnings when detecting fighting behavior in real time. Keywords: Smart drone, AI integrated drone, Pre-trained pose

ID-02 **NAME(S): FEDYA JELILA / AMELYA DESTIA PUTRI**
ORGANIZATION: SMA NEGERI 1 TAKENGON
TITLE **AceticPro Acetic Acid-Based Bio-Fungicide from Coffee Fruit Waste**
This study aims to develov an acidum aceticum bio-fungicide from Arabica coffee fruit waste fermentation to control pink disease (Upasia salmonicolor). The method utilized a laboratory-based approach, involving two sequential fermentation stages (alcohol and acetic acid) with variations in duration and bacterial volume, followed by Field-Validated. Optimal conditions were achieved via a 10-day fermentation with 60 ml of bacteria, yielding 65.25 g/L of acetic acid. Application successfully reduced disease intensity from 16.86% to 7.18%, achieving a 57.24% recovery rate. This formulation has proven to be more effective than chemical fungicides (46–50%) and is an environmentally friendly solution for coffee plants highly scalable and low-lost cultivation.

ID-03 **NAME(S): Alifia Rahmadhani Hamid / Angelina Carissa Aiko Cetta / Nabila Rahmatya / Quinn Joan Sitompul / Thalita Yumna Savin**
ORGANIZATION: SMA Taruna Nusantara Kampus Malang
TITLE **DERMAPIPER : Dermatitis Solution from Piper Leaf Extracted Hydrogel**
Atopic and Contact Dermatitis are skin diseases that affect the skin's protective layer or skin barrier. Atopic dermatitis occurs due to a genetic, dry skins and immune systems that reach 66.3% of Contact Irritant Dermatitis in Indonesia. Another main triggers such as environment, soap/detergents, wheals, peeling, and other symptoms that will disrupt the sufferer's daily life. The effectiveness of steroids and flavonoids in betel leaves as anti-inflammatory and antipruritic in the form of a gel plaster as hydrating may be expected to utilizing betel leaves as a natural treatment for dermatitis, a common condition in tropical regions.

ID-04 **NAME(S): Lukas Satyatulusati Pamungkasbudi / Aisha Rachmadewi Syarif / Audrey Salsabila Rafani / Rafqa Prasetya Dewantoro / Rizqi Atha Rosadi**
ORGANIZATION: Labschool Cibubur Senior High School
TITLE **CORE-PAC: Eco-Friendly Lightweight Roof Paver for Thermal Heat Reduction Using Recycled PET Plastic, Rice Husk Ash, and Coconut Coir**
Conventional concrete absorbs solar radiation, increases cooling costs and CO_2 emissions, while unmanaged waste pollutes the environment. To address this, we introduce CORE-PAC: a sustainable, lightweight thermal roof paver. CORE-PAC integrates recycled PET plastic replacing heavy sand, rice husk ash as a low-carbon cement substitute, and coconut coir for fiber reinforcement. This combination creates a porous composite with drastically reduced thermal conductivity. Experimental testing confirms CORE-PAC successfully blocks heat transfer. By shielding flat roofs and reducing cement usage, it provides an effective circular-economy solution to cool urban buildings and minimize waste.

ID-05 **NAME(S): CHUMAIRAH OKTRISA RAMADHANIA / MALAICALYA HASINA LEGOWO / ZIA ZURIE ADRIANSYAH / RAHMA ALYA HIMAWAN / DAVINA ANNISA CANDRAWATI / RAYI ADITYA NUGROHO / RADITYA RAAFI ALDIRANGGA**
ORGANIZATION: SMA LABSCHOOL CIBUBUR
TITLE **Himānila: A Smart Bioactive Thermoregulatory Hydrogel Patch with Thermochromic Indicator System Incorporating Stelechocarpus burahol for Sustainable Thermal Management**
Himānila is an innovative smart bioactive thermoregulatory hydrogel patch that integrates sustainable cooling, skin-supporting bioactives, and real-time thermal monitoring into a single wearable platform. Formulated with a polyvinyl alcohol (PVA) hydrogel matrix enriched with Aloe vera, Stelechocarpus burahol extract, Maluku eucalyptus oil, menthol, and Clitoria ternatea anthocyanins, it delivers multifunctional therapeutic benefits. Its distinctive thermochromic indicator changes color in response to skin temperature fluctuations, enabling intuitive, device-free temperature monitoring. Laboratory evaluations confirmed suitable physicochemical properties, microbial safety, skin compatibility, and sustained cooling performance. Himānila offers a scalable, eco-conscious solution for fever management, heat-stress mitigation, and climate-adaptive personal healthcare.

ID-06 **NAME(S): Salwa Raihannur Sabira / Ahda Sabyla Zulfikar / Ulfah Syafni**
ORGANIZATION: Teuku Nyak Arief Fatih Bilingual School
TITLE **Complexity Analysis of Phytochemical Properties of Breadfruit Waste (Arcocarpus altilis) Feasibility Test as Alternative Planting Media in Urban Farming**
Breadfruit (Artocarpus altilis) waste is often underutilized and may contribute to environmental pollution. This study evaluated the potential of breadfruit waste as an alternative planting medium for urban farming. Three treatments were tested: P1 (50% soil + fresh breadfruit), P2 (50% soil + fresh breadfruit and breadfruit leaves), and P3 (50% soil + rotten breadfruit). Parameters observed included moisture content, phytochemical compounds, and plant height. Results showed that fresh breadfruit-based media supported mung bean growth, while rotten breadfruit inhibited germination. These findings suggest that breadfruit waste has potential as a sustainable planting medium, supporting waste reduction and urban agriculture.

ID-07 **NAME(S): Achmad Fadel Rizki Mubarak / Amelia Ardiana Ningrum / Nadine Qinanti Putri Abian / Muhammad Andika Syam Pangestu / Fawaz Bimantara Shidqi / Achmad Naufaldiansyah**
ORGANIZATION: Institut Teknologi Sepuluh Nopember
TITLE **SmartBelt: Inertial Sensor and Artificial Intelligence-Based Belt Innovation for Early Detection of Sarcopenia Risk in the Productive Age**
Sarcopenia is a progressive decline in skeletal muscle mass and function that can occur not only in older adults but also in productive- age individuals with low physical activity. This study proposes Smartbelt an innovative wearable belt integrating inertial sensor, Internet of Things, and Artificial Intelligence for early detection of sarcopenia risk. The system utilizes an Inertial Measurement Unit (IMU) and ESP32 microcontroller to capture and process pelvic movement data, which are analyzed using AI algorithms through a smartphone application. Smartbelt evaluates physical performance indicators and classifies users into safe, pre-sarcopenia, or sarcopenia-risk categories,enabling early intervention and prevention.

IRAN

IR-01 **NAME(S): Mohammad Saleh Bahadori / Seyed Parsa KazeminezhadFard / Ahmad Parang**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Temperature and Humidity-Responsive Topical Hydrogel Product for the Control of Evaporation and Heat Transfer from the Neonatal Skin Surface**
This invention introduces a thermo-sensitive hydrogel for neonatal skin that regulates evaporation and heat transfer to prevent heat stress in infants. The hydrogel undergoes a liquid-to-gel transition upon skin contact and utilizes biocompatible materials for effective thermal regulation.

IR-02 **NAME(S): Majid Akrami / Mohammad Yasin Karami / Arad Shekouh / Ali Jami**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **System and Method for Sanitary Collection, Containment, and Labeling of Human Excretory Samples**
An integrated system designed for hygienic, non-contact collection, containment, and labeling of human excretory samples. It minimizes contamination risks and pre-analytical labeling errors while improving diagnostic accuracy and patient safety.

IR-03 **NAME(S): Sonia Safari**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Smart Adaptive Orthopedic Insole for Dynamic Pressure Redistribution and Diabetic Foot Ulcer Prevention**
A smart adaptive orthopedic insole that provides continuous plantar pressure monitoring and dynamic pressure redistribution. By integrating pressure sensors, adaptive pneumatic cushions, and an intelligent control system, it offers personalized support for orthopedic conditions and diabetic foot complication prevention.

IR-04 **NAME(S): Mahdi Shorgashti / Hosein Daliriyan**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Passive Airflow Deflection Safety Valve for Drones with Mechanical Thrust Cut-Off Detection, Inertial Mass Safety Lock and Mechanical Time Delay**
A fully mechanical and passive drone safety system that activates emergency airflow redirection without electrical power. The system detects thrust loss and free-fall conditions through mechanical mechanisms to deploy an airbag or compressed gas safety device, improving drone crash protection and reliability.

IR-05 **NAME(S): Ali Saadat Bagheri**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Adaptive Serviceable Thermal Energy Core System for Cementitious Structural Elements**
An adaptive thermal energy core system integrated into concrete structures for efficient energy storage and thermal management. Its removable and serviceable design enables maintenance, replacement, and future upgrades while improving building energy efficiency and supporting sustainable smart infrastructure.

IR-06 **NAME(S): Hamid Pourmohammadi Baltorki**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Fully Mechanical Boiler without Using Electricity**
A fully mechanical boiler system that generates steam without electrical power. It uses mechanical water level control, pressure-driven water transfer, and non-electrical heat generation mechanisms to improve efficiency, safety, and operational reliability.

IR-07 **NAME(S): Mohammad Amin Pournouri / Payam Kian Ara / Hamed Jamshidi / Zahra Delbari / Sadegh Rezaei / Morteza Rahimi Tari / Ali Rafiei Tari**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Modular Beehive System with Independent Access and 360° Rotating Hexagonal Frame Modules**
A modular beehive system featuring independent frame modules with 360° rotating hexagonal structures for easier inspection and colony management. The design improves beekeeper ergonomics, reduces handling stress, and enables expandable hive configurations.

IR-08 **NAME(S): SeyedVahid Ahmadi**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **AMNIODISK: Three-Dimensional Self Retaining Placental Tissue Graft with Integral Engagement Structures**
A three-dimensional placental tissue graft with integrated self-retaining structures that enables conversion from a sheet form into a tissue-conforming shape. The graft maintains its position without sutures, adhesives, or external fixation elements for tissue protection and repair applications.

IR-09 **NAME(S): Sara Moradian / Elahe Moazamian**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Skin Digital Twin System Based on Multi-Parametric Data**
A Skin Digital Twin system that integrates imaging, physiological, environmental, and skincare history data to create a personalized dynamic model of skin condition. The system continuously monitors and predicts skin changes to support personalized skincare planning and data-driven dermatology and aesthetic medicine decisions.

IR-10 **NAME(S): Amir Dashti**
ORGANIZATION: The First Institute Researchers and Inventors in I.R. IRAN (FIRI)
TITLE **Method and System for Additively Manufacturing a Customized Article Having Spatially Varying Properties**
Introducing an AI-driven additive manufacturing technology that creates customized products with spatially varying properties from a single 2D image, without 3D scanning or multi-material fabrication.

ITALY

IT-01 **NAME(S): Dorina Burlacu**
ORGANIZATION: Science and Cooking World Congress Foundation (Barcelona)
TITLE **BUR DOR – Next Generation Functional Gastronomy Platform for Health, Wellness and Sensory Science**
BUR DOR is an innovative butter cream created by Chef Dorina Burlacu to explore the future of nutrition, sensory science and Health & Wellness Cuisine. The project introduces a new approach to food design that combines nutritional value, sensory satisfaction and culinary versatility within a single innovation framework. BUR DOR promotes healthier lifestyles while preserving the pleasure and cultural dimensions of gastronomy. Designed as a scalable platform, it supports future developments in functional foods, sensory nutrition, neurogastronomy and wellbeing-oriented culinary applications.

IT-02 **NAME(S): Dr. Golshan Barazesh**
ORGANIZATION: Golshan S.R.L (Rome, Italy)
TITLE **VIZLOC: The 360° Vial Safety Platform Protecting People and High-Value Medicines**
VIZLOC is a modular vial-safety platform designed to route, localize, capture, and contain small leaks during vial handling and transfer. It integrates a self-sealing access interface, Mountain-Core fluid-routing geometry, a segmented wet-activated color indicator, a sector-matched transfer layer, a downstream absorbent containment zone, a >28 cm under-vial localization and anti-slip pad, and standard or adaptive cannula options. Low-cost disposable and advanced configurations support hazardous-drug, radiopharmacy, laboratory, and training workflows while aiming to protect people and preserve high-value medicines. A non-clinical prototype is under development, with performance to be quantified through bench, materials, residual-volume, stability, and usability testing.

JAPAN

JP-01 **NAME(S): Yejin Kim**
ORGANIZATION: The American School in Japan
TITLE **Development of an Agar–Lignin Composite as a Sustainable Shoe Insole Material with Improved Moisture Control and Antibacterial Activity**
This invention proposes an agar–lignin composite as a sustainable shoe insole material with improved moisture control and antibacterial activity. Agar was selected for flexibility and moisture absorption, while lignin was added for structural support, faster drying, and natural antibacterial properties. Composite films with different lignin concentrations were tested for drying behavior, surface moisture response, and antibacterial activity against E. coli. Increasing lignin reduced drying time, decreased retained surface moisture, and enhanced antibacterial effects. The 5–10% lignin range showed the most balanced performance. This project offers a biodegradable, hygienic, and eco-friendly alternative to petroleum-based shoe insole materials.

KAZAKHSTAN

KZ-01 **NAME(S): Najmudin Adikhanov / Semyon Chistyakov / Aidana Kobentai / Alinur Akezhanov / Alikhan Zhetpis**
ORGANIZATION: Nazarbayev Intellectual Schools
TITLE **Óskin – smart seed incubator**
Adverse environmental factors, such as extreme temperatures, moisture fluctuations, and pathogens, significantly reduce seed germination, causing economic losses in Kazakhstan's agricultural sector. This study analyzes the causes of poor germination and the limitations of existing technical solutions. To address these challenges, we propose "Oskin," an intelligent seed germination incubator. The developed system optimizes germination by automatically regulating humidity and continuously monitoring microclimatic parameters via integrated sensors. Additionally, a Telegram bot integration provides users with remote control and real-time telemetry data access.

KENYA

KE-01 **NAME(S): Clinton Adoga / Stella Njambi**
ORGANIZATION: FarmLens Limited
TITLE **FarmLens: AI-Powered Climate-Smart Agriculture Decision Support System**
FarmLens is an AI-powered platform that provides smallholder farmers with real-time, localized insights on weather patterns, soil conditions, and climate risks. By integrating IoT sensors, satellite data, and machine learning, the system delivers actionable recommendations on crop selection, irrigation, and pest control. FarmLens improves productivity, reduces losses, and promotes climate resilience. The platform is accessible via mobile devices, making it scalable across rural communities in Africa and beyond.

KOREA, REPUBLIC OF

KR-01 **NAME(S): Chanhyuk Lee / Chanung Lee**
ORGANIZATION: Student Inventors
TITLE **Somang Bowl: Accessibility-Driven Feeding Bowl for Dogs with Oral Limitations**
Somang Bowl is an accessibility-focused feeding bowl designed for dogs with oral limitations. Its supportive bowl geometry and feeding interface are intended to make food easier to reach and consume, reduce strain during eating, and provide a more stable mealtime experience for animals with restricted jaw or mouth function. The concept supports safer, more independent feeding and improved daily care for affected dogs.

KR-02 **NAME(S): Raymond Otis Kwon**
ORGANIZATION: Seoul International School
TITLE **VibeCoach: AI-Powered Vibrotactile Music Practice Assistant**
VibeCoach is an AI-driven wearable that delivers selective vibrotactile feedback only when a music learner makes pitch or rhythm errors. Unlike existing music to haptic products designed for passive sensory experience, VibeCoach is the first system using real-time AI analysis, pitch detection, onset detection, and MIDI score comparison is included to evaluate playing accuracy and deliver targeted correction. Silence signals correct performance; errors trigger distinct vibration patterns through a wrist-band with three ERM motors. Applications span music education for general learners and accessibility solutions for hearing-impaired musicians, who can practice without auditory dependency.

KR-03 **NAME(S): Joy Min / Seojin (Lauren) An / Siddhi Deshmukh / Pavitra Barones Bentinck**
ORGANIZATION: Chadwick International
TITLE **EcoGlow**
EcoGlow is sustainable makeup. Plant-based biodegradable glitter used instead of traditional glitter, and makeup is water-soluble. It can be easily washed away without releasing microplastics or toxic substances into waterways. The makeup also comes with sustainable packaging, further reducing the impact on the environment.

KR-04 **NAME(S): Aiden Yoon / Changjoon Chung**
ORGANIZATION: IRIS LAB
TITLE **WildNet: Solar-Powered AI Mesh Network for Early Wildfire Detection**
WildNet is a solar-powered AI wildfire detection system designed to identify fire risks before they become large-scale disasters. Each sensor node combines thermal imaging, RGB camera analysis, smoke/gas sensing, edge AI processing, and rotating wide-area scanning. Instead of relying on internet access, WildNet nodes communicate through an offline mesh network, allowing alerts to travel across remote forest regions. The system reduces false alarms by cross-validating heat, visual smoke or flame, and gas signals before sending warnings. WildNet offers a low-cost, scalable solution for national parks, municipalities, timber companies, remote resorts, and wildfire-prone communities.

KR-05 **NAME(S): Alyssa Lee**
ORGANIZATION: Yongsan International School of Seoul
TITLE **Postbiotic NeuroShield**
Postbiotic NeuroShield is a cell-free probiotic-derived platform designed to reduce cortisol-induced oxidative stress in human glial cells. This invention uses conditioned medium from Lactobacillus reuteri ATCC PTA 6475 to test whether secreted bacterial factors can protect A172 cells from stress-hormone-induced damage. Cortisol decreased cell viability with an estimated IC_{50} of approximately 380 μM, disrupted cell morphology, and increased intracellular ROS to about 245% of control. However, L. reuteri conditioned medium partially preserved cell attachment and reduced ROS levels in a treatment-dependent manner, suggesting future potential for postbiotic-based stress-protection research.

KR-06 **NAME(S): Ashleen Jisoo Lee**
ORGANIZATION: Korea International School, Pangyo
TITLE **Development of a Smart Portable Air Quality Monitoring Device for Detecting E-Cigarette and Traditional Smoking Exposure**
This study aims to develop a portable device and web-integrated detection system capable of identifying e-cigarette aerosol and traditional cigarette smoke. The system incorporates multiple sensors—PM1.0, PM2.5, PM10, VOC, and MQ9—to capture real-time particulate and gas-phase signatures associated with different smoking behaviors. Experimental results demonstrated that the PM1.0 sensor exhibited the highest sensitivity. The device utilizes Wi-Fi and Bluetooth communication to transmit time-stamped sensor data to a cloud-based dashboard. The findings highlight the potential application of this technology in schools, healthcare settings, and other sensitive environments to reduce secondhand smoke exposure and improve public health monitoring capabilities.

KR-07 **NAME(S): Chae-Eun Lim**
ORGANIZATION: Korea International School, Jeju
TITLE **Endangered Language Time Capsule Platform**
The Endangered Language Time Capsule Platform is a mobile and web-based system designed to preserve endangered languages before they disappear. Using Jejueo, the language of Jeju Island, as the first pilot model, the platform collects voice recordings, translated sentences, local expressions, stories, songs, and historical background from native speakers. The system organizes each entry with location, speaker generation, meaning, and cultural context. It also visualizes language change through maps, colors, timelines, and language survival scores. This invention helps users understand that language is not only communication, but also history, identity, and cultural memory.

KR-08 **NAME(S): Colin Kim Doh**
ORGANIZATION: Korea International School Jeju
TITLE **SambiHeal Vet Patch: A Natural Sauchinone-Based Wound Recovery Gel-Patch for Veterinary Care**
SambiHeal Vet Patch is a natural wound-care invention designed for veterinary applications using Saururus chinensis leaf extract and its active compound, sauchinone. In vitro scratch assay results showed that optimized Saururus chinensis extract and sauchinone treatment improved fibroblast wound recovery, while excessive concentrations reduced healing potential. This product concept applies the research as a controlled topical gel-patch, spray, or hydrogel dressing for minor skin wounds in pets and livestock. By combining plant-based anti-inflammatory activity, antioxidant support, and practical veterinary delivery, SambiHeal offers a sustainable, low-cost, and scientifically guided alternative for future animal wound-care products.

KR-09 **NAME(S): Eric Kim**
ORGANIZATION: IRIS LAB
TITLE **ThermoRecover Patch: A Temperature-Optimized Smart Patch for Muscle Cell Recovery and Sports Injury Care**
ThermoRecover Patch is a temperature-optimized smart recovery patch designed to support muscle healing after exercise, soreness, or minor injury. Conventional recovery products often use simple heating or cooling without considering the biological stage of muscle repair. This invention applies a stage-based strategy: early cooling to reduce acute stress and later mild warming to support muscle cell migration, repair, and regeneration. The product can be designed with a hydrogel contact layer, controllable temperature module, and recovery guidance system. By combining muscle cell biology with wearable technology, ThermoRecover Patch offers a practical and science-based solution for sports recovery and rehabilitation.

KR-10 **NAME(S): Hayjun Kang**
ORGANIZATION: Seoul Scholars International Art and Design
TITLE **Eco-Friendly Indigo Biosynthesis in Escherichia coli: A Dual-Enzyme Platform for Sustainable Textile Dye Production**
This invention presents an eco-friendly microbial platform for indigo dye production using engineered E. coli. The system compares StyA/StyB-only, NDO-only, and StyA/StyB + NDO co-expression conditions to identify the most effective biosynthetic strategy. The dual-enzyme N+S condition produced the strongest indigo signal across tested temperatures, with the highest output at 37°C. The biologically produced indigo also successfully stained cotton fabric and thread, demonstrating practical textile potential. Although staining intensity was lower than commercial indigo, this project provides a strong proof of concept for sustainable, fermentation-based indigo dye production as an alternative to conventional chemical synthesis.

KR-11 **NAME(S): Ian Kim**
ORGANIZATION: Saint Paul Preparatory Seoul
TITLE **NeuroFit Patch: A Wearable Brain-Recovery Patch Inspired by Exercise-Induced TPH2 Activation**
NeuroFit Patch is a wearable neuro-recovery device inspired by exercise-induced TPH2 activation, a serotonin-related pathway associated with brain-cell survival under oxidative stress. The patch combines gentle micro-vibration, mild thermal stimulation, guided breathing cues, and optional heart-rate variability tracking to simulate short exercise-like recovery signals for students and adults experiencing stress or fatigue. Based on preliminary cell research showing that TPH2 overexpression improved A172 brain-cell survival under H_2O_2-induced oxidative stress, this invention translates a biological exercise mechanism into a non-invasive, daily-use wellness technology.

KR-12 **NAME(S): Jaden Min**
ORGANIZATION: Chadwick International
TITLE **Development of Coffee-Infused Agarose Films as Sustainable Antibacterial Food Packaging Materials**
This invention presents coffee-infused agarose films as sustainable antibacterial food packaging materials. Agarose was used as a biodegradable film matrix, while coffee extracts from Kenya, Indonesia, and Guatemala were added as natural antimicrobial ingredients. The 0.4 g agarose formulation showed better flexibility and adhesion than thicker films, making it suitable for fruit wrapping. In a seven-day apple surface test, the Kenya coffee-infused film showed the strongest reduction in bacterial contamination and visible browning. This project suggests that coffee-derived bioactive compounds can improve biodegradable food packaging and provide an environmentally friendly alternative to plastic packaging and synthetic preservatives.

KR-13 **NAME(S): Jaeyoon Lee**
ORGANIZATION: Chadwick International
TITLE **Developing Natural Wound Healing Agents from Jeju Tangerine Byproducts for Veterinary Care**
This invention develops natural veterinary wound-healing agents from Jeju tangerine byproducts. Citrus peels were processed into fresh and fermented extracts, then analyzed for flavonoid composition, phenolic content, antioxidant activity, and wound-healing effects. Fermentation reduced glycoside flavonoids such as hesperidin and naringin while increasing aglycones such as hesperetin and naringenin, improving antioxidant activity. In scratch wound-healing assays, low-dose fermented extract showed the strongest wound closure, while higher concentrations inhibited cell migration. This project demonstrates that Jeju citrus waste can be converted into a sustainable, bioactive, and low-cost veterinary wound-care material.

KR-14 **NAME(S): Jennifer Kang**
ORGANIZATION: Grace International Academy Micro Lab
TITLE **AromaFocus StudyPod: A Botanical Scent-Based Learning Support Diffuser for Student Stress Relief and Concentration**
AromaFocus StudyPod is a botanical air freshener designed to support student stress relief and concentration during studying. The product uses rosemary, lavender, lemon, and orange scents to create purpose-based aroma blends for learning environments. Rosemary and lemon provide a fresh focus-supporting scent, while lavender and orange create a calming atmosphere for stress reduction. Unlike ordinary air fresheners, this product is designed specifically for students and study spaces, such as desks, classrooms, libraries, and exam-preparation rooms. AromaFocus StudyPod offers a simple, non-digital, low-cost, and student-friendly wellness tool for improving comfort and focus in academic environments.

KR-15 **NAME(S): Jeongha Youm**
ORGANIZATION: IRIS LAB
TITLE **AgeSync Duo: A Cell-Tested Anti-Aging Skincare System Using Vitamin C, Vitamin E, Niacinamide, Retinol, and Peptides**
AgeSync Duo is a cell-tested anti-aging skincare invention that evaluates combinations of vitamin C, vitamin E, niacinamide, retinol, and peptides. Many anti-aging products use these ingredients, but the safest and most effective combinations are not always clear. This project uses skin cell-based testing to compare ingredient mixtures for cell viability, oxidative stress protection, and skin-repair potential. The final product concept separates daytime antioxidant protection from nighttime renewal and repair. By combining cosmetic science with biological validation, AgeSync Duo offers a practical and evidence-based approach to developing safer, more effective, and personalized anti-aging skincare products.

KR-16 **NAME(S): Jiyoo Erin Lee**
ORGANIZATION: Seoul Foreign School
TITLE **Standardizing Microbial Art: A Scientific Framework for Predictable Bioart Using Pigmented Microorganisms**
This invention proposes a standardized scientific framework for microbial art using safe pigmented microorganisms. Six BSL-1 strains, including three E. coli K-12 variants and three S. cerevisiae variants, were compared for colony growth, pigment intensity, and color stability on agar plates. ImageJ analysis was used to quantify color intensity objectively. E. coli showed faster growth and stronger saturation, making it suitable for bold short-term designs, while S. cerevisiae showed slower growth but better long-term color stability. This project provides a reproducible microbial palette system for Bioart, STEAM education, exhibition design, and safe interdisciplinary science-art applications.

KR-17 **NAME(S): Jiyoon Kwon**
ORGANIZATION: Saint Paul Preparatory Seoul
TITLE **ThermoSkin Shield: A Heat-Protective Skincare Formula Using Gluconolactone and Trehalose**
ThermoSkin Shield is a climate-adaptive skincare invention designed to protect human skin cells from heat-induced damage. As global warming and heatwaves increase, skin is exposed not only to ultraviolet radiation but also to direct thermal stress. This project tested trehalose and gluconolactone as protective ingredients in human skin cells exposed to acute heat stress. Heat alone reduced cell viability and disrupted morphology. Trehalose showed protective effects at low to moderate concentrations, while gluconolactone provided stronger and more consistent protection across a broader range. This invention proposes a new heat-focused skincare formula for future high-temperature environments.

KR-18 NAME(S): Lea Kim
ORGANIZATION: US International School
TITLE PressureLink Health Monitor: A Non-Invasive Smart System for Aged Groups and Disease-Specific Care
PressureLink Health Monitor is a non-invasive smart pressure-sensing system designed for elderly individuals and patients requiring continuous care. The system uses a thin bed, chair, or floor pad to monitor posture, movement, prolonged pressure, bed-exit behavior, and inactivity patterns. It supports applications in sleepwalking, narcolepsy, pressure-ulcer prevention, dementia-related wandering, and medication care management. Connected to a caregiver app, PressureLink provides real-time alerts and daily activity reports without requiring wearable or invasive devices. This invention aims to improve patient safety, reduce caregiver burden, and provide an affordable monitoring solution for homes, hospitals, and long-term care facilities.

KR-19 NAME(S): Minjun Lee
ORGANIZATION: Seoul Academy
TITLE AEKI: A Caregiver-Friendly Daily Observation App for Children with Autism Spectrum Disorder
AEKI is a caregiver-friendly wellness web app designed for parents of young children aged 2–7 who have been diagnosed with Autism Spectrum Disorder. Many caregivers feel overwhelmed after diagnosis and struggle to organize daily observations for medical consultations. AEKI helps them record sleep, mood, behavior, meals, and short notes in a simple one-minute daily check-in. Important behavioral events can be documented using the ABC format: Antecedent, Behavior, and Consequence. The app also provides activity preparation tips and generates printable doctor-friendly reports, helping caregivers communicate more clearly with professionals while keeping data secure and private.

KR-20 NAME(S): Quinn Illynn Lee
ORGANIZATION: Seoul Foreign School
TITLE MyoRecover Precision Nutrition System: A Cell-Based Strategy for Personalized Muscle Recovery
MyoRecover Precision Nutrition System is a proposed muscle-recovery support platform designed to identify optimal nutritional recovery strategies after exercise-induced muscle damage. The invention is based on a cell-screening approach comparing whey protein, casein protein, and creatine under muscle-stress conditions caused by oxidative stress, lactic acid accumulation, and inflammation. By testing these nutrients in L6 muscle cells and analyzing cell viability and recovery-related gene expression, the system aims to guide evidence-based recovery recommendations for athletes, rehabilitation patients, and aging populations. This invention combines nutritional science, muscle biology, and personalized recovery planning in a practical future health-support system.

KR-21 NAME(S): Seeun Jang
ORGANIZATION: Busan Foreign School
TITLE NoodleCycle BioConversion: Transforming Expired Instant Noodles into a Plant-Supporting Soil Resource Through Microbial Processing
This invention presents NoodleCycle BioConversion, a microbial system that converts expired instant noodles into a plant-supporting soil resource. Expired noodles are difficult to recycle because their starch, oil, salt, and seasoning may inhibit plant growth when applied directly to soil. In this project, crushed expired noodles were pretreated with Bacillus subtilis and then mixed into soil at different doses. Bok choy was used to test germination and early seedling growth. Unprocessed noodle soil reduced germination, while fermented low-dose soil restored germination and improved root and shoot growth. This system offers a sustainable solution for processed food-waste recycling.

KR-22 NAME(S): Seho Jang
ORGANIZATION: Busan Foreign School
TITLE MycoSeal Insulator: Prototype Development of a Water-Resistant Bio-Based Insulation Board Using Mycelium, Red-Algae Agar, and a Natural Wax Barrier
MycoSeal Insulator is a prototype water-resistant bio-based insulation board designed for sustainable construction. The material combines a mycelium composite core, red-algae agar binder, and natural wax barrier layer. Mycelium provides a lightweight porous structure for insulation, agar improves internal cohesion, and wax coating reduces moisture penetration. Prototype samples were successfully fabricated using a simple mix–mold–dry process. Compared with pure beeswax, a beeswax–canola oil blend showed better coating workability. Wax-coated samples also demonstrated improved short-term water resistance compared with uncoated samples. This project suggests a promising eco-friendly insulation concept requiring further engineering validation.

KR-23 NAME(S): Seojun Lee
ORGANIZATION: Korea International School, Pangyo
TITLE SeaShield BioCoat: A Marine Biomass-Based Protective Coating for Sustainable Cement Infrastructure
SeaShield BioCoat is a marine biomass-based protective coating designed for sustainable cement infrastructure. This invention uses agar as a natural film-forming matrix combined with seaweed or kelp biomass to create low-toxicity cement surface coatings. In prototype testing, optimized 1.5 g agar–seaweed and agar–kelp formulations formed smoother films with fewer cracks, reduced water absorption, and improved resistance to UV-induced microcrack formation compared with uncoated cement. The project offers a renewable alternative to conventional epoxy, polyurethane, and acrylic coatings. With further durability validation, SeaShield BioCoat could support greener buildings, coastal infrastructure, and environmentally responsible construction.

KR-24 NAME(S): Seoyeon Park
ORGANIZATION: IRIS LAB
TITLE AromaMind BioFocus: A Biomarker-Guided Scent Diffuser for Student Stress Relief and Concentration Support
AromaMind BioFocus is a biomarker-guided scent diffuser designed to support student stress relief and concentration. The system uses rosemary, lavender, lemon, and orange scents in preset blends for focus, calmness, mood uplift, and sleep relaxation. To move beyond subjective aromatherapy claims, this project evaluates scent effects using salivary cortisol, salivary α-amylase, HRV, heart rate, short-term memory tests, and problem-solving performance. Instead of fully personalized scent design, which may be difficult to commercialize, the product recommends practical scent modes based on student needs. AromaMind BioFocus offers a measurable, student-friendly wellness tool for learning environments.

KR-25 **NAME(S): Seoyoung Im**
ORGANIZATION: BC Collegiate
TITLE **Fabrication of Mushroom-Derived Fibers for Sustainable Textile and Biomaterial Applications**
This invention presents a proof-of-concept method for producing biodegradable mushroom-derived fibers from Pleurotus ostreatus biomass. Fresh mushroom material was mechanically processed into a homogeneous slurry, extruded into continuous filaments using a syringe-based method, and dried under laboratory conditions. The resulting fibers retained elongated, fiber-like structures after drying, demonstrating the feasibility of converting mushroom biomass into stable filamentous materials. Microscopic observations revealed surface roughness, micro-cracks, and diameter variation, indicating that fabrication optimization is still needed. This project suggests that mushroom biomass may serve as a renewable precursor for future sustainable textiles, biodegradable composites, and biofabrication applications.

KR-26 **NAME(S): Sogyu L Kim**
ORGANIZATION: Korea International School
TITLE **AirHeal-Lung: A Cell-Based Screening Platform for Evaluating Natural and Anti-Inflammatory Recovery Strategies**
AirHeal-Lung is a screening platform using human lung cells to determine recovery mechanisms from PM2.5-induced cell injury. In a pre-clinical setting, the project will expose A549 lung cells to fine particulate matter, then treat them with a Natural Healing candidate or an anti-inflammatory drug, decamethasone. The project will measure cell viability by using the PrestoBlue assay, examine cell structure using microscopy, and collect samples of RNA for gene expression analysis. This research offers a practical model for studying air pollution-related lung cell injury and developing preventative or supportive health technologies.

KR-27 **NAME(S): Yugun Sok**
ORGANIZATION: Korea International School, Pangyo
TITLE **EcoImpact BioPad: A Biodegradable Cork–Mycelium–Seaweed Composite for Sustainable Sports Protection**
EcoImpact BioPad is a biodegradable composite sheet designed for sustainable impact absorption in sports equipment. The material combines cork powder, mushroom mycelium powder, and seaweed solution to create a natural alternative to petroleum-based foams and plastics. Cork contributes compressibility and shock absorption, mycelium provides fibrous reinforcement, and seaweed functions as a biodegradable binder. Among tested formulations, the hybrid cork–mycelium–seaweed sheet showed the best overall performance, with high flexibility, strong structural integrity, and stable morphology during storage. This invention offers a promising eco-friendly material platform for future protective sports gear, padding, and cushioning products.

KR-28 **NAME(S): Yuna Jung**
ORGANIZATION: Branksomehall Asia
TITLE **NeuroAroma Shield: Evaluation of Peony, Peppermint, and Lavender Oils for Reducing Cortisol-Induced Brain Cell Inflammation**
This invention presents NeuroAroma Shield, a biological screening platform for evaluating fragrance-related oils against cortisol-induced brain cell inflammation. A172 human glial cells were treated with cortisol to induce inflammatory responses, then exposed to lavender, peppermint, peony, or diphenhydramine. Lavender, peppermint, and peony maintained relatively high cell viability and reduced the expression of inflammatory markers TNF-α, IL-6, and IL-1β. Peony showed the strongest anti-inflammatory effect, while diphenhydramine increased inflammatory marker expression. This project suggests that selected fragrance oils, especially peony, may provide biologically supported stress-care potential beyond subjective aromatherapy effects.

KR-29 **NAME(S): Cheon Dongin**
ORGANIZATION: Seoul National University of science and technology
TITLE **SurvivorSense Smart Emergency Survival Spoon for Human Condition Assessment and Hydration Recovery**
SurvivorSense is a Smart Emergency Survival Spoon designed to support rapid hydration recovery and emergency response in disaster and survival situations. The device integrates a sealed electrolyte and nutrient delivery chamber with a human-condition assessment indicator that helps users recognize dehydration risks. By simply adding the spoon contents to water, users can quickly prepare a recovery drink and use the same spoon for mixing and consumption. Compact, lightweight, and easy to carry, SurvivorSense provides an all-in-one solution for emergency hydration support in natural disasters, outdoor activities, military operations, humanitarian aid, and remote environments where immediate assistance may be unavailable.

KR-30 **NAME(S): Kim Jihyeon**
ORGANIZATION: Ewha Woman's University
TITLE **Smart Hair Pin (AI-Powered Smart Hair Pin for Women's Safety, Health, and Environmental Monitoring)**
Smart Hair Pin is an AI-powered smart hair accessory that integrates women's safety, health, and environmental monitoring functions into a single compact wearable device. This invention incorporates UV detection, fine dust monitoring, emergency SOS alerts, GPS location sharing, and low-level light therapy for hair loss prevention into a fashionable hairpin design. The collected environmental and health data are synchronized with a smartphone application and analyzed in real time to provide personalized alerts and management information to users. By converging beauty, safety, and healthcare technologies, Smart Hair Pin is a next-generation wearable accessory that enhances women's daily protection, convenience, and overall quality of life.

KR-31 **NAME(S): KIM KIHYUN / (CEO, GEOGRID Co., Ltd.)**
ORGANIZATION: GEOGRID Co., Ltd.
TITLE **BLOS (Building Oasis): A Building-Scale Platform That Purifies Water, Restores Aging Pipes, and Verifies Water Quality in Real Time**
infrastructure instead of replacing it. One bypass-mounted unit integrates three functions — water purification, pipe restoration, and real-time water-quality analysis. Patented power-free ionization removes dissolved oxygen, converting rust inside existing pipes into a protective magnetite coating, while built-in sensors verify quality continuously instead of two-week laboratory tests. KTR certified that a 50-year-old apartment reached building-wide drinking-water compliance within three weeks; residents' drinking rate rose from 1% to 82%. BLOS operates at 34 sites, protected by 21 registered patents..

KR-32 **NAME(S): Daehan Kwon**
ORGANIZATION: Wow Baby Co., Ltd.
TITLE **AI-Powered Smart Stroller Cover with Environmental Monitoring and Infant Safety Management System**
The AI-Powered Smart Stroller Cover with Environmental Monitoring and Infant Safety Management System is an intelligent infant protection platform that integrates artificial intelligence (AI), the Internet of Things (IoT), and real-time environmental sensing technologies into a conventional stroller cover. The system continuously monitors temperature, humidity, UV radiation, air quality (PM2.5/PM10), CO_2 concentration, rainfall, and ventilation conditions surrounding the infant. AI analyzes the collected data to assess potential risks and automatically provides safety alerts, ventilation control, and personalized recommendations through a smartphone application. This invention significantly enhances infant safety, environmental awareness, and parental peace of mind during outdoor activities.

KR-33 **NAME(S): Lee Yun Seo**
ORGANIZATION: Daeyoung Middle School
TITLE **Time Token Clock**
The Time Token Clock is a self-directed smart clock system designed to visualize and manage a user's daily time in the form of digital ‘tokens.’ Users can allocate time tokens to various activities such as studying, gaming, exercising, and resting, and the corresponding tokens are automatically deducted in real time based on the selected activity. The system features an LED-based visual interface, vibration alerts, and voice notifications to help prevent excessive immersion in specific activities and promote self-regulation. In addition, AI-based behavioral pattern analysis supports users in improving their awareness of time and ability to maintain focus.

KR-34 **NAME(S): Park Eunhye**
ORGANIZATION: ACTS University
TITLE **Bible Touch (AI-Powered Dynamic Braille Bible Pad with Voice Guidance System)**
Bible Touch is a smart accessibility platform that converts Bible content into real-time dynamic Braille for visually impaired and low-vision users. The device integrates micro-actuator-based Braille cells, voice recognition, text-to-speech (TTS), and AI-powered Bible commentary functions, enabling users to read and listen to Scripture through tactile and audio interaction. Users can instantly search for specific Bible verses using voice commands, while multilingual Bible and educational content are also supported. By replacing bulky printed Braille Bibles with a portable digital platform, Bible Touch significantly improves accessibility, portability, educational opportunities, and the overall convenience of spiritual life.

KR-35 **NAME(S): Minkyeol Kim / Junki Shin**
ORGANIZATION: Korea International School Jeju Campus / St Johnsbury Academy Jeju
TITLE **Natural deodorizer made with Jeju's naturally derived tree resources and herbs**
The present invention relates to a natural multi-functional antibacterial and deodorizing agent that maximizes efficacy by extracting essential oils from five plants native to or cultivated on Jeju Island—cypress, lavender, eucalyptus, tea tree, and lemongrass—using steam distillation, mixing them with Jeju Samdasu water, and nanoemulsifying them through ultrasonic treatment. Existing antibacterial and deodorizing products rely on synthetic chemicals, posing issues of skin irritation and environmental burden. Furthermore, natural essential oils have limitations in their practical performance due to low water solubility and dispersion stability. However, the present invention overcomes these limitations by applying ultrasonic treatment to the extracted essential oils after mixing them with Samdasu water. Specifically, the acoustic cavitation generated within the liquid by ultrasound induces the formation, growth, and collapse of microbubbles. The localized high-energy shock waves and powerful shear forces generated during this process pulverize and disperse the oil phase of the essential oil into nano-sized microdroplets within the water phase. The nano-sized oil particles formed through this process dramatically increase surface area and dispersion stability and maximize contact efficiency with target microorganisms and odor molecules, thereby enhancing antibacterial and deodorizing efficacy.

KUWAIT

KW-01 **NAME(S): Meshari Hamoud Al-Mutairi**
ORGANIZATION: Individual Participant
TITLE **Smart trolley**
The Smart Trolley is an autonomous luggage transport system designed to operate inside airports without human intervention. It transfers baggage directly from the check-in counter to the aircraft using conveyor integration, barcode tracking, and real-time flight information displays. The trolley is powered by solar energy or rechargeable batteries and includes an automatic solar panel self-cleaning system. Inside, it contains three storage racks with a total capacity of up to 60 bags, equipped with sensors and stabilizers to ensure safe handling. For security and safety, the system features X-ray scanning, internal cameras, warning lights, and audible alerts. After unloading at the aircraft, the trolley automatically returns to collect the next batch of luggage and continues operation autonomously.

LEBANON

LB-01 **NAME(S): Kassem Hallal / Ahmad Hallal / Ahmad Issa / Ameer Arzouni /**
Invention Teacher: Mr Kassem Hallal / Coordinator: Mrs Amena Allouch
ORGANIZATION: Safir High School & Lebanese Innovators' Society (L.I.S.)
TITLE **AutoFlora**
AutoFlora is an AI-enhanced smart wireless irrigation system designed to improve irrigation efficiency while reducing water consumption. The system continuously monitors soil moisture using wireless sensor nodes and transmits data to a central monitoring station. An artificial intelligence module analyzes soil moisture together with environmental conditions to determine the optimal irrigation time and duration. When watering is required, the system automatically activates the pump until the desired moisture level is reached. Experimental testing demonstrated reliable wireless communication and approximately 28% water savings, making AutoFlora an efficient and sustainable solution for modern agriculture.

LB-02 **NAME(S): Kareem Ghazali / Rayan Darwish / Tarek Hinnawi / Celine Sultan Abi Faraj /**
Sora Souhail Abi Ghannam / Teacher: Mrs Rena Alhamra / Director : Mr Ramzi Zeineddine
ORGANIZATION: Irfan Schools - Bassateen & Lebanese Innovators' Society (L.I.S.)
TITLE **Fog to Water Technology**
This invention presents a sustainable fog-to-water harvesting system that converts atmospheric fog into clean water. The device uses a high-voltage electrostatic collector to attract and condense microscopic water droplets onto a collection surface, where the water is directed into a storage container. Powered by solar energy, the system operates with minimal environmental impact and is suitable for arid and water-scarce regions. The invention provides an energy-efficient, low-cost, and eco-friendly solution for producing fresh water for domestic, agricultural, and emergency applications.

LB-03 **NAME(S): Doha Dabdoub / Julia Manaa / Naya Nahas / Mohammad Al Khatib / Yousef Al Sayed /**
Teacher: Mrs Asmaa Hindwi / Director: Mr Jehad Daoud
ORGANIZATION: Global International School & Lebanese Innovators' Society (L.I.S.)
TITLE **SafePack IoT**
SafePack IoT is an intelligent, dual-device student safety and health ecosystem integrated with the Internet of Things (IoT). It consists of a smart backpack and a wearable wireless wristband that communicate seamlessly via micro:bit radio signals. Built to protect young students, the system uses an internal accelerometer to correct spinal posture, a light-sensor-based "Silent Guard" to detect open-zipper theft during recess, and a discreet SOS button for emergencies. It also incorporates background health timers for hydration and eye-strain alerts. If the backpack is forgotten or stolen, the wristband triggers an instant proximity alarm.

LB-04 **NAME(S): Georges Al Maalouf / Mohamad Chaabo / Lamita Ghawi / Razane Salah / Tala Ghawi /**
Teacher: Mrs Linda Sawan / Director: Mrs Jeanne Marie Sawan
ORGANIZATION: École Orhodoxe Secondaire- Kobbeh- Tripoli & Lebanese Innovators' Society (L.I.S.)
TITLE **Shared Responsibility Network**
Shared Responsibility Network is an interactive educational system that demonstrates how ethical responsibility is shared within a community. Using multiple BBC micro:bit devices connected through wireless radio communication, users face realistic moral dilemmas and choose whether to act or ignore a situation. Responsible actions produce immediate positive outcomes, while ignored situations are transferred to another participant, illustrating that responsibility does not disappear but shifts to others. The project combines interactive programming, wireless communication, and visual feedback to promote empathy, accountability, ethical leadership, and active citizenship while demonstrating how technology can encourage positive social behavior.

LB-05 **NAME(S): Dr. Moussa Sweidan / Raefa Jomaa**
ORGANIZATION: Touch Education & Lebanese Innovators' Society (L.I.S.)
TITLE **Smart Tutor – A Personalized AI Learning Environment**
Smart Tutor is a personalized, multilingual AI learning environment that gives every student an individual tutor. Built with the no-code platform n8n and powered by a free AI model, it adapts each explanation to the student's level and interests — for example, teaching fractions through football for a student who loves the sport. It understands and replies in Arabic, English, and French, and adjusts its difficulty as the student progresses. Every conversation is automatically logged to a data table, giving teachers real insight into engagement and learning needs. Smart Tutor makes one-to-one, adaptive learning affordable, scalable, and accessible on any device.

MACAU, CHINA

MO-01 **NAME(S): CHONG CHI HIN / LEONG WENG IN / LAM JEFFREY / BABOLAL SANJAANA PATRICE / HONG SIO TENG**
ORGANIZATION: The Affiliated School of the University of Macau
TITLE **Visual-Text Cognitive Support for Learning Disabilities**
This research addresses text comprehension difficulties faced by individuals with special educational needs, including dyslexia and visual impairments. By integrating Optical Character Recognition (OCR) with AI image generation technology, it provides an efficient, accessible learning aid to improve learning efficiency and promote educational inclusion. In traditional learning environments, these individuals often struggle with text understanding, leading to low efficiency and psychological exclusion. OCR enables accurate text extraction from images, while AI image generation transforms abstract text into intuitive visual materials. Together, they create personalized learning paths tailored to each user's needs. The study optimizes recognition rates, processing speed, and interface design to overcome existing barriers, ultimately fostering educational equity and accessibility.

MACEDONIA

MK-01 **NAME(S): Dejan Shirkoski**
ORGANIZATION: Orto Frend DOO Prilep
TITLE **Cervical Collar with oximeter – CervO2Sense**
The invention is a medical device comprising an anatomically shaped cervical collar made of polyurethane foam with a soft, skin-compatible cover. It integrates a pulse oximetry sensor containing red and infrared LEDs and a photodetector for continuous measurement of arterial oxygen saturation (SpO_2) and heart rate. The sensor is connected to an external microprocessor module that processes the signals and displays the measured values on an integrated screen. The invention combines cervical immobilization with real-time physiological monitoring for emergency, clinical, and home healthcare applications

MALAYSIA

MY-01 **NAME(S): ASST PROF DR NORZALIFA ZAINAL ABIDIN / KALAM PIE / NURUL AINA SUHAILA MOHD NIZA / NURUL DIANA SOFIYA MOHD NIZA / NURUL HANA KHAIRINA BT MOHD NIZA**
ORGANIZATION: JUNGLE SCHOOL GOMBAK MALAYSIA, IIUM JUNGLE SCHOOL INITIATIVE, AAD KAED IIUM
TITLE **INDIGENOUS OA IMMERSIVE INTERGENERATIONAL INCLUSIVE KNOWLEDGE AS GOMBAK HULU LANGAT NATIONAL GEO PARK COMMUNITY SHARING AND FACILITATION**
In 2025–2026, Jungle School Gombak Malaysia (JSGM) delivered immersive Orang Asli (OA) programmes focused on intergenerational, facilitation, inclusive knowledge-sharing within the Gombak–Hulu Langat Geopark community. Activities integrated indigenous survival skills, forest food sourcing, hut-building, and ecological stewardship with cultural practices. Visitors from local and global communities enhanced cross-cultural exchange and global impact. Collaborations included the IIUM Jungle School Initiative, Usrah in Action (UNICORE) IIUM students, government agencies, local authorities, schools, colleges, corporates, NGOs, universities, and volunteers. These partnerships strengthened community-based learning, research, and sustainable development, positioning indigenous knowledge as a shared global heritage fostering resilience and inclusive growth.

MY-02 **NAME(S): Dr. Fatin Hana Naning / Associate Prof Dr Yiu Pang Hung / Ms. Elisha Yiu / Dr. Latifah Omar / Ts. Jimmy Anjang**
ORGANIZATION: Universiti Putra Malaysia, Universiti Pendidikan Sultan Idris
TITLE **Functional Bario Rice for a Functional Life**
This invention presents Functional Bario Rice, a premium whole grain product derived from highland cultivars of Bario rice in Sarawak. By selecting and de-husking the top-performing cultivars, the rice retains its exquisite texture, aroma, and taste, while demonstrating enhanced nutrient bioaccessibility and antioxidant properties. This makes it an ideal functional food for health-conscious consumers seeking whole grain alternatives. The innovation delivers a product that combines traditional heritage with modern nutritional benefits, offering potential applications in functional food products, nutraceuticals, and wellness-focused diets. This invention not only adds value to local rice varieties but also promotes healthy dietary options, supporting both consumer wellness and sustainable agricultural development.

MY-03 **NAME(S): Ir. Dr. Mohd Azuwan Maoinser / Mr. Muhammad Haris Hamdan / Dr. Nur Hidayah Sazali / Ts. Sulaiman Sidek / Mrs. Siti Nur Syazni Mohd Zuki**
ORGANIZATION: Universiti Teknologi PETRONAS & PETRONAS Carigali Sdn. Bhd.
TITLE **AGGLOVA: Next-Generation Hybrid Sand Control System Using Chemical Agglomeration for Sustainable Well Integrity**
AGGLOVA is a next-generation hybrid sand control system integrating chemical agglomeration with mechanical screens to address sand production challenges in unconsolidated reservoirs, which cause wellbore instability, erosion, and production loss. By inducing controlled interparticle bonding through Sand Agglomeration Chemicals (SAC), AGGLOVA transforms fine particles into stable agglomerates, forming a pseudo-gravel pack that enhances retention while preserving permeability. Laboratory validation enables predictive correlations between sand characteristics and performance. AGGLOVA improves operational reliability, reduces interventions, and offers a scalable, cost-effective solution for sustainable well integrity and long-term production optimization.

MY-04 **NAME(S): Professor Ts. Dr. Murali Raman / Prof Ir EUR ING Dr Vinesh Thiruchelvam / Prof. Dr. Mohammad Falahat Nejadmahani**
ORGANIZATION: Asia Pacific University of Technology & Innovation, Kuala Lumpur
TITLE **Design Thinking & Growth Mindset Model: From Process to Progress**
Design thinking (DT) acts as a catalyst for fostering a growth mindset (GM) within organizations. While GM is the belief that abilities develop through dedication and learning from failure, DT provides a systematic, user-centric framework to practice these traits. Through iterative stages like prototyping and testing, DT encourages teams to "fail fast" and refine solutions based on feedback, reducing the fear of failure. This collaborative process squashes silo mentalities and sharpens listening skills, directly addressing GM dimensions like talent development and constructive feedback, ultimately driving innovation and resilience.

MY-05 **NAME(S): PROFESSOR DR. ABDURAHMAN HAMID NOUR / PROFESSOR DR. AZHARY HAMID NOUR / Dr. AHMED ADAM HASSAN / Dr. NORASYIKIN BINTI ISMAIL / MOHD ARMAN BIN KADIR**
ORGANIZATION: UNIVERSITY MALAYSIA PAHANG AL SULTAN ABDULLAH, UMPSA
TITLE **Industrial Scale-Up of Novel Canola Oil-Based Surfactant for Commercial Production of Stable Heavy Crude Oil Emulsions to Improve Pipeline Transport Efficiency**
This study presents the industrial scale-up of a novel canola oil-based surfactant for the commercial production of stable heavy crude oil emulsions aimed at improving pipeline transport efficiency. The bio-based surfactant was formulated to reduce crude oil viscosity, enhance emulsion stability, and minimize energy consumption during transportation. Pilot and industrial-scale evaluations demonstrated significant improvements in flow characteristics, pressure reduction, and operational stability under varying pipeline conditions. The surfactant also exhibited good environmental compatibility and economic feasibility compared with conventional petroleum-based additives. The findings highlight the potential of renewable surfactant technology as a sustainable and cost-effective solution for heavy crude oil transportation.

MY-06 **NAME(S): PROFESSOR DR. ABDURAHMAN HAMID NOUR / PROFESSOR DR. AZHARY HAMID NOUR / Dr. AHMED ADAM HASSAN / Dr. NORASYIKIN BINTI ISMAIL / MOHD ARMAN BIN KADIR**
ORGANIZATION: UNIVERSITY MALAYSIA PAHANG AL SULTAN ABDULLAH, UMPSA
TITLE **Integrated Ultrasonic Membrane Anaerobic System (UMAS) for Efficient and Sustainable Organic Wastewater Treatment**
This study presents an Integrated Ultrasonic Membrane Anaerobic System (UMAS) for efficient and sustainable organic wastewater treatment. The system combines anaerobic digestion with ultrasonic-assisted membrane filtration to enhance pollutant removal, reduce membrane fouling, and improve biogas production. Ultrasonic irradiation promotes membrane permeability and biomass activity, resulting in higher treatment efficiency and operational stability. The UMAS demonstrates effective removal of chemical oxygen demand (COD), suspended solids, and organic contaminants while reducing energy consumption and sludge generation. The integrated approach offers a promising and environmentally sustainable solution for treating high-strength organic wastewater in industrial and agricultural applications.

MY-07 **NAME(S): Associate Professor Dr Norma Ab Rahman / Su Li**
ORGANIZATION: School of Dental Sciences, Universiti Sains Malaysia
TITLE **Customized Orthodontic Mini-implant Guide (OrthoCOMIG)**
Orthodontic mini-implants provide vital skeletal anchorage, but freehand placement is technique-sensitive, risking root damage, inaccurate angulation, prolonged chairside time, and inconsistent outcomes. To address these challenges, Customized Orthodontic Mini-implant Guide (OrthoCOMIG) is a patient-specific guiding system developed using digital 3D planning and CAD/CAM fabrication. It ensures precise, standardized control over implant angulation, depth, and insertion site, minimizing human error. By transitioning from freehand to guided insertion, OrthoCOMIG enhances clinical precision and patient safety. It reduces root injuries, shortens chairside time, and lowers operator dependency, ultimately advancing precision orthodontics and improving overall treatment predictability and standards of care. Key words. 3D and CAD/CAM designed, customized mini-implant guide, orthodontic treatment.

MY-08 **NAME(S): Ahmad Ashraf Bin Abdul Aziz / Mohd Fakhizan Romlie / Moosavi Mahdiyehsadat / M Naufal M Saad / Frédéric Merienne**
ORGANIZATION: Universiti Teknologi PETRONAS
TITLE **Development of a Virtual Reality High Voltage Laboratory (VRHVL)**
The Virtual Reality High Voltage Laboratory (VRHVL) is an immersive educational platform designed to improve high-voltage engineering learning. The platform allows users to safely explore virtual laboratory environments, interact with equipment, and observe electrical phenomena such as dielectric breakdown. Developed using virtual reality technology, VRHVL addresses limitations of conventional laboratories including safety risks, high operational costs, and restricted accessibility. The platform provides repeatable, interactive, and realistic learning experiences while supporting engineering education and technical training. It offers a scalable solution for universities and industry seeking cost-effective and accessible laboratory-based learning.

MY-09 **NAME(S): HU LAEY NEE / NORSARIHAN AHMAD / VUN XIU XUAN / LAI CHAUN CHOY / GRACE TAN HONG HUI / AUDREY KONG SIAU JING / JENNISSA AING ANAK JIM**
ORGANIZATION: INSTITUTE OF TEACHER EDUCATION SARAWAK CAMPUS, MIRI, SARAWAK, MALAYSIA
TITLE **Robots-enhanced Operation for Brilliant Opportunity in Teaching Success 5.0 (R.O.B.O.T.S5.0)**
R.O.B.O.T.S 5.0 (Robots-enhanced Operation for Brilliant Opportunity in Teaching Success) is an advanced educational innovation designed to transform primary school learning through robot construction, mobile programming, and gamified learning. Moving toward a structured, mission-based approach, pupils build and navigate smartphone-controlled robots to complete specific curriculum tasks in English, Malay language, and Mathematics. Grounded in collaborative and differentiated learning, the program requires young students to work in diverse teams, actively matching letters, vocabulary, and numbers while recording their daily progress. Thus, this initiative creates a dynamic, student-centered classroom environment that deeply fosters digital literacy, teamwork, problem-solving capabilities, and 21st-century communication skills.

MY-10 **NAME(S): Narendran Ramasenderan / Krishna Ravinchandra / Vinesh Thiruchelvam / Harshayn Vythilingam / Darrick Aaron Untarman / Gayatri Reshma Penjarla / Moiz Bin Jaafar Bhay / Yaswanth Komatineni**
ORGANIZATION: Asia Pacific University of Technology & Innovation
TITLE **ARIVAAN Robot doctor Kiosk: AI-Powered Autonomous Medical Screening for Underserved Rural Communities**
ARIVAAN MediGuard is an autonomous mobile robotic platform for clinical screening in hospitals, clinics, and care institutions. It combines a twelve-modality non-contact physiological sensor arrayincluding millimetre-wave radar, thermal imaging, remote photoplethysmography, acoustic sensing, VOC and CO_2 detection, pose estimation, near-infrared spectroscopy, and seismocardiographywith edge-fog-cloud computing. A five-model multilingual subsystem captures patient history across nine Southeast Asian languages, while an agentic retrieval-augmented AI pipeline fuses biomarkers with symptoms to deliver ranked differential diagnoses, urgency classification, evidence tracing, and practitioner referral. Targeting Malaysian MDA Class B certification and ISO 80601-validated, it addresses Malaysia's specialist shortage, 1,500:1 patient-to-doctor ratio, and language and cost barriers.

MY-11 **NAME(S): Ir. Narendran Ramasenderan / Prof. Ir. Eur Ing Dr. Vinesh Thiruchelvam / Krishna Ravinchandra / Sin Jun Yan / Chin Kah Min**
ORGANIZATION: Asia Pacific University of Technology & Innovation (APU) — Centre for Research & Development of IoT (CREDIT) / IoTech Solutions Sdn Bhd
TITLE **MultiSentinel SwarmGuard ISW-H2: An ATEX-Rated Autonomous Chemical-Safety Rover for Leak Detection and Integrity Assurance in Green-Hydrogen Production Facilities**
MultiSentinel SwarmGuard ISW H2 is an AI-powered autonomous inspection rover for hazardous industrial and green-hydrogen facilities, built on the SCUTTLE AMR platform with a ROS2/Nav2 stack and ATEX-rated, explosion-proof design. Patrolling electrolyser halls, storage banks, refuelling points, semiconductor fabs and chemical plants, it fuses stereo acoustic sensing, MQ137 hydrogen/ammonia detection, MLX90640 thermal imaging, acoustic-triggered OV3660 cameras, and machine-vision fiber-optic cable inspection flagging damage, bend-radius violations and improper routing. A One-Class Anomaly Detection pipeline using Qwen2-VL embeddings detects unseen faults, while a Gaussian-plume model predicts leak spread and triggers evacuation guidance. The result: continuous autonomous integrity assurance, cutting hazardous human exposure by up to 90%.

MY-12 **NAME(S): Goh En Qi / Danya Loo Yixuan / Howen Lim / Stephanie Hew Pui Yan / Dr. Chng Chern Wei / Dr. Mohd Ridhwan Hilmi Bin Mohd Adnan**
ORGANIZATION: First City University College
TITLE **FinGuardian AI: Smart Banking Intelligence for Risk, Retention & Customer Growth**
FinGuardian AI: Smart Banking Intelligence for Risk, Retention & Customer Growth is an intelligent banking system we developed to predict customer behavior, assesses financial risk, and recommends personalized banking strategies. The architecture of our system includes data understanding, data cleaning, machine learning, prediction, smart recommendation engine that recommend different offer based on customer types, and visualizes all data on an interactive executive dashboard. By combining these features, FinGuardian AI enables banks to improve loan targeting reduce customer churn, and enhance growth strategies. The platform transforms raw banking data into actionable insights, supporting smarter and more efficient banking operations.

MY-13 **NAME(S): Prof. Dr. Mohammad Falahat**
ORGANIZATION: Strategic Research Institute (SRI), Asia Pacific University of Technology & Innovation (APU)
TITLE **Big Data Analytics Capability Ecosystem Framework for SME Digital Transformation**
The Big Data Analytics Capability Ecosystem Framework for SME Digital Transformation is a ministry-ready programme design innovation derived from Prof. Dr. Mohammad Falahat's MASA-funded Malaysian SME research and its published policy paper. It helps ministries, SME agencies, incubators and universities diagnose SME data readiness, identify internal enablers and external barriers, and design targeted interventions for big-data adoption, productivity, export readiness and sustainable competitiveness. The framework is valuable because Malaysian MSMEs are large contributors to GDP, employment and exports, yet many still lack the capability and support system needed to convert digital activity into business value.

MY-14 **NAME(S): YE XUNAN / XU JINGAN / MA YIKUI / FU HANGHANG / SUN YINGBIAO / LIU WENQI**
ORGANIZATION: CHINA CONSTRUCTION YANGTZE RIVER SDN BHD
TITLE **Key Technologies and Application of "Reduction-Interception-Control" Collaborative Prevention and Control for Urban and Rural Water Pollution**
This technology adopts a "reduction–interception–control" model for water pollution treatment. It introduces innovations in pollutant detection, remote sensing early warning, ecological revetment and sludge recycling technologies. The technology has obtained multiple patents and standards, and has been widely applied in many provinces, achieving significant economic and ecological benefits.

MY-15 **NAME(S): YE XUNAN / MA YIKUI / FU HANGHANG / LI JIAN / SHOU XUCHENG**
ORGANIZATION: CHINA CONSTRUCTION YANGTZE RIVER SDN BHD
TITLE **Key Semi-top-down Construction Technologies for Deep Foundation Pits in Urban Core Areas of Mekong River Basin with Complex Geology**
This invention provides key semi-top-down construction technologies for deep foundation pits in urban core areas of the Mekong River Basin with complex geology. It develops an innovative soil–structure interaction model, a complete construction methodology and an intelligent monitoring platform, solves construction difficulties in narrow soft soil areas, shortens construction period, improves safety and efficiency, and has been successfully applied in Cambodia FTB Project with significant economic and social benefits.

MY-16 **NAME(S): YE XUNAN / MA YIKUI / FU HANGHANG / XU JINGAN / SUN YINGBIAO**
ORGANIZATION: CHINA CONSTRUCTION YANGTZE RIVER SDN BHD
TITLE **Key Technology for Foundation Treatment in Tidal Mangrove Marsh with Thick Humus Soft Soil**
This technology solves construction challenges related to thick flow-plastic soft silt under high tidal fluctuations. It adopts shallow hard-shell solidification, deep sleeved bored piles and a collaborative monitoring system. The technology improves foundation bearing capacity, avoids pile defects and ensures construction safety, making it suitable for coastal engineering under complex tidal geological conditions.

MY-17 **NAME(S): YE XUNAN / MA YIKUI / FU HANGHANG / WANG RAN / TEO YEE LONG**
ORGANIZATION: CHINA CONSTRUCTION YANGTZE RIVER SDN BHD
TITLE **Key Technologies and Modular Data Center Construction with AI-Based Completion of the Final 30% Forward Design**
This project addresses key challenges in overseas data center construction. It uses AI intelligent agents to automatically complete the final 30% of forward design, integrates modular construction with a digital platform, and establishes a closed loop across design, construction and operation. The technology improves efficiency, reduces design changes and lowers costs.

MY-18 **NAME(S): PROFESSOR DR. ABDURAHMAN HAMID NOUR / Dr. AHMED ADAM HASSAN / Dr. NORASYIKIN BINTI ISMAIL / MR. ABDELGADIR ABDELRAHMAN ALKHABEER / MR. MOHAMED ELHAFIZ AHMED IBRAHIM**
ORGANIZATION: UNIVERSITY MALAYSIA PAHANG AL SULTAN ABDULLAH, UMPSA
TITLE **From Lab to Market: Pilot-Scale Microwave-Assisted Hydro-distillation (MAHD) of Gum Arabic for High-Value Natural Ingredients and Premium Food-Grade Gum**
This project translates lab-scale MAHD of gum arabic into a pilot-ready process that yields two marketable product streams: (1) a premium, deodorized/low-color food- and pharma-grade gum with improved sensory and functional attributes, and (2) natural hydrosol/volatile fractions (and their gum-based microencapsulated powders) for use as clean-label flavor, fragrance, and antimicrobial ingredients. MAHD provides rapid, energy-efficient selective removal/recovery of volatile impurities and bioactives compared with conventional hydrodistillation and solvent extraction, while leveraging gum arabic's intrinsic emulsifying capacity to enable in-situ stabilization and downstream spray-drying. The program targets TRL advancement from TRL-4/5 → TRL-7, demonstrating a continuous or semi-continuous pilot line, validated QC specifications, regulatory readiness (GRAS/EFSA), techno-economic viability, and a partner-oriented commercialization plan for food, beverage, nutraceutical, and cosmetic markets.

MY-19 **NAME(S): Ts. Dr. Rayner @ Henry Pailus / Professor Ts. Dr. Rayner Alfred / Ts. Lee Ren Ting**
ORGANIZATION: Universiti Malaysia Sabah
TITLE **MADBOOST AI Land-Based AQUA: An AI-Driven Smart Land-Based Grouper Breeding and Farming System Using Computer Vision, IoT Sensors, Predictive Analytics, and Recirculating Aquaculture Systems**
The increasing demand for grouper fish and sustainable food production has accelerated the adoption of land-based aquaculture systems. This study proposes MADBOOST AI Land-Based AQUA, an artificial intelligence-driven framework that integrates computer vision, Internet of Things (IoT) sensors, predictive analytics, and Recirculating Aquaculture Systems (RAS) for smart grouper breeding and farming. The framework utilizes underwater cameras and water quality sensors to monitor fish health, behavior, growth, and environmental conditions. At its core, the MADBOOST (Multiple Adaptive Derivative Boosting) algorithm combines multiple data sources to support disease detection, growth prediction, water quality forecasting, feeding optimization, and early warning alerts, enabling sustainable and efficient Aquaculture 4.0 practices.

MY-20 **NAME(S): Ts. Shaffika Suhaimi / Ungku Hajah Noorakmal Binti Ungku Sulaiman / Ts. Khairunnisha Ismail / Tan You Fu / Lah Wan Yee / Dr. Bambang Suhartono bin Mohd Said**
ORGANIZATION: Southern University College (SUC) and Perbadanan Perpustakaan Awam Johor (PPAJ)
TITLE **ADAPTIVE SMART PLATFORM: SUSTAINING JOHOR'S IDENTITY THROUGH INNOVATION**
This system introduces a pioneering smart innovation designed to sustain and preserve the unique story of Johor, aligning with global calls for sustainability, resilience, and cultural continuity. Unlike conventional platforms that overlook Johor's cultural, historical, and environmental narrative, this solution integrates artificial intelligence, interactive storybooks, adaptive quizzes, family communication tools, and a centralized dashboard to safeguard local heritage while promoting long-term resilience. By embedding intelligent technologies with adaptive design and resource-efficient practices, the system enhances operational efficiency, reduces ecological impact, and ensures Johor's identity and legacy are maintained for future generations. The platform's modular and scalable architecture empowers diverse stakeholders including communities, educators, and industry partners to engage with Johor's story in meaningful ways. Interactive storybooks and quizzes foster literacy and critical thinking, while the family chat module strengthens intergenerational dialogue and cultural transmission. The dashboard provides real-time insights into learning progress, resource utilization, and engagement, enabling informed decision-making and sustainable practices. Early findings demonstrate improved adaptability to disruptions, optimized resource use, and the creation of social and economic value rooted in cultural sustainability. This innovation exemplifies how smart technologies can extend beyond technical efficiency to preserve heritage, foster environmental responsibility, and shape intelligent solutions for a sustainable and resilient future. By combining data-driven insights with cultural storytelling and family centered engagement, the system positions Johor as a model for integrating sustainability with digital innovation, ensuring that its legacy continues to inspire and educate generations to come.

MY-21 **NAME(S): Ts. Abdul Mueiz bin Rosli / Ts. Dr. Megat Azrin bin Ahmad / Dr. Ahmad Wiraputra bin Selamat / Mr. Prabu a/l Tharmalingam**
ORGANIZATION: Sultan Idris Education University
TITLE **GeoAttendance: Solving UPSI's Staff Attendance Challenges with Geolocation Technology**
GeoAttendance is a geolocation-based attendance solution developed in-house for Sultan Idris Education University. It replaces unreliable punch-card and QR-reader processes with GPS-enabled check-ins using staff smartphones. Built with Flutter, CodeIgniter and PostgreSQL, the system records attendance in real time and integrates with UPSI's Human Resource Division system. The solution improves data accuracy, accessibility, transparency and user experience while reducing queues, processing delays, hardware dependency and operating costs. Results include 98.1% positive user feedback, HR processing time reduction from 72 to 24 hours, over 90% cost savings and 93% faster event attendance recording.

MY-22 **NAME(S): Assoc. Prof. Dr. Murni Halim / Dr. Sangkaran Pannerchelvan / Prof. Ts. Dr. Rosfarizan Mohamad / Dr. Mohd Shamzi Mohamed / Dr. Fadzlie Wong Faizal Wong**
ORGANIZATION: Universiti Putra Malaysia
TITLE **GABA-Enriched Probiotic Fermented Milk: A Novel Functional Food for Health and Wellness**
Gamma-aminobutyric acid (GABA) is a non-protein amino acid with significant health benefits, including stress reduction, sleep improvement, and blood pressure regulation. However, natural dietary sources are scarce. Our innovation is a novel, cost-effective method to produce GABA-enriched fermented milk using a natural probiotic strain, Lactiplantibacillus plantarum B7. By optimizing fermentation conditions (skim milk concentration, temperature, pH, substrate, co-factors and incubation) and using food-grade ingredients, we have successfully produced fermented milk with high GABA content (4.85 g/L) and superior probiotic viability, offering a safe, delicious, and accessible functional food.

MY-23 **NAME(S): Professor Ts. Dr. Rayner Alfred / Ts. Dr. Rayner Henry Pailus / Ts. Lee Ren Ting**
ORGANIZATION: Malaysia AI Centre of Excellence (MaiCoE), UMS
TITLE **FusionCare: A Smart Patient Tracking and Behavioral Analytics System**
FusionCare is an intelligent healthcare monitoring platform designed to provide continuous, real-time human activity recognition (HAR) for patient safety using smartphone and Ultra-Wideband (UWB) sensors. The system integrates mobile applications, machine learning models, a web-based dashboard, and cloud-enabled data management to detect activities including walking, standing, sitting, sleeping, and falls. Comparative evaluation demonstrates that the smartphone-based XGBoost model achieved 86.23% accuracy with 90.91% fall recall, outperforming both the UWB tag model (82.05%) and a CNN–LSTM model (70.04%). FusionCare offers privacy-preserving, scalable, and cost-effective monitoring with real-time alerts, supporting safer, more responsive, and intelligent healthcare environments.

MY-24 **NAME(S): DR.GOMATHY SANKARAN**
ORGANIZATION: SJKT KANGKAR PULAI
TITLE **KARAI NAGAR ECO-STEM WATER-SAVING PELLET**
Karai Nagar Eco Pellet is an innovative Eco-STEM solution developed to increase water retention in desert sand and support plant growth in water-scarce environments. Produced from biodegradable organic waste such as coconut husk, sugarcane bagasse, corn cob, orange peel and rose petals, the pellet transforms discarded materials into a high-value water-saving resource. When mixed with desert sand, its porous fibres absorb water, slow drainage and retain moisture for longer periods. The invention was evaluated through controlled experiments using equal quantities of sand, organic material and water to compare retention performance. This affordable, environmentally friendly solution reduces waste, conserves water and strengthens dryland cultivation. It demonstrates how Science, Technology, Engineering and Mathematics can transform organic waste into climate-resilient solutions worldwide.

MY-25 **NAME(S): NUR SYAHIRUNNIZA BIN NUR DZAINUDDIN / MUHAMAD HALEEL BIN NAZRI / MUHAMMAD SYUIB FITRI BIN KAMARULNIZAM / WONG CHI ZHER**
ORGANIZATION: KOLEJ TEKNOLOGI TERMAJU JABATAN TENAGA MANUSIA KAMPUS KUALA LUMPUR.
TITLE **Development of a Smart Vehicle Turn Signal System (Smart Turn Assist Signal) Based on Voice Sensor and Magnetic Switch**
This project was developed as a Vehicle Signal Light Control System based on voice commands and magnetic switches, with the primary objective of enhancing safety and facilitating the use of signal lights during driving. The system employs Arduino UNO WiFi Rev2 as the main controller, an Intelligent Voice Recognition Sensor to receive voice command inputs, a magnetic switch to detect steering movement, and relays to control the left and right signal lights.The purpose of developing this system is to reduce driver negligence when changing lanes or making turns, while simultaneously raising awareness of the importance of using signal lights. Initial testing was conducted using a simulator before being implemented on a real vehicle, namely the Hyundai Santa Fe. The test results demonstrated that the system operated reliably in activating the left and right signal lights through both voice commands and magnetic switches.

MY-26 **NAME(S): Dr. Maheera Mohamad (Leader) / Dr. Chuah Lai Fatt / A Jasril Akhtar Saleh / Nur Azean Baharom / Tunku Muhammad Al-Amin Tunku Kasim**
ORGANIZATION: School of Technology Management & Logistics (STML), Universiti Utara Malaysia, (UUM)
TITLE **EcoPress Brick & Tile: Environmentally Safe Pressmud-Cement Bioaggregate Brick-Tile**
EcoPress Brick & Tile is a sustainable binary cement brick and tile that converts sugar-refinery pressmud into a useful bioaggregate. Pressmud is sun-dried, ground, sieved and incorporated at 10-30% by weight, balancing environmental and mechanical performance. Standardized granular and tank leaching assessments showed minimal trace-metal release below relevant regulatory thresholds, supporting its classification as a non-hazardous construction material. The innovation diverts industrial residue from disposal, reduces dependence on conventional raw materials and supports circular, lower-impact brick and tile production through a simple process that can be integrated into existing manufacturing operations.

MY-27 **NAME(S): AIDA SHUHAIDA MUSTAFA / HERNI HALIM / JULIE AZITA MOHD ROSLI / ROSAIDA ABDUL KADIR**
ORGANIZATION: SCHOOL OF LANGUAGES, LITERACIES & TRANSLATION – UNIVERSITI SAINS MALAYSIA
TITLE **THE EVOLUTION OF ACTING ACROSS DIMENSIONS TOWARD MODERN DIGITAL PEDAGOGY: INTEGRATING THE CYBER-STANISLAVSKI EXPERIMENTAL FRAMEWORK IN MALAY LANGUAGE TEACHING**
This study presents a paradigm shift in character acting and language training through "Cyber-Stanislavski," an experimental framework that integrates Constantin Stanislavski's classic acting system into the digital pedagogy ecosystem for the Tatabahasa Melayu Interaktif (TMI) micro-credential course at the Tuanku Syed Sirajuddin Engineering Campus, Universiti Sains Malaysia. The Cyber-Stanislavski framework is an innovative digital pedagogical model designed for the Tatabahasa Melayu Interaktif (TMI) micro-credential course at Universiti Sains Malaysia (Tuanku Syed Sirajuddin Engineering Campus). It bridges classic dramatic arts theory—specifically Constantin Stanislavski's methods—with modern immersive technologies to enhance digital Malay language learning.

MY-28 **NAME(S): Khalilullah Amin Ahmad / Ali Abdul Jalil / Mohammad Hafiz Darpen / Muhammad Fathullah Al Haq Muhammad Asni / Muhammad Wafiy Adli Ramli**
ORGANIZATION: School of Humanities, Universiti Sains Malaysia
TITLE **I-TABAYYUN HADITH: A Hybrid Verification Protocol (HVP) for Digital Hadith Authentication in Teaching and Learning**
I-TABAYYUN HADITH is an innovative Hybrid Verification Protocol (HVP) that integrates classical Hadith authentication methodologies with Malay-language digital databases to simplify Hadith verification in teaching and learning. The framework guides users through a structured five-step verification process, combining textual analysis, keyword search, cross-database validation, scholarly verification, and reflective learning. Implemented in higher education, the innovation significantly enhances students' digital literacy, verification accuracy, and learning efficiency. More than 90% of users reported improved confidence in authenticating Hadith. The framework supports educational institutions, religious agencies, and public communities in promoting evidence-based Islamic knowledge and combating misinformation.

MY-29 **NAME(S): Puganeshwary Palaniandy / Mohd Sharizal Mohd Sapingi**
ORGANIZATION: School of Civil Engineering, Universiti Sains Malaysia
TITLE **Synthesis TiO2/Fe/Zeolite Nanocomposites Catalyst**
The TiO_2/Fe/Zeolite nanocomposite catalyst described in this invention was prepared via a controlled sol-gel synthesis method for potential use in environmental treatment. By integrating the adsorption capacity of zeolite with the photocatalytic qualities of TiO_2 and the modifying impact of iron, the material combines natural zeolite with iron-modified TiO2. Titanium (IV) isopropoxide and ferric nitrate are used in production, with the mixture then carefully mixed, aged, dried, and calcined. The suggested approach provides a systematic way to create a supported nanocomposite catalyst that could be used for sustainable water and wastewater treatment, as well as for improved handling and removal of contaminants.

MY-30 **NAME(S): Khalilullah Amin Ahmad / Muhammad Fathullah Al Haq Muhammad Asni / Muhammad Airil Rizman Izhar / Mohd Nasrul Yaqin Abdullah / Nik Ikrami Haji Omar**
ORGANIZATION: School of Humanities, Universiti Sains Malaysia
TITLE **SMART JELAJAH SEERAH: AI-Powered Immersive Umrah Learning Ecosystem Integrating Ritual Guidance, Prophetic Heritage and Digital Spiritual Experience**
SMART JELAJAH SEERAH is an AI-powered hybrid learning ecosystem that transforms conventional Umrah training into an immersive spiritual experience. The innovation integrates interactive Manasik guidance, Prophetic Seerah exploration, AI-assisted learning, QR-enabled content, reflective e-journaling, and gamified assessments within a single digital platform. Unlike traditional Umrah modules that primarily focus on ritual procedures, SMART JELAJAH SEERAH promotes experiential learning by connecting every stage of Umrah with authentic historical narratives and spiritual reflections. The ecosystem enhances pilgrims' preparedness, engagement, knowledge retention, and spiritual transformation while providing scalable, market-ready solutions for Hajj agencies, Islamic institutions, universities, and lifelong learning communities worldwide.

MY-31 **NAME(S): MUHAMAD FAIZAL PAKIR MOHAMED LATIFF / NORMASHITA ABDUL HALIM / ANAS IBRAHIM / MOHD AZRIZAL FAUZI / MUHAMMAD NASRI NASEHIR KHAN / SHANKER KUMAR SINNAKAUDAN / MOHD SHARIZAL ABDUL AZIZ / WAN MOHD YUSOF RAHIMAN WAN ABDUL AZIZ / MOHD REMY ROZAINY MOHD ARIF ZAINOL**
ORGANIZATION: Universiti Teknologi Mara & Universiti Sains Malaysia
TITLE **RainReady-IDF: A Climate-Smart Rainfall Design Tool for Flood-Resilient Cities**
RainReady-IDF is a climate-smart decision-support tool that transforms local rainfall records into climate-adjusted design rainfall information for resilient urban drainage planning. The framework integrates gauge-derived intensity-duration-frequency (IDF) analysis, ARI-specific climate change factors and Malaysia's HP1 regional benchmark within a transparent workflow. It identifies storm durations where local climate-adjusted rainfall may exceed conventional regional design assumptions, enabling engineers to review drainage capacity more effectively. Demonstrated in the Permatang Rawa urban catchment, the approach highlights critical short-duration rainfall risks and supports evidence-based decisions for drains, culverts, detention systems and future climate-resilient infrastructure.

MY-32 **NAME(S): Haichuan Ma / Bin He / Beibei Hao / Mohd Remy Rozainy Mohd Arif Zainol**
ORGANIZATION: Ningbo University & Universiti Sains Malaysia
TITLE **A One-Health Watershed Risk Assessment Method Coupling Event Memory, Phenotypes, and Multi-Receptor Dynamics**
Pollution events are not isolated accidents, but cumulative signals embedded in watershed systems. This invention proposes a One Health risk assessment method that transforms historical pollution records into computable Watershed Event Memory through natural language processing, geolocation, evidence weighting, and expert verification. It integrates river-network transport, health-buffer capacity, and human-animal-ecosystem receptors to identify risk phenotypes, including hotspots, corridors, clusters, and compound networks. Validated with 2,606 pollution events from the Yangtze and Yellow River basins, the method outputs event likelihood, transmission pathways, receptor exposure, vulnerable nodes, and evidence confidence, enabling watershed governance to shift from reactive response to anticipatory health protection.

MEXICO

MX-01 **NAME(S): Yeo Eun Park / Jason Jung**
ORGANIZATION: American School Foundation of Guadalajara, Cypress High School
TITLE **TAL1-PrognoScan: A Gene-Amplification-Based Prognostic Screening System for Breast Cancer Risk Assessment**
TAL1-PrognoScan is a breast cancer prognostic screening system designed to identify patients with potentially aggressive cancer behavior through TAL1 gene-amplification and expression analysis. The invention was developed from genomic database analysis showing that TAL1 amplification appeared in deceased breast cancer patients but not in living patients. Experimental validation in MDA-MB-231 breast cancer cells further showed that TAL1 overexpression increased cell viability and colony formation, while TAL1 knockdown reduced cancer-cell growth. This system combines TAL1 genomic screening, mRNA expression testing, and risk-score interpretation to support personalized prognosis prediction and future treatment planning.

MONGOLIA

MN-01 **NAME(S): Myagmarsuren Tsanjid**
ORGANIZATION: Urangar Urlal LCC
TITLE **Mongolian Ger Lantern**
This artwork is inspired by the iconic form and structure of the traditional Mongolian ger, a remarkable symbol of the nomadic Mongolian people's intellectual heritage and craftsmanship. The design beautifully combines traditional knotting techniques with contemporary interior aesthetics, creating a unique harmony between cultural tradition and modern design. The composition of the ger's roof poles and the circular crown (toono) is delicately recreated through intricate hand-tied string patterns. By using ancestral knotting methods in an innovative way, the piece reinterprets a centuries-old craft from a fresh artistic perspective. The lantern's distinctive woven textures and ornamental knots interact elegantly with light, producing a warm, peaceful, and comforting atmosphere within any living space. Beyond its practical function as a lighting object, it serves as an artistic statement that brings the spirit of Mongolian heritage into modern interiors. More than a decorative lamp, this piece embodies the beauty of traditional Mongolian culture while celebrating the creativity of contemporary craftsmanship. Its fusion of cultural symbolism, fine handwork, and ambient illumination makes it a one-of-a-kind artwork that both preserves and reimagines the essence of nomadic life.

OMAN

OM-01 **NAME(S): AHMED SIDEEG HAGANA ELMASAD**
ORGANIZATION: Structural and Mechanical Safety and Resilience LLC (SMSR Global)
TITLE **A Unified Materials Platform for 112 Engineering Applications**
A unified materials platform delivering 112 engineering solutions across 11 technology families: defense, infrastructure, energy, water, transport, healthcare, aerospace, marine, agriculture, furniture, and mechanical systems. Built on a single composite material system (recycled content), governed by graded resistance for impact absorption and biomimetic mechanical interlocking for structural stability. Solutions include self-healing armor, self-sealing tanks, earthquake-resistant foundations, passive solar desalination, and lighter aerospace structures. Fully documented, ready for manufacturing licensing. Patent applications filed in Oman. Sustainable, cost-effective, and globally scalable

PERU

PE-01 **NAME(S): Manuel Jesús, Sánchez Chero / William Rolando Miranda Zamora / José Antonio, Sánchez Chero / Lesly Carolina, Flores Mendoza**
ORGANIZATION: UNIVERSIDAD NACIONAL DE FRONTERA
TITLE **AN OSMOTIC DEHYDRATOR FOR VEGETABLE PRODUCTS WITH RECIRCULATION OF THE OSMOTIC SOLUTION**
The invention consists of an osmotic dehydrator for plant products with recirculation of the osmotic solution, comprising: a formulation tank, supported by a main support, connected to a rotating motor equipped with vanes; a dehydration tank, connected to the formulation tank by piping, housing a main grid and a concentration sensor; solenoid valves and a water pump connected to the piping; and a control system connected to the rotating motor and the solenoid valves. The invention is useful for the osmotic dehydration of plant products without the use of mechanical agitators in contact with them.

PE-02 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **ANTIBACTERIAL EDIBLE COATING BASED ON ESSENTIAL OILS AND PROCESS FOR OBTAINING THEREOF**
This invention relates to an antibacterial edible coating based on a gelatin/chitosan matrix combined with essential oils of copaiba, oregano, saffron, and bay leaf. It forms a flexible, transparent, and adherent film for fruits, vegetables, meats, and other perishable foods, helping inhibit microbial growth, preserve sensory quality, and extend shelf life through a natural and biodegradable solution.

PE-03 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **REPELLENT COMPOSITION AGAINST BACTERICERA COCKERELLI POTATO PSYLLID BASED ON ESSENTIAL OILS OF PERUVIAN PEPPER TREE, PINE, AND CITRONELLA**
Natural repellent composition against Bactericera cockerelli potato psyllid, based on essential oils of molle, pine, and citronella. It is formulated as a stable aqueous microemulsion for foliar application in potato crops, helping disrupt insect olfactory perception, feeding behavior, and host location, while reducing reliance on synthetic pesticides.

PE-04 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **REPELLENT COMPOSITION AGAINST PREMNOTRYPES SPP. ANDEAN POTATO WEEVIL BASED ON ESSENTIAL OILS OF CINNAMON, PERUVIAN PEPPER TREE, AND CLOVE**
This invention is a natural repellent composition against Premnotrypes spp., the Andean potato weevil, based on cinnamon, molle, and clove essential oils. It is formulated as a stable aqueous microemulsion for foliar and soil application, helping reduce adult and larval presence, protect potato tubers, and support sustainable pest management.

PE-05 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman / Miguel Angel Ipanaqué Zapata / Alberto Antonio Cerna Salcedo**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **CAMU CAMU AND GUAVA JUICE FORTIFIED WITH FERRIC EDTA AND VITAMIN B COMPLEX**
This invention is a fortified camu camu and guava juice containing ferric EDTA, zinc gluconate, inulin, folic acid, vitamins B6 and B12, ascorbic acid, and microencapsulated omega-3. It is designed to help prevent and treat iron-deficiency anemia, improve nutritional support, and reduce common adverse effects associated with conventional iron salts.

PE-06 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman / Miguel Angel Ipanaqué Zapata / Alberto Antonio Cerna Salcedo**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **KIWI-BASED BEVERAGE WITH FERRIC EDTA AND OMEGA-3**
This invention relates to a kiwi-based functional beverage fortified with ferric EDTA, inulin, folic acid, vitamins B6 and B12, ascorbic acid, and omega-3. It is designed to support iron bioavailability, help prevent and treat iron-deficiency anemia, provide prebiotic fiber and omega-3, and reduce common adverse effects of conventional ferrous salts.

PE-07 **NAME(S): Oriana Rivera Lozada De Bonilla / Paolo Andree Cayetano Terrel / Sheylla Dally Lorza Huaman / Miguel Angel Ipanaqué Zapata / Alberto Antonio Cerna Salcedo**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **CHICHA DE JORA FORTIFIED WITH FERRIC EDTA, FOLIC ACID, AND PROBIOTICS**
This invention relates to a fortified chicha de jora beverage containing ferric EDTA, folic acid, inulin, vitamins C, B6 and B12, zinc gluconate, and probiotics such as L. plantarum and S. boulardii. It is designed to help prevent and treat iron-deficiency anemia, support gut health, improve iron absorption, and reduce metallic taste and gastrointestinal discomfort.

PE-08 **NAME(S): Oriana Rivera Lozada De Bonilla / Miguel Angel Ipanaqué Zapata / Linda Flor Villa Ricapa**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **ANTIMICROBIAL CHITOSAN COATING WITH ESSENTIAL OILS FOR HOSPITAL ENVIRONMENTS**
This invention relates to a water-based antimicrobial chitosan coating with eucalyptus and muña essential oils and quinoa aqueous extract. It forms a functional film on hospital surfaces, helping reduce microbial load, provide sustained antimicrobial action, improve surface protection, and offer a lower-toxicity alternative to conventional synthetic disinfectants.

PE-09 **NAME(S): Oriana Rivera Lozada De Bonilla / Miguel Angel Ipanaqué Zapata / Linda Flor Villa Ricapa**
ORGANIZATION: Universidad Señor de Sipán - USS
TITLE **DISINFECTANT COMPOSITION BASED ON QUINOA EXTRACT FOR HOSPITAL SURFACES**
This invention relates to a natural disinfectant composition for hospital surfaces, based on oregano, thyme, and eucalyptus essential oils, combined with tara, rosemary, and quinoa extracts in an aqueous matrix. It provides effective antimicrobial action, surface compatibility, formulation stability, and lower toxic impact than conventional disinfectants.

PE-10 **NAME(S): Carlos Alberto Farje Gallardo / Erikson Alexander Jimenez Torres / Lenin Edwads Velez Rodríguez / Oscar Pizarro Salazar / Neyser Mercedes Vigo Maicelo / Jorge Antonio Rojas Quiroz**
ORGANIZATION: UNIVERSIDAD NACIONAL TORIBIO RODRÍGUEZ DE MENDOZA
TITLE **Interactive Modular Oral Health Learning System**
Dental caries remains one of the most prevalent chronic diseases in childhood worldwide. The Interactive Modular Oral Health Learning System is an innovative educational platform that uses large-scale detachable 3D tooth modules to promote active participation, tactile exploration, and collaborative learning. A quasi-experimental study involving 38 preschool children demonstrated statistically significant improvements in oral health knowledge, hygiene practices, participation, and acceptance compared with traditional teaching methods. The intervention showed large effect sizes in knowledge acquisition and student engagement, confirming its educational effectiveness. The system offers a scalable, low-cost solution for schools, dental clinics, and preventive health programs.

PE-11 **NAME(S): Josefa Bertha Pari Olarte / Eddie Loyola Gonzáles / Donato Efraín Ambía Pereyra / José Francisco Kong Chirinos / Pedro Córdova Mendoza**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **HELMET EQUIPPED WITH ARTIFICIAL INTELLIGENCE TECHNOLOGY FOR ADVANCED ACCIDENT DETECTION AND PREVENTION, TOGETHER WITH AN INTEGRATED SOLAR CHARGING SYSTEM.**
The present invention relates to an advanced protective helmet, specifically designed to safeguard physical integrity in high risk activities such as motorcycling, construction, and mining operations, among others. The helmet integrates artificial intelligence technology for enhanced accident detection and prevention, together with an incorporated solar charging mechanism to power its electronic components without requiring external energy sources. Furthermore, it includes impact sensors, real time monitoring, automatic alerts, and mobile connectivity, allowing immediate assistance, greater operational safety, risk reduction, and efficient user protection during continuous hazardous activities in demanding work and transportation environments under different operational and environmental conditions worldwide

PE-12 **NAME(S): Teresa Oriele Barrios Mendoza / Pedro Córdova Mendoza / Cecilia Guiliana Solano García / Angelita Magdalena Martínez Contreras / Esmeralda Del Rocío Córdova Barrios**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **PROCEDURE FOR OBTAINING A NATURAL COAGULANT FROM ALBIZIA LEBBECK FOR THE CLARIFICATION OF DRINKING WATER**
This invention describes an innovative procedure for obtaining a biodegradable natural coagulant from Albizia lebbeck seeds for drinking water clarification through sustainable coagulation–flocculation processes. The system optimizes drying, grinding, extraction, and formulation stages to maximize coagulant protein activity, achieving turbidity removal efficiencies above 90% without generating toxic metallic residues. The proposed technology represents an ecological, low-cost, and adaptable alternative for urban and rural water treatment systems, contributing to environmental sustainability, public health protection, and water security challenges of the 21st century.

PE-13 **NAME(S): Pedro Córdova Mendoza / Teresa Oriele Barrios Mendoza / Dante Fermín Calderón Huamaní / Isis Cristel Córdova Barrios / Juan Carlos Quijandria Lavarello**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **ADVANCED ELECTRIC OVEN WITH SMART TECHNOLOGY TO OPTIMIZE THERMAL EFFICIENCY, REDUCE HEAT LOSSES AND ENSURE PRECISE TEMPERATURE CONTROL IN THREE COMPOSITE LAYERS**
This invention introduces an advanced intelligent electric furnace integrating thermal sensors and specialized software to optimize heat transfer through a three-layer composite structure composed of refractory brick, diatomite, and calcium silicate. The system continuously analyzes thermal behavior, calculates heat losses in real time, and precisely controls temperature distribution, significantly improving energy efficiency and operational safety. Its innovative design minimizes thermal losses, reduces energy consumption, and enhances performance in metallurgical, ceramic, pharmaceutical, and advanced manufacturing industries. The technology contributes to sustainable industrial development and represents a scalable solution with significant global impact in thermal engineering and energy conservation.

PE-14 **NAME(S): Pedro Córdova Mendoza / Teresa Oriele Barrios Mendoza / Carmen Luz Cuba Cornejo / Leslie Marielly Felices Vizarreta / Isis Cristel Córdova Barrios**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **HYBRID BIOADSORBENT BASED ON ACTIVATED POMEGRANATE PEEL AND MICROALGAE BIOCHAR, ITS PREPARATION METHOD AND USE IN THE REMOVAL OF HEAVY METALS FROM WASTEWATER**
The present invention describes an innovative hybrid bioadsorbent composed of activated pomegranate peel and microalgae-derived biochar for the efficient removal of heavy metals from wastewater. The material forms a three-dimensional architecture with heterogeneous pores and active sites, enabling synergistic physicochemical adsorption mechanisms not evident in the prior art. The process includes physicochemical activation, carbonization, and structural integration of both biological phases. The hybrid bioadsorbent exhibits high structural stability, regeneration capability, and reusability in batch and continuous treatment systems, constituting an ecological, sustainable, and low-cost solution for advanced wastewater treatment and environmental remediation.

PE-15 **NAME(S): JANET NATALIA MENDOZA REJAS / AMANDA MARÍA GARCÍA AQUIJE / CAROLINA SOCORRO ROMÁN ESTRADA / AMELIA ROSA MENDOZA REJAS / IRMA ESPERANZA AYBAR BELLIDO**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Portable Handwashing Station Equipped with a Purification System, Integrated Meter, Solar Charging and Ultraviolet Light**
The Portable Handwashing Station Equipped with a Purification System, Integrated Meter, Solar Charging and Ultraviolet Light is a sustainable hygiene solution designed for areas with limited access to clean water and electricity. The device combines multi-stage filtration, UV disinfection, real-time water monitoring, solar energy, rechargeable battery support, and an electronic faucet to ensure safe and efficient handwashing. Its portable and modular design enables deployment in schools, healthcare facilities, rural communities, emergency shelters, and public spaces. The invention improves water quality, promotes public health, reduces water waste, and supports sustainable development through renewable energy integration.

PE-16 **NAME(S): JANET NATALIA MENDOZA REJAS / AMELIA ROSA MENDOZA REJAS / JOSÉ ERNESTO ROJAS CAMPOS / BARI RAFAEL VÁSQUEZ HERNÁNDEZ / SANDRA NIEVES CUADROS LUNA**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Portable and Multifunctional Thermal Box Equipped with a Solar Charging System, Integrated Glucometer, and an AI-Powered Endocrinology Virtual Assistant**
The invention is a portable multifunctional thermal box designed to preserve temperature-sensitive medications such as insulin while simultaneously monitoring patient health. The device integrates a solar-powered refrigeration system, rechargeable battery, digital glucometer, cloud-based data storage, and an AI-powered endocrinology virtual assistant capable of providing personalized recommendations and health alerts. The system ensures medication safety in areas with limited access to electricity, improves diabetes management, and supports remote health monitoring. Its sustainable energy design, portability, and intelligent decision-support functions make it an innovative solution for chronic disease care in rural, emergency, and mobile environments

PE-17 **NAME(S): BARI RAFAEL, VÁSQUEZ HERNÁNDEZ / GROBER JOSÉ, MIRANDA MENDOZA / JOSÉ ABELARDO, CASTILLO NAVARRO / CARLOS GONZALO, SOTELO APARCANA / JULIO ALFREDO, NARRO FALCONÍ**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Multi-Country Customs Compliance Verification Equipment with QR/RFID Digitalization and Sealed Local Record System**
The Multi-Country Customs Compliance Verification Equipment is a portable device that integrates QR code scanning, RFID identification, secure local event recording, and operational profile management into a single platform. The system enables customs and logistics personnel to perform on-site verification of goods and associated documentation while preserving evidence in a protected non-volatile memory system. A tamper-evident compartment safeguards recorded data and may include manipulation detection features. The invention operates independently of continuous internet connectivity and records the active operational profile during each verification event, enhancing traceability, integrity, accountability, and operational reliability across international customs environments

PE-18 **NAME(S): Luisa Antonia Pacheco Villa García / Pedro Cordova Mendoza / Isabel Natividad Urure Velazco / Teresa Oriele Barrios Mendoza / Esmeralda Del Rocío Córdova Barrios**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **SMART MEDICAL ELECTROMAGNETIC INDUCTION HEATER POWERED BY SOLAR ENERGY FOR SAFE HOSPITAL FLUID SUPPLY**
This invention introduces an intelligent medical heating system that safely warms blood, plasma, and intravenous fluids using electromagnetic induction technology without direct contact. The device integrates dual thermal sensors, artificial intelligence-based predictive control, hybrid solar-electric power, digital traceability, and an automated safety alarm system. Designed for hospitals, rural clinics, and mobile healthcare units, it improves patient safety, reduces thermal risks, enhances energy efficiency, and promotes sustainable healthcare. Its innovative combination of smart medical heating, renewable energy, and clinical monitoring offers a globally scalable solution for modern healthcare systems.

PE-19 **NAME(S): AMELIA ROSA, MENDOZA REJAS / BARI RAFAEL VÁSQUEZ HERNÁNDEZ. / TOTI GERMAN, CABRERA MORALES / ALBERTO JESÚS, BARRUETA MENDOZA / ADEMIR GUSTAVO CHALCO CANO**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Georeferenced Device for Estimating Local Economic Activity with Interchangeable Edge Acquisition and Processing Modules**
This invention is a georeferenced modular device designed to estimate local economic activity through the acquisition of field signals using interchangeable sensing modules. The system automatically identifies each module, loads its operational profile, and associates captured data with location and time information. Integrated edge computing processes the information locally, generating technical indicators and spatiotemporal datasets without requiring continuous internet connectivity. The device incorporates traceable data recording, local storage, optional integrity sealing, and export capabilities, providing reliable, standardized, and comparable measurements across different geographic areas and time periods.

PE-20 **NAME(S): CHUQUILLANQUI CASTRO, Jan Carlos / QUISPE REPUELLO, Jhon Anderson**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Robotic Vehicle for Excavation, Seeding, and Irrigation with Embedded Web Control**
This invention consists of a multifunctional, solar-powered, web-controlled robotic vehicle designed to automate three essential agricultural operations—soil tilling, precision seeding, and localized irrigation—in a single continuous cycle. The system integrates a tracked chassis, dynamic stabilization, helical tilling, seed metering, and a servo-driven irrigation arm, all managed by an integrated microcontroller with a local Wi-Fi web interface. It operates autonomously in rural fields without internet or external power, using photovoltaic panels and a rechargeable battery. GPS-based mapping records every treated point, enabling traceable, low-cost precision agriculture for small and medium-sized farms.

PE-21 **NAME(S): LEON GOMEZ, Rodolfo / OCHOA MUÑOZ, Gisela Estefani / SALAZAR ARCHI, Jenny Fabiola / LLIMPE PEREZ, Lenny**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Biological control of the avocado blight (Florinia fiorinae) in avocado cultivation using the fungi Beauveria bassiana and Metarhizium anisopliae.**
This invention relates to a method and a composition for treating the scale insect Fiorinia fiorinae in avocado, using spores of the entomopathogenic fungi Beauveria bassiana and Metarhizium anisopliae. The method comprises isolating both fungi from soil by burying pre-cooked rice in plastic containers for thirty days, culturing the selected isolates in potato dextrose agar (PDA) and related media at controlled pH and temperature, purifying and recovering spores, and applying defined doses between 4.0×10^{12} and 1.2×10^{13} CFU per plant as biological insecticides for the control of Fiorinia fiorinae in avocado crops.

PE-22 **NAME(S): LIZANA HILARIO, Epifanio / CARHUAPOMA SOTO, Jeyssi Yenifer**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Udder Protector for Alpacas**
This invention is an anatomically-designed udder protection device for alpacas used during weaning. It consists of a multi-layer mammary cover and a body-mounting system with a wide Velcro abdominal belt and a bifurcated elastic rear strap forming a pre-shaped perianal opening. This configuration prevents suckling, protects the udder from injuries, dirt and infections, and avoids contact with feces and urine. The device has been validated as a functional prototype in real Andean field conditions, improving animal welfare, reproductive management and productivity in extensive alpaca farming systems.

PE-23 **NAME(S): QUISPEALAYA ARMAS, Luis**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Filter Mask for Underground Mining with Pollutant Sensors and Danger Level Indicators**
This invention is a smart filtering respiratory mask designed for underground mining workers, integrating a multilayer filtration system (primary filter, HEPA and activated carbon) with embedded gas, dust and vibration sensors. Real-time measurements of CO, SO_2, O_2, CO_2, silica dust and structural vibration are processed by an integrated control unit that triggers visual, acoustic and haptic alerts based on danger levels. Through a Leaky Feeder communication module, environmental data and alarms are transmitted to a remote monitoring center, enhancing occupational safety, decision-making and operational continuity in extreme underground conditions.

PE-24 **NAME(S): MENCIA SANCHEZ, Noemi Gladys / RIVERA CASAVILCA, Roger**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Sustainable Construction Panel Filled with Natural Andean Fiber**
This invention is a multi-layer modular sandwich panel for building enclosures that integrates a treated Andean natural fiber core confined in an internal support frame, between external and internal facing layers with dedicated moisture barrier films. The panel incorporates a tongue-and-groove edge with a compressible perimeter gasket, butyl sealing tape, hidden fasteners and a perimeter drainage channel. The architecture assigns a specific technical function to each layer to provide thermal and acoustic insulation, dimensional stability, airtightness and controlled moisture management, enabling rapid modular installation and improved durability for prefabricated walls, partitions and prefabricated building covers.

PE-25 **NAME(S): DIAZ SACCACO, Javier / ORE ARECHE, Franklin / YAURICASA TORNERO, Sandy Vialid**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **PROCESS FOR THE PRODUCTION AND COMPOSITION OF GREEK-STYLE YOGURT WITH THE ADDITION OF PUMPKIN SEED MILK (Cucurbita ficifolia Bouché)**
This invention presents a functional Greek-style yogurt produced from a hybrid matrix of cow's milk and pumpkin seed (Cucurbita ficifolia Bouché) plant-based milk. The standardized process integrates seed soaking–grinding–filtration with conventional dairy operations (pasteurization at 85 °C, lactic fermentation at 43 °C) to obtain a stable, dense and creamy product without syneresis. The optimized 20% vegetal milk formulation provides 7.70% protein, 3.50% fat and 148.12 mg calcium/100 g at pH 4.5 and 16 °Brix, meeting strict microbiological safety criteria and delivering enhanced nutritional, functional and sustainability benefits compared with conventional Greek yogurt.

PE-26 **NAME(S): PAREDES URRIBARRI, Jubneel**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **A cocoa-based food product containing natural sweeteners and enriched with nutritional flours**
This invention presents a cocoa-based food product completely sweetened with a natural sweetener and fortified with nutritional flours from cuy blood and huitlacoche. It contains 80-90% cocoa, 6-8% stevia and 5-9% of each flour. The formulation is designed to increase iron levels in people with anemia and to be safely consumed by diabetic individuals, since it does not use sucrose. Cocoa acts as a masking ingredient, preserving organoleptic and sensory quality so the product can be offered as chocolates, cookies, cakes and other acceptable food formats.

PE-27 **NAME(S): MARIO FRANCISCO, BONIFAZ HERNÁNDEZ / TOTI GERMÁN, CABRERA MORALES / MIDUA CECILIA, GARAYAR GARIBAY / NAUN JOSÉ ALVARADO, FÉLIX MAGALLANES / YESSICA CARMELA MUÑOZ MUÑOZ**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Smart Cash Register with Automatic Tax Calculation and Multi- Currency Accounting**
The Smart Cash Register with Automatic Tax Calculation and Multi-Currency Accounting is a compact electronic device designed to register commercial transactions, calculate taxes automatically, convert amounts between currencies, update exchange rates through internet connectivity, issue printed receipts, and securely store cash. The system integrates an electronic processing unit, internet connection, interactive touch screen, cash storage compartment, thermal printing system, and backup power supply. Its embedded software applies fiscal and accounting algorithms, reducing manual errors and improving transaction control. This invention is intended for businesses, retail stores, entrepreneurs, and commercial environments requiring accurate tax and multi-currency management.

PE-28 **NAME(S): JANET NATALIA MENDOZA REJAS / AMELIA ROSA MENDOZA REJAS / MARIO FRANCISCO BONIFAZ HERNÁNDEZ / TOTI GERMAN CABRERA MORALES / ALBERTO JESÚS BARRUETA MENDOZA**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Smart File Organizer with Automatic Expired Document Detection**
The invention consists of a smart file organizer designed to automatically detect expired and soon-to-expire physical documents. It uses optical sensors connected to an internal processing unit that reads printed dates, labels, or identification codes. The system classifies documents as valid, near expiration, or expired, and generates alerts for the user. It operates autonomously through a rechargeable lithium-ion battery with USB-C charging.

PE-29 **NAME(S): MARINA KELIBE ORÉ CHOQUE / BELINDA MARLENI NAVARRO GUERRA / LUIS ALBERTO PECHO TATAJE / GIULIANA EDITH SOTO LOZA / ANDRÉ ANTONIO MIRANDA MENDOZA**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Smart Vocal Recovery Chamber with Adaptive Environmental Conditioning and Biometric Monitoring System**
EchoRoom is an intelligent vocal rest chamber designed to promote voice recovery through a controlled and adaptive environment. The system integrates acoustic insulation, biometric monitoring, automated regulation of temperature, humidity, lighting, relaxing sounds, and therapeutic aromas. Real-time physiological data are processed to optimize environmental conditions according to the user's vocal and physical state. Designed for teachers, singers, broadcasters, healthcare professionals, and other voice-dependent users, EchoRoom provides a personalized recovery experience that improves vocal health, reduces fatigue, and supports long-term voice preservation through advanced environmental control technologies.

PE-30 **NAME(S): EDWIN MARTIN CORDERO TATAJE / MARSHA KRISTY ORÉ CHOQUE / JANET NATALIA MENDOZA REJAS / AMANDA MARÍA GARCÍA AQUIJE / EVELYN CRISPINA ACEVEDO CRUZ**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **Smart AI-Powered Projector for Body Language and Linguistic Analysis Integrated with a Solar Energy System**
The Smart AI-Powered Projector for Body Language and Linguistic Analysis Integrated with a Solar Energy System is an advanced multimedia device designed to analyze verbal and non-verbal communication in real time. It integrates artificial intelligence, a high-resolution RGB camera, motion sensors, speech analysis, wireless connectivity, projection technology, speaker output, a solar panel, and an internal rechargeable battery. The system detects gestures, facial expressions, body movements, and spoken language to generate adaptive visual or audio feedback. Its solar-powered design enables autonomous, sustainable operation in educational, business, outdoor, and remote environments.

PE-31 **NAME(S): Pedro Córdova Mendoza / Teresa Oriele Barrios Mendoza / Isabel Natividad Urure Velazco / Luisa Antonia Pacheco Villa García / Isis Cristel Córdova Barrios**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **FILTER WITH INTERNAL MICROPOROUS LAYERS BASED ON MORINGA OLEIFERA, VITIS VINIFERA, MUSA X PARADISIACA, ACTIVATED CARBON FROM COCOS NUCIFERA TO PURIFY AND MAKE WATER POTABLE**
This invention introduces an intelligent medical heating system that safely warms blood, plasma, and intravenous fluids using electromagnetic induction technology without direct contact. The device integrates dual thermal sensors, artificial intelligence-based predictive control, hybrid solar-electric power, digital traceability, and an automated safety alarm system. Designed for hospitals, rural clinics, and mobile healthcare units, it improves patient safety, reduces thermal risks, enhances energy efficiency, and promotes sustainable healthcare. Its innovative combination of smart medical heating, renewable energy, and clinical monitoring offers a globally scalable solution for modern healthcare systems.

PE-32 **NAME(S): Cecilia Guiliana Solano García / Teresa Oriele Barrios Mendoza / Pedro Córdova Mendoza / Esmeralda Del Rocío Córdova Barrios / Mario Gustavo Reyes Mejía**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **PORTABLE MODULAR DEVICE INCORPORATING A SEQUENTIAL MECHANICAL CLASSIFICATION MECHANISM AND DYNAMIC COMPARTMENTALIZED REDISTRIBUTION SYSTEM FOR SUPPLIES**
This invention introduces a novel portable modular storage system capable of mechanically classifying, directing, and dynamically redistributing supplies without electronic sensors or structural disassembly. The device integrates mobile compartments, articulated directing plates, progressive redistribution channels, and adaptive locking mechanisms that automatically reorganize internal storage space according to operational needs. Its innovative sequential mechanical architecture improves accessibility, optimizes usable volume, enhances transport stability, and increases organizational efficiency across medical, industrial, logistics, agricultural, and technical applications. The invention represents a new generation of intelligent mechanical storage technologies designed for flexible, scalable, and high-performance supply management.

PE-33 **NAME(S): RULY TERAN HILARES / GILBERTO COLINA ANDRADE / KEVIN TEJADA MEZA / ORNELLA HEREDIA RONDÓN / EDUARDO FLOREZ MARTÍNEZ**
ORGANIZATION: Catholic University of Santa Maria
TITLE **Integrated Process for Obtaining High-Purity Saponin Extracts Selectively Enriched with Phenolic Compounds from Quinoa Residues.**
The present invention describes an integrated process for obtaining saponin extracts from Chenopodium quinoa polishing residues, an agro-industrial by-product with no current commercial value. The process produces extracts with controlled saponin purity levels (42%, 65–68%, and 75–80%) selectively enriched with flavonoids such as rutin and quercetin. Hydrodynamic cavitation is employed for extraction, followed by sequential purification through membrane filtration (microfiltration, ultrafiltration, and nanofiltration), adsorption on AB-8 macroporous resin, and liquid–liquid partitioning. The resulting extracts exhibit high surfactant efficiency, reducing surface tension from 72 to 35 mN/m and showing a critical micelle concentration of 0.33 g/L. The invention supports circular economy principles and enables the use of these biosurfactants as agricultural detergents and as biofungicidal, biostimulant, and wetting additives.

PE-34 **NAME(S): Karen Esteincin Cuba Vargas / Xavier Antonio Laos Laura / Vidis Jack Cutipa Arapa**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Leather drying apparatus with automatic angular adjustment, tensioning, and precipitation protection**
This invention relates to an automatic leather drying and protection apparatus designed to optimize the drying, tensioning, and preservation of natural leather under outdoor conditions. The system includes a tripod-type support structure, solar-powered energy supply, electronic control board, automatic tensioning mechanism, solar exposure orientation module, and rain protection module. Sensors detect excessive solar radiation and rainfall, activating motorized adjustment or automatic cover deployment. The apparatus maintains uniform leather tension, prevents deformation or damage, and enables efficient, autonomous, and eco-friendly drying in rural or semi-industrial environments.

PE-35 **NAME(S): Karen Esteincin Cuba Vargas / Xavier Antonio Laos Laura / Vidis Jack Cutipa Arapa**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Ergonomic assist device for handling vertical posts with a spring system and linear actuator**
This invention is an ergonomic assistance device designed to improve the manual carrying and handling of construction props or vertical supports. The device reduces physical overload on the worker's shoulder and spine by combining a lightweight curved platform, an arched spring-based cushioning module, an adjustable fastening system, and an active assistance mechanism driven by a linear actuator. The actuator is controlled by a microcontroller that receives data from a gyroscope and a force sensor, allowing automatic support when excessive load and unsafe inclination are detected. The device also includes a rechargeable battery, display panel, and audible warning system to alert the user when the load exceeds a preset safety threshold. Its purpose is to increase worker safety, reduce musculoskeletal strain, and improve efficiency in construction environments.

PE-36 **NAME(S): Karen Esteincin Cuba Vargas / Xavier Antonio Laos Laura / Vidis Jack Cutipa Arapa**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Automatic guinea pig skinning machine**
This invention relates to an automatic guinea pig hair-removal machine for primary post-mortem processing. The system integrates a feeding hopper, controlled dispenser, conveyor belt, infrared sensors, scalding platform with heated water container, adaptive holding sleeve, rail-guided displacement mechanisms, spring-loaded rollers, drainage channel, waste container, touchscreen control panel, and position sensors. Its adaptive massage-based peeling system removes hair uniformly without relying on constant impacts, reducing manual handling and improving processing safety, hygiene, productivity, and final product quality. The machine enables continuous, controlled, and efficient operation for small and medium-scale guinea pig meat production.

PE-37 **NAME(S): Karen Esteincin Cuba Vargas**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Machine for the mechanical extraction of seeds from plant bodies with an internal cavity**
This invention relates to an automated machine for mechanical seed extraction from hollow vegetable bodies. The system includes a motor-driven conveyor belt, infrared detection sensor, vertically movable receiving basket, pressure roller, articulated extractor arm, expandable radial detachment elements, discharge mechanism, seed collection container, load cell, and programmable control board. The extractor enters the internal cavity and performs controlled radial brushing or expansion to detach adhered seeds without damaging the vegetable structure. The machine reduces manual intervention, improves ergonomic conditions, increases seed recovery efficiency, and provides real-time monitoring of collected seed weight through audible and visual alerts.

PE-38 **NAME(S): KIARELA ESTEFANIA OTAYZA CALLE**
ORGANIZATION: INDECOPI
TITLE **Traction Machine for Fishing by Using a Flat Helical Coil Spring**
A fishing traction machine using a flat helical spring connected to a gear and a rotating shaft, which is deformed by a butterfly wrench operated by the user with clockwise turns, subjects the spring to an angular torsional force, generating and transmitting elastic potential energy through the gears. The present invention falls within the technical field of mechanics, specifically mechanical devices for fishing.

PE-39 **NAME(S): Diaz Castillo Brunella / Figueroa Valencia, Genesis Fernanda / Ipanaque Vasquez, Aldo Sebastian / Maquen Perleche, Milagros Isabel / Montenegro Pisfil, Camila de los Angeles**
ORGANIZATION: UNIVERSIDAD CATÓLICA SANTO TORIBIO DE MOGROVEJO
TITLE **Vertical growing system with gravity-assisted drip irrigation and tilted containers equipped with a phenological viewing window**
The current invention presents a vertical growing system with gravity-assisted drip irrigation and tilted containers equipped with a phenological viewing window. This system is designed to improve the use of space and the efficient distribution of water in crops by (60%). In addition, its modular structure helps maintenance, expansion, and adaptation to different types of crops and installation areas.

PE-40 **NAME(S): LUQUE SANCA, CECILIA ESTHER / VILLANO SALAS, SILVIA**
ORGANIZATION: Universidad Tecnológica del Perú
TITLE **Controlled and Reproducible Method for Dyeing Natural Fibers Using a Sequential Mordanting and Dyeing System with Natural Colorants Derived from Walnut (Juglans regia) and Alder (Alnus acuminata) Extracts**
This invention proposes a controlled and reproducible method for the sustainable dyeing of natural cotton and wool fibers using walnut extract as a natural dye and alder extract as a natural mordant. The process includes pretreatment, mordanting, dyeing, fixation, and colorimetric evaluation stages, carried out under controlled conditions of temperature, pH, processing time, and bath-to-fiber ratio. The results demonstrate significant improvements in color uniformity, intensity, and fixation, as well as enhanced resistance to washing and light exposure. Furthermore, the method reduces the use of polluting chemical substances, providing an environmentally friendly and replicable alternative for the textile industry.

PE-41 **NAME(S): Luciana De la Fuente Carmelino / Ana Maria Muñoz Jáuregui / Karla Paola Sabana León / Lourdes Victoria Tinoco**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Anhydrous Serum-Type Dermocosmetic Composition with Regenerating and Firming Properties Based on Dragon's Blood Resin and Stingless Bee Honey Actives, and Preparation Process**
Addressing the instability of highly bioactive natural ingredients in cosmetics, this invention introduces an anhydrous serum based on Dragon's Blood resin and stingless bee honey, stabilized in a propanediol system with controlled pH regulation. The formulation preserves physicochemical stability under different storage conditions while enabling high concentrations of natural Amazonian actives for sustainable dermocosmetic applications.

PE-42 **NAME(S): Luciana De la Fuente Carmelino / Ana Maria Muñoz Jáuregui / Karla Paola Sabana León / Lourdes Victoria Tinoco**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Anhydrous Bar-Type Dermocosmetic Composition with Prolonged Moisturizing, Skin Barrier Restoration and Firming Properties Based on Amazonian Oil Bioactives and Preparation Process**
This invention addresses the instability of high-lipid cosmetic systems by developing waterless solid bars capable of stabilizing unsaturated Amazonian oils through a plant-based structural matrix. The formulation prevents oil exudation, phase separation, and oxidative degradation while maintaining structural integrity under thermal stress. Technology offers a sustainable, vegan, and biodegradable alternative aligned with circular cosmetic innovation and SDG 12.

PE-43 **NAME(S): Chuquiruna Miranda Leydy Verónica**
ORGANIZATION: Universidad Privada del Norte
TITLE **Greywater treatment system with natural flocculation, multi-layer filtration and automated electrochemical disinfection.**
An innovative system that converts greywater into a safe and reusable resource through a smart, sustainable process. It integrates natural flocculation using moringa seeds, multi-layer filtration, and electrochemical disinfection with copper–silver electrodes. With automated control based on water quality and solar-powered operation, it offers a low-cost, scalable solution to reduce water waste and improve access in water scarce communities.

PE-44 **NAME(S): Luciana De la Fuente Carmelino / Ana Maria Muñoz Jáuregui / Karla Paola Sabana León / Lourdes Victoria Tinoco**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Anhydrous Bar-Type Dermocosmetic Composition with SPF50 Sunscreen and High Naturality Index Based on Mineral Filters and Amazonian and Andean Oils, and the Preparation Process**
This invention addresses the instability of conventional sunscreen formulations by developing an anhydrous solid sunscreen bar with a structured lipid matrix that stabilizes mineral UV.filters and highly unsaturated Amazonian oils. The formulation resists oil exudation, phase separation, and oxidative degradation even under thermal stress conditions, while maintaining broad-spectrum UV protection through a stable and homogeneous mineral dispersion.

PE-45 **NAME(S): Luciana De la Fuente Carmelino / Ana Maria Muñoz Jáuregui / Juana Patricia Lozada Huancachoque**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Dermocosmetic Composition Employing Vegetable Oils and Extracts as Active Agents for Improving Skin Hydration and Firmness, and Its Preparation Process**
Addressing skin dehydration and loss of firmness caused by aging and environmental exposure this dermocosmetic innovation combines Amazonian oils and plant extracts rich in omega fatty acids and polyphenols to improve hydration, elasticity, and skin recovery. The formulation demonstrated significant biomechanical and antioxidant effects promoting long-term skin wellness through sustainable bioactive ingredients from Peru.

PE-46 **NAME(S): Luciana De la Fuente Carmelino / Ana Maria Muñoz Jáuregui / Juana Patricia Lozada Huancachoque**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Moisturizing and Oil-Absorbing Facial Skin Cream Providing Color and Containing a Vegetable Oil**
Addressing the need for multifunctional and safer skincare products, our innovation combines hydration, oil-control, and skin coverage in a single natural-based facial cream using aguaje oil rich in omega 3, 6, and 9. The formulation reduces the need for multiple cosmetic products while promoting healthier skin and a matte finish. This sustainable cosmetic solution supports clean beauty trends and contributes to SDG 3 and SDG 12.

PE-47 **NAME(S): Lesly Milagros Vilela Yovera / Ariana Renata Solis Baldera / Ruth Noemi Hernández Suarez / Daiana Grisel Fiestas Valladares / Luis Angel Menor Fernández**
ORGANIZATION: UNIVERSIDAD CATÓLICA SANTO TORIBIO DE MOGROVEJO
TITLE **Roof panel with integrated photovoltaic system for electricity generation**
The invention involves a modular photovoltaic roofing panel that integrates a tile-like structural body made of cement, silica sand, and micronized recycled rubber, incorporating a flexible photovoltaic module to generate electricity directly from the roof. Its technical innovation lies in a system of corrosion-resistant sliding rails, which allows for the installation and removal of the panel without permanent fasteners, optimizing maintenance, replacement, and service life. It includes protected internal conduits for wiring, improving safety and waterproofing. The result is a sustainable, energy-efficient, removable construction solution that can be adapted to energy-efficient buildings.

PE-48 **NAME(S): Pamela del Pylar Lyon del Carpio / Benjamin Emanuel Gil Saravia**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Cooking Pot with Height-Adjustable Cooking Compartments**
Addressing the challenge of cooking different foods with varying heat needs using one heat source, our adjustable multi-compartment cooking pot enables independent thermal control through height-regulated compartments, integrated mixing paddles, and sliding lid windows for adding ingredients without heat loss. The system improves cooking efficiency, versatility, and energy optimization for modern food preparation.

PE-49 **NAME(S): Olga Gabriela Castro Matos / Carlos Fernando Cardenas Agurto / Carlos Alonso Seminario Cueto**
ORGANIZATION: UNIVERSIDAD SAN IGNACIO DE LOYOLA
TITLE **Frying device with mold and product ejection mechanism**
Addressing the risks and inefficiencies of traditional fried mold-based food preparation, our frying device innovates through a controlled product-ejection mechanism that releases fried dough without manual impacts or direct contact with hot oil. Featuring an L-shaped ergonomic handle, tension system, and passive pressure element, it improves user safety, product uniformity, and cooking efficiency while preserving traditional culinary techniques.

PE-50 **NAME(S): Joselyn Jhajayra Rojas Huachaca / Emily Nicol Santiago Hinostroza / Jeremy Daniel Espinoza Delgado / Jerson Edilson Merino Alvarado**
ORGANIZATION: Universidad Privada del Norte
TITLE **Cutlery handle with interchangeable heads for nutritional control**
Smart eco-friendly handle that attaches to cutlery via magnetic bayonet. It integrates VIS-NIR spectroscopy, a CMOS camera, and an IMU sensor to estimate macronutrients (carbs/sugars) and detect allergens per bite using TinyML. It provides real-time haptic and visual feedback to correct accelerated eating habits. Designed with biodegradable PLA, it operates offline, stores data for clinical follow-up, and includes hydration/meal reminders.

PE-51 **NAME(S): David Angel Asmat Campos / Meliza Lindsay Rojas Silva**
ORGANIZATION: Universidad Privada del Norte
TITLE **Method for the biogenic synthesis of Zinc Oxide nanoparticles**
The present invention relates to a method for the biogenic synthesis of zinc oxide (ZnO) nanoparticles using extracts obtained from the agro-industrial waste of Asparagus officinalis stump as a reducing and stabilizing agent. The process comprises obtaining the bioactive extract through ultrasound-assisted extraction, preparing a zinc acetate precursor solution, and carrying out a controlled reaction between both under specific conditions of temperature, agitation, and time, followed by a calcination process for the formation of ZnO nanoparticles. The proposed method eliminates or significantly reduces the use of conventional toxic chemical reagents, thereby decreasing environmental impact and improving process safety. In addition, it utilizes low-cost agro-industrial waste, promoting sustainability and the circular economy. The obtained nanoparticles exhibit physicochemical characteristics suitable for applications in sectors such as medicine, food, textiles, cosmetics, electronics, and water treatment.

PE-52 **NAME(S): Noelia Estela Medina / Grace Gutierrez Díaz / Yessy Linares Rios / Luis Vilca Aguilar**
ORGANIZATION: Universidad Privada del Norte
TITLE **Device with Fish-Inspired Bionic Morphology and Artificial Vision for Floating Plastic Waste Collection**
“Pezclador” is an autonomous biomimetic robotic fish designed to collect floating plastic waste from narrow waterways such as irrigation canals and drainage channels. The device combines artificial intelligence, computer vision, robotics, and renewable energy to detect, collect, and store plastic debris without human intervention. Using a YOLOv11-based vision system, solar-powered operation, and real-time monitoring through Wi-Fi or LoRa communication, Pezclador provides an eco-friendly and scalable solution for reducing plastic pollution, improving water quality, and supporting sustainable environmental management in agricultural and urban water systems.

PE-53 **NAME(S): ROGER NAVARRO MENDOZA / MARGARITA CÓRDOVA DELGADO / FLOR ANGÉLICA LAVANDA REYES / OLGA MARÍA CURRO URBANO / DAVID MÁXIMO MIRANDA HUAMÁN**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **PREGNANCY MONITORING BELT DESIGNED WITH INTEGRATED SOLAR PANEL, REMINDER FUNCTION AND ALERT SYSTEM FOR MEDICAL APPOINTMENTS**
The present invention falls within the field of medical technology and wearable monitoring devices, specifically related to monitoring the health of pregnant women and fetuses during pregnancy. It pertains to a pregnancy monitoring belt that includes an integrated, self-contained solar panel system, a medical appointment reminder function, medication intake tracking, monitoring of the pregnant woman's health parameters, an alert system for medical appointments, and fetal movement tracking. This technology aims to improve the quality of life for pregnant women and monitor the health of the fetus.

PE-54 **NAME(S): ROGER NAVARRO MENDOZA / FLOR ANGÉLICA LAVANDA REYES / DAVID MÁXIMO MIRANDA HUAMÁN / SERGIO ARTURO ROJAS CHACALTANA / MARITZA ELIZABETH ARONES MAYURÍ**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **EXECUTIVE DOCUMENT HOLDER WITH SENSOR MODULES FOR CLASSIFICATION AND CONTENT MANAGEMENT**
The device integrates identification sensors, electronic management modules, and a digital interface for the automated classification, control, and monitoring of physical documents, merging tangible storage with intelligent digital assistance. It enables information sorting by alphabetical order, usage date, and priority level. Its primary technical benefit is the efficient transport of large volumes of physical and digital data within a compact, space-saving apparatus suitable for work, academic, and administrative environments.

PE-55 **NAME(S): ROGER NAVARRO MENDOZA / JUAN TEODORO BERNAOLA RAMOS / CARMEN NAVARRO DE BERNAOLA / ESTHER JESÚS VILCA PERALES / ANGELITA MAGDALENA MARTÍNEZ CONTRERAS**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **ERGONOMIC ANTI-STRESS CHAIR AND EARLY DETECTION FOR STUDENTS WITH SPECIAL EDUCATIONAL NEEDS.**
The ergonomic chair helps prevent physical health problems, such as back and neck pain. It is designed specifically for students with special educational needs, promoting good posture, preventing fatigue, improving mood, and especially reducing stress, allowing for comfort during long study sessions. Furthermore, it enhances concentration, facilitates breathing, allows for better brain oxygenation, and promotes good blood circulation. The ergonomic chair features a padded seat, adjustable arms, height adjustment, a reclining backrest, and is equipped with sensors that analyze posture and movements in real time.

PE-56 **NAME(S): ROGER NAVARRO MENDOZA / JUAN TEODORO BERNAOLA RAMOS / CARMEN NAVARRO DE BERNAOLA / FLOR ANGÉLICA LAVANDA REYES / DAVID MÁXIMO MIRANDA HUAMÁN**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **INTEGRATED NEUROERGONOMICAL SYSTEM WITH STRUCTURAL BIOMETRIC IDENTIFICATION FOR EDUCATIONAL CHAIR WITH SIDE ARMS**
The structural ergonomic furniture with integrated electronic components is a complete educational chair with structurally integrated side arms, incorporating an internal configuration of pressure sensors, a useful seat for those jobs that are done standing up and especially for document classification work and in operating rooms for surgical operations, a biometric module based on body distribution pattern and mechanical mechanism for automatic backrest adjustment, the integrated structural configuration allows automatic recognition and ergonomic adaptation, improving postural stability and biometric accuracy.

PE-57 **NAME(S): Xiomy Leyla Arellano Laredo**
ORGANIZATION: Universidad Privada del Norte
TITLE **Playful device with magnetic boards and electronic light system for social stimulation for children with Autism Spectrum Disorder**
TripTumi is an innovative and playful game that addresses the challenges associated with Autism Spectrum Disorder (ASD) Phase 1. It provides three interactive sections for children to develop their communication and social skills through teamwork. The game's intuitive and adaptable interface leverages the unique characteristics of children with ASD (Phase 1), such as patterns, colors, missions, and group objectives, to foster healthy competition, reduce frustration, and increase motivation. In this way, the game can help improve the social skills of children with ASD, enabling them to function independently in adulthood. Furthermore, it is designed to be used by healthcare and education professionals, as well as families, as a playful tool to support the development of children with ASD in various settings.

PE-58 **NAME(S): Jhon Anthony Beltran Cortez**
ORGANIZATION: Universidad Privada del Norte
TITLE **Autonomous Device for the Treatment and Recovery of Degraded Agricultural Soils**
The Autonomous Device for the Treatment and Recovery of Degraded Agricultural Soils is a portable, self-guided device that restores farmland by combining mechanical aeration with precise organic biofertilizer dosing. Within a user-defined area, it navigates the terrain on tank-style tracks, drills the soil with a retractable rotary bit, and injects biofertilizer through a peristaltic pump. A hybrid solar and lithium-battery system powers it, operating even in light rain thanks to its high-impact polypropylene housing. Designed for small and medium farmers in remote rural areas, it improves soil structure and fertility without heavy machinery or harsh chemicals.

PE-59 **NAME(S): GONZALO HUGO DÍAZ GARCÍA**
ORGANIZATION: UNIVERSIDAD CÉSAR VALLEJO
TITLE **A RIGID JOINT FOR IMPROVING CONCURRENT FORCE CONNECTIONS IN SOFTWOOD STRUCTURES**
The invention consists of a rigid joint based on a solid dodecahedron designed to optimize concurrent force connections in structures built with softwood. The system incorporates strategically positioned removable through-bolts on the faces of the dodecahedron, allowing the simultaneous connection of columns, beams, and joists in multiple directions. Its geometric configuration facilitates efficient load distribution, improves structural stability, and provides assembly flexibility. The solution offers a functional and aesthetic alternative for civil construction applications, enabling stronger, more versatile, and adaptable wooden structures

PE-60 **NAME(S): Paul Martin Baltazar Guerrero / Max Stevens Castañeda Franco**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Artificial Seedling-Based Algae Cultivation System**
This invention introduces a patented seaweed cultivation system based on artificial seedlings and long-line configurations for marine macroalgae production. The technology uses inoculated algal branches attached to specially designed support structures that maximize growing surface and biomass accumulation. Experimental validation with Chondracanthus chamissoi demonstrated superior productivity, achieving harvests up to 6.88 kg per cultivation unit and average yields of 450–600 g per linear meter per month. The system offers a scalable, standardized, and sustainable solution for commercial seaweed farming, supporting food, biotechnology, and marine resource industries.

PE-61 **NAME(S): Marisol Edith Zelarayan Adauto / Gamaniel Domingo Gonzales Salvador / Richard Miller Armas Castañeda / Mario Jaime Andia / María Carmela Rodríguez San Miguel De Salas / Yovana Connie Roca Ávila / Isabel Menacho Vargas**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **Modular Electronic Interactive Book for Logical–Mathematical Activities**
Traditional logical–mathematical resources often remain fixed, printed, or limited to isolated electronic activities. This invention proposes a modular electronic interactive book that changes from a compact case-like position to an extended working configuration. It includes multiple electronic modules with rigid printed surfaces, input elements, indicators, displays, sensors, or actuators for direct user interaction. The system integrates microcontrollers, rechargeable power distribution, independent module activation, and optional wireless connectivity. Its modular structure allows activities to be replaced, expanded, or adapted, supporting active logical–mathematical learning in classrooms, workshops, tutoring spaces, and inclusive educational environments.

PE-62 **NAME(S): Paul Martin Baltazar Guerrero / Max Stevens Castañeda Franco / Arturo Joel Mires Reyes**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Method for Producing Mazzaella canaliculata Seedlings from Spores**
A validated biotechnological process was developed for producing Mazzaella canaliculata seedlings from sexual spores under controlled laboratory conditions. The invention integrates sequential stress induction, sporulation, settlement, germination and seedling development stages using progressive adjustments of temperature, irradiance and combined Provasoli–Von Stoch culture media. Experimental validation demonstrated 35% higher spore release, 22% greater settlement, 40% higher germination and growth rates reaching 4.5% per day, enabling scalable production of genetically diverse biomass for aquaculture, restoration and industrial applications.

PE-63 **NAME(S): Jimy Frank Oblitas Cruz / José Antonio Cruz Anchiraico**
ORGANIZATION: Universidad Privada del Norte
TITLE **CheeseMT: Portable AI-Powered NIR Analyzer for Non-Destructive Cheese Ripening Monitorin**
CheeseMT is a portable and intelligent device designed for real-time, non-destructive monitoring of cheese ripening. The system integrates Near-Infrared (NIR) spectroscopy, artificial intelligence, cloud connectivity, and a touchscreen interface within a compact battery-powered platform. It quantitatively predicts ripening level, firmness, and color evolution while storing data locally and in the cloud for traceability and process control. Unlike conventional laboratory instruments, CheeseMT operates directly in ripening chambers without requiring external computers or specialized software. Its low-cost, user-friendly design enables dairy producers to improve quality consistency, reduce losses, and optimize cheese maturation processes.

PE-64 **NAME(S): Jimy Frank Oblitas Cruz / José Antonio Cruz Anchiraico**
ORGANIZATION: Universidad Privada del Norte
TITLE **BlueScan AI: Intelligent NIR-CNC System for Non-Destructive Blueberry Quality Assessment and Ripeness Monitoring**
BlueScan AI is a portable and intelligent platform designed for non-destructive assessment of blueberry quality, ripeness, firmness, and integrity. The system combines Near-Infrared (NIR) spectroscopy, automated CNC positioning, artificial intelligence, and wireless communication to analyze individual fruits with high precision. Spectral information is automatically collected, processed, and classified to generate real-time predictions that support harvesting, quality control, and commercialization decisions. The compact and energy-efficient design enables deployment in farms, packing facilities, and laboratories. By providing objective and traceable quality measurements, BlueScan AI helps reduce losses, improve productivity, and enhance blueberry supply chain management.

PE-65 **NAME(S): Zara Graciela Pablo Ricra / Guillermina Norberta Hinojo Jacinto / Isulina Luzmila Roque Rivera / Magda Marianella Tazzo Tomas / Lucila Amelia De La Cruz Rojas / Maria Maura Camac Tiza / Josefina Arimatea García Cruz / Isabel Menacho Vargas**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **Interactive Electronic Device for Rhythmic and Motor Activities with Visual–Auditory Feedback and an Intelligent Dual Recharging System**
Conventional rhythm, attention, and motor-coordination activities often rely on verbal instructions, cards, clapping, or isolated materials that cannot guide sequences, detect user responses, or correct errors immediately. This invention is a portable circular tabletop board divided into radial interactive zones that light up, emit percussion-like sounds, and receive presses or strikes. Through a microcontroller, addressable LEDs, tactile/impact sensing, and acoustic feedback, the board presents patterns, verifies responses, and confirms or corrects performance. Its USB–solar recharging system supports education, psychomotor training, occupational therapy, cognitive stimulation, inclusive learning, and recreation.

PE-66 **NAME(S): Franklin Steven Cruz Hurtado / Luis Miguel Moreno Sandoval / Jesús Giovanni Lozano Pretell**
ORGANIZATION: Universidad Privada del Norte
TITLE **Autonomous Modular System for Agricultural Monitoring and Management**
This autonomous agricultural monitoring and management system brings precision farming to open-field environments through a modular, solar-powered robotic platform. It integrates interchangeable structural modules, tank-type traction, wireless communication, environmental and soil sensors, cameras, infrared lighting, localized pesticide dosing, and animal detection and deterrence. Its self-aligning mechanical and electrical connections allow modules to be added or removed without external wiring, improving adaptability, reliability, and field operation. Designed to monitor crops, apply treatments only where needed, and protect farming areas from external threats, this innovation supports smarter, more efficient, and sustainable agriculture.

PE-67 **NAME(S): Yasmina Beatriz Riega Virú De Salas / Miryam Patricia Inciso Rojas**
ORGANIZATION: Universidad Privada del Norte
TITLE **Adjustable protective helmet for children in the shape of a beanie with a ventilated multi-layer core**
Happy Head Kid es an innovative helmet designed to protect children from everyday bumps and minor falls. It combines comfort, lightweight materials and effective impact absorption with a playful design that kids will love to wear.

PE-68 **NAME(S): Bendezú De La Cruz, Eyne Omar / Huamán Munares Lila Karina / Quispe Avalos Angélica María / Chalco Palomino María Esmeralda / Huamán Chacaliaza Juan José**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **SMART ARCHAEOLOGICAL SUITCASE WITH ADAPTIVE MICROCLIMATE CAMERA, THREE-DIMENSIONAL CONTEXTUAL RECORD AND DIGITAL CHAIN OF CUSTODY FOR CONSERVATION AND TRACEABILITY OF SAMPLES.**
The invention relates to a smart archaeological suitcase integrating an adaptive microclimate chamber, three-dimensional recording and a digital chain of custody for sample conservation and traceability. It includes a rigid portable housing, calibrated sample holder, temperature and humidity sensors, microclimate conditioning system, 3D capture module, identification module, locking mechanism with opening detection, processing unit and add-only registration module. Archaeological samples are stored under configurable environmental conditions, identified through unique codes and documented without removal from the chamber. The system ensures secure monitoring, transport, conservation and traceability of cultural property, archaeological materials and heritage samples.

PE-69 **NAME(S): Clara Jimena Rojas Barrios / Braulio Edinson Sifuente Cuadros / Nayeli Alessandra Ccencho Herrera / Cinthia Elizabeth Díaz Alvites**
ORGANIZATION: Universidad Privada del Norte
TITLE **Haptic Device with Multisensory Feedback System for Digital Interaction of Visually Impaired People**
This sustainable, inclusive haptic device enables visually impaired individuals to seamlessly interact with computers through sensory feedback, bridging the digital accessibility gap. Utilizing an ergonomic headband layout equipped with a micro-controlled core (ESP32 Devkit V1) and mini coin vibration motors, it decodes digital interface actions—such as cursor tracks, text lines, and software errors—into structural haptic pulses. Supplemented with screen-reader audio, this modular, eco-friendly system integrates biodegradable bioplastics and flexible solar charging. It delivers an affordable, scalable tool optimized for inclusive programming, education, and professional workplace integration.

PE-70 **NAME(S): Mario Jaime Andia / José Alberto Marquez Beltrán / David Aroni Palomino / Ketty Magali Munguía Miguel / Mario Garrido Cotaquispe / Rolando Oscco Solorzano / Isabel Menacho Vargas**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **Device for Solving Arithmetic Operations Through Rotary Selection of Numerical Values**
Many arithmetic-learning tools remain limited to static cards, worksheets, or screens that do not physically represent numerical values or actively validate the user's process. This invention proposes an interactive educational device for solving arithmetic operations through illuminated numerical selection, internal arithmetic processing, and mechanical number representation. The user selects tens and units through independent controls, confirms the chosen values, selects an operation such as addition, subtraction, multiplication, or division, and receives visual validation. A processing system activates LEDs, controls actuators, moves segmented number-forming elements, and displays operation status through an LED matrix, supporting active and multisensory mathematics learning.

PE-71 **NAME(S): Bendezú De La Cruz, Eyne Omar / Huamán Munares Lila Karina / Quispe Avalos Angélica María / Chalco Palomino María Esmeralda / Huamán Chacaliaza Juan José**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **PORTABLE FIELD SYSTEM FOR MULTIMODAL CHRONOLOGICAL PRE-SELECTION OF ARCHAEOLOGICAL AND GEOLOGICAL SAMPLES USING OPTICALLY STIMULATED LUMINESCENCE, X- RAY FLUORESCENCE AND ENVIRONMENTAL CORRELATION SAMPLING.**
The present invention relates to a portable field system for multimodal chronological pre-selection of archaeological and geological samples. The system comprises a portable housing, a sample isolation compartment, optically stimulated luminescence and X-ray fluorescence modules, environmental and geospatial sensors, a multimodal processing unit, data storage, user interface, portable power source, and sample identification module. The processing unit correlates preliminary OSL and XRF data with environmental and geospatial information from the same sample to generate a preliminary chronological suitability classification without determining an absolute age. It supports archaeological, geoarchaeological, and geological field campaigns by improving sample selection for subsequent chronological analyses.

PE-72 **NAME(S): Alberto Claudio Miano Pastor**
ORGANIZATION: Universidad Privada del Norte
TITLE **Device to Facilitate the Study of Food Cooling and Freezing Curves**
This invention is a device designed to facilitate the determination of cooling and freezing curves of food samples. The system incorporates guided channels that accurately position temperature sensors at the geometric center of cylindrical food samples, ensuring reliable and repeatable temperature measurements during freezing experiments. The device can accommodate up to four samples simultaneously, improving experimental efficiency and enabling error analysis. It can be manufactured using stainless steel or food-grade polymers and is intended for research, education, and industrial applications related to food freezing and refrigeration system design.

PE-73 **NAME(S): Nathaly Naomi Tarazona Mallqui / Jhon Anthony Beltran Cortez**
ORGANIZATION: Universidad Privada del Norte
TITLE **Portable money identification and verification device for the visually impaired**
QoriCheck is an innovative, offline portable electronic device designed to empower visually impaired individuals by independently identifying and verifying the authenticity of banknotes and coins. Utilizing advanced optical sensors and advanced physical recognition mechanisms, the device processes currency data without requiring internet connectivity. Instead of using auditive feedback, which compromises user privacy and safety in public spaces, QoriCheck features a dynamic, renewable Braille/tactile interface. This mechanism provides silent, discreet haptic feedback regarding currency value and legitimacy, significantly enhancing personal autonomy, financial security, and social inclusion for users.

PE-74 **NAME(S): Guillermo Pastor Morales Romero / Nicéforo Ladislao, Trinidad Loli / José Alberto Márquez Beltrán / Narcio Felimon Vilcapoma Lara / Giomar Arturo Shiguay Guizado / Consuelo Nora Casimiro Urcos / Isabel Menacho Vargas**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **Geometric Visualization System Using a Rotating LED Propeller Based on Persistence of Vision**
Conventional geometry learning often remains limited to drawings, boards, or flat digital images that do not show how geometric figures can be formed dynamically. This invention proposes a geometric visualization system that uses a rotating LED propeller to generate luminous figures through persistence of vision. The user selects geometric features, such as sides, vertices, or polygon type, through a touchscreen interface. A processing unit synchronizes LED activation with propeller rotation, creating visible geometric shapes in space. The system includes a transparent protective cover, motor housing, solar panel, USB charging, and support structure for safe educational use.

PE-75 **NAME(S): Jimy Frank Oblitas Cruz / José Antonio Cruz Anchiraico**
ORGANIZATION: Universidad Privada del Norte
TITLE **AI-Powered Multi-Sensor Machine for Coffee Bean Contamination and Defect Detection**
This invention is a compact, AI-powered platform designed for real-time coffee quality assessment and contaminant detection. The system integrates Near-Infrared (NIR) spectroscopy, computer vision, environmental sensing, and automated material handling within a portable device controlled by a Raspberry Pi 5. It identifies defective coffee beans, foreign materials, and potential chemical contaminants while simultaneously monitoring environmental conditions. Through intelligent classification algorithms, the platform provides traceable quality metrics, contamination estimates, and automated decision support. Its modular, low-cost, and space-efficient design enables deployment in coffee farms, processing facilities, laboratories, and quality control centers

PE-76 **NAME(S): Guillermo Pastor Morales Romero / Nicéforo Ladislao, Trinidad Loli / José Alberto Márquez Beltrán / Narcio Felimon Vilcapoma Lara / Giomar Arturo Shiguay Guizado / Consuelo Nora Casimiro Urcos / Isabel Menacho Vargas**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **Computer Vision System for the Recognition of Geometric Figures in Motion**
Early geometry learning often requires students to identify shapes through static cards, drawings, or manual correction. This invention proposes an educational computer vision system that recognizes geometric figures placed on a curved conveyor belt. The device includes a processing housing, camera, auxiliary lighting, display, actuator-driven belt movement, rechargeable batteries, and USB charging. It operates in two modes: simple recognition of each figure and target-figure recognition, where the system compares moving pieces with a selected shape. By combining physical manipulation, motion, image capture, and immediate visual feedback, it supports interactive learning of basic geometry.

PE-77 **NAME(S): David Angel Asmat Campos**
ORGANIZATION: Universidad Privada del Norte
TITLE **Biogenic procedure for the synthesis of chitosan nanoparticles using green tea extract**
The present invention relates to a biogenic process for the synthesis of chitosan nanoparticles using green tea (Camellia sinensis) extract as a natural reducing and stabilizing agent. The method comprises the preparation of an aqueous green tea extract rich in polyphenolic compounds, the dissolution of chitosan in an acidic medium, and the controlled mixing of both solutions under moderate temperature and agitation conditions, resulting in the formation of stable chitosan nanoparticles without the use of toxic chemical crosslinkers or hazardous reducing agents. The synthesized nanoparticles exhibit characteristic physicochemical properties confirmed by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), and Transmission Electron Microscopy (TEM), demonstrating successful nanoparticle formation and stabilization through bioactive compounds naturally present in the plant extract. The invention provides an environmentally friendly, cost-effective, and sustainable alternative to conventional nanoparticle synthesis methods, reducing chemical consumption and minimizing environmental impact. The resulting chitosan nanoparticles can be applied in biomedical, pharmaceutical, agricultural, food packaging, and environmental remediation fields due to their biocompatibility, biodegradability, and enhanced functional properties. This invention contributes to the advancement of green nanotechnology by integrating renewable natural resources with biopolymer-based nanomaterials, offering a scalable and industrially applicable process for the production of high-value chitosan nanoparticles.

PE-78 **NAME(S): Reyes Gutierrez César Augusto / Catashunga Peña Breider David / Chura Yucra Edwin Amilcar / Zapata Melgar Angela Franchesca / Guillermo Vallejos Axel Jeremy**
ORGANIZATION: Universidad Privada del Norte
TITLE **Detection and Visual Recognition System for Safety Signs for People with Visual Disabilities**
Portable smart-glasses system designed for visually impaired people, operating offline with an AI camera, ultrasonic sensor, and real-time local processing. Powered by Raspberry Pi technology, it detects obstacles and safety signs with 95% accuracy, classifies their meaning, and converts visual data into audio alerts notifications. It enhances spatial awareness, enabling autonomous, safe, and inclusive mobility, reducing risks and helping prevent social isolation in urban environments.

PE-79 **NAME(S): Michael David Garay Sanchez / Luis Antonio Flores Chacayan**
ORGANIZATION: Universidad Privada del Norte
TITLE **Device for detecting list and fuel spills in vessels.**
The invention relates to a device for detecting vessel heel and fuel spills in small and medium-sized boats. The system comprises a control unit, inclination sensor, fuel spill detection sensor, wireless communication unit, sound emitter, battery, wireless charging module, electronic housing, and mounting clamp for installation near the engine. The inclination sensor continuously monitors vessel stability, while the fuel sensor detects leaks or spills in critical areas. When abnormal conditions are detected, the control unit activates audible alerts and transmits notifications wirelessly. The invention enhances maritime safety, reduces environmental contamination risks, and enables continuous preventive monitoring.

PE-80 **NAME(S): Reyes Gutierrez César Agusto / Juarez Zapata Diego Humberto / Fernández Asencios Jefferson Ernesto / Vara Alvarado Nefi Vara / Yovera Villegas Franky Yoel**
ORGANIZATION: Universidad Privada del Norte
TITLE **Didactic Device with Motorized Launch and Measurement System for the Teaching of Parabolic Motion**
This interactive electromechanical module is designed for teaching projectile motion, addressing the lack of practical tools in physics education. It uses servomotors, sensors, and a display to control and measure launch angle, force, and mass; it features Bluetooth connectivity and integration with MATLAB for advanced analysis. Based on the STEAM methodology, it transforms theory into hands-on experiences: users can input data, visualize trajectories, and compare theoretical and experimental results. It promotes active learning, is portable, affordable, and easy to operate, supporting both teacher demonstrations and student experimentation, moving beyond traditional rote learning.

PE-81 **NAME(S): Paul Martin Baltazar Guerrero / Max Stevens Castañeda Franco / Arturo Joel Mires Reyes**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **NaOH-Assisted Alkaline Flocculation Method for Sustainable Harvesting and Concentration of Microalgal Biomass from Chlorella vulgaris and Phaeodactylum tricornutum**
This invention describes a NaOH-assisted alkaline flocculation process for the sustainable concentration and harvesting of microalgal biomass from both freshwater and marine species, including Chlorella vulgaris and Phaeodactylum tricornutum. The technology standardizes NaOH dosage, pH control, mixing, reaction and sedimentation parameters to achieve rapid biomass recovery without additional coagulants. Experimental validation demonstrated efficient biomass separation within 15–30 minutes compared with 18–24 hours required for natural sedimentation, producing concentrated biomass suitable for nutraceutical, food, environmental and bioindustrial applications.

PE-82 **NAME(S): ROGER NAVARTRO MENDOZA / ANA CECILIA ÁLVAREZ ARBULÚ / JUAN TEODORO BERNAOLA RAMOS / CARMEN NAVARRO DE BERNAOLA / IRMA ESPERANZA AYBAR BELLIDO**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **SMART COLLAR FOR SPECIES CLASSIFICATION, HEART MONITORING, DETECTION OF PATHOLOGICAL STATIONS AND BIOMETRIC ANALYSIS IN THE FIELD**
The present invention describes an autonomous smart collar that integrates biometric and environmental sensors, along with artificial intelligence algorithms, for biological species classification, physiological monitoring, detection of pathological conditions, and biometric analysis in the field, the system combines optical and acoustic data capture with physiological data, generating real-time georeferenced reports and health alerts. Its autonomy and connectivity make it an innovative tool for biological research, conservation, agriculture, and veterinary medicine, the autonomous smart collar integrates biometric modules, species classification modules, an integrated AI system, a georeferencing and connectivity system, and a power supply system.

PE-83 **NAME(S): Paul Martin Baltazar Guerrero / Max Stevens Castañeda Franco / Arturo Joel Mires Reyes / Antonio Calderon Navarro**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Method for Producing Brown Algae Seedlings with Enhanced Growth, Increased Foliar Development, and Thermotolerance**
A patented process for producing brown seaweed seedlings with enhanced growth, increased foliar capacity, and thermotolerance. The method integrates controlled stress induction, optimized Provasoli medium, wave-motion fertilization, sporophyte fusion, and free-living cultivation. Experimental validation demonstrated 40,541 germinated gametophytes/mL, an average of 17.1 folioles per seedling, and 81.45% survival at 24°C. The technology enables large-scale cultivation in warm waters and climate-affected regions while improving aquaculture productivity and ecosystem restoration potential.

PE-84 **NAME(S): Betti Korina Vargas Mamani / Joaquim Ruiz Blázquez**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Photosynthetic Biotechnological Scaffold Based on an Interpenetrating Polymer Network with Encapsulated Recombinant Cyanobacteria and Chimeric Protein Containing Intrinsically Disordered Regions, and Method of Production**
A photosynthetic biotechnological scaffold was developed for chronic ischemic and multidrug-resistant infected wounds. The system integrates an interpenetrating polymer network reinforced with nanocellulose, genetically engineered Nostoc sphaericum, and a chimeric VEGF-A containing intrinsically disordered regions that induce liquid-liquid phase separation for sustained therapeutic delivery. Experimental validation demonstrated oxygenation above 35 mmHg, VEGF-A release exceeding angiogenic thresholds for up to 72 hours, enhanced thermal stability (72°C versus 55°C), and long-term storage without cold-chain requirements.

PE-85 **NAME(S): ROGER NAVARRO MENDOZA / IRMA ESPERANZA AYBAR BELLIDO / MARLENE ELIZABETH MUÑOZ AGUIRRE / ANA CECILIA ÁLVAREZ ARBULÚ / MÓNICA AYNE GUEVARA SARAVIA**
ORGANIZATION: UNIVERSIDAD NACIONAL 'SAN LUIS GONZAGA'
TITLE **SMART MULTIFUNCTIONAL CRIB WITH SPEAKER FOR NEWBORNS, EQUIPPED WITH A SOLAR CHARGING SYSTEM**
The invention features a smart, multifunctional crib equipped with a solar panel for autonomous charging, a speaker system for two-way communication and soothing sounds, and temperature and motion sensors to adjust environmental conditions. This technology provides an innovative and autonomous solution for newborn care, enhancing interaction between parents and baby while ensuring a controlled and comfortable environment.

PE-86 **NAME(S): Jose Enrique Paredes Palacios / Nicole Anthuane Cerdan Huicho / Paolo Jesús Asunción Cachique / Diego Sebastian Chambergo Reategui**
ORGANIZATION: Universidad Privada del Norte
TITLE **EcoFly: Environmental Monitoring Drone for Sustainable Mining Operations**
EcoFly is a hexacopter environmental monitoring drone designed for sustainable mining operations. The system integrates gas, particulate matter, barometric pressure, and airflow sensors to detect environmental pollutants while minimizing measurement errors caused by propwash turbulence. Using an adaptive aerodynamic compensation system, EcoFly automatically adjusts flight stability and sensor accuracy in real time, providing reliable environmental data through telemetry and GPS communication for safer and more efficient mining management.

PE-87 **NAME(S): Richard Andi Solorzano Acosta**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Native Multi-Strain Liquid Microbial Consortium and Method for Its Preparation and Integration into a Closed Autotrophic Hydroponic System**
A native liquid microbial consortium composed of Pseudomonas putida, Pseudomonas plecoglossicida, and Bacillus subtilis in a defined 1:1:1 ratio was developed for integration into a closed autotrophic hydroponic germination system. The technology enables stable microbial coexistence and early root colonization without external organic carbon inputs. Experimental validation demonstrated approximately 30% faster germination, 360–430% increases in root and biomass development, up to 90% disease reduction, enhanced nutrient uptake, and over 90% survival under saline stress conditions.

PE-88 **NAME(S): Vivian Collahua Rupaylla / Myrian Elizabeth Paredes Robles / Zoila Esther Cherres Lopez / Yoly Eumelia Miguel Chavez / Doris Nora Carhuavilca Capcha / Jenny Victoria Moreno Saenz**
ORGANIZATION: UNIVERSIDAD NACIONAL ENRIQUE GUZMAN Y VALLE
TITLE **IoT System for Magnetic Matrix Detection Enabling the Construction and Automatic Area Analysis of Manipulable Geometric Figures**
Geometry learning becomes more meaningful when students build figures physically and receive immediate digital analysis. This invention proposes an IoT educational system with a magnetic detection matrix that identifies the position of manipulable blocks placed on its surface. Each block contains a magnet detected by Hall sensors, while LEDs provide local visual validation. A control circuit processes the occupied cells, generates a digital representation of the constructed figure, calculates its area, and transmits the information wirelessly to an external platform for visualization, exercise validation, and performance tracking.

PE-89 **NAME(S): Lia Hermione Araujo Jondec**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Method for Producing a Veterinary Healing Poultice Based on Plantago major, Achyrocline alata, Oenothera rosea, and Aloe vera**
This invention presents a patented and standardized method for producing a veterinary wound-healing poultice based on Plantago major, Achyrocline alata, Oenothera rosea, and Aloe vera. The innovation lies in the synergistic combination of four medicinal plants and a controlled preparation process involving soaking, decoction, blending, filtration, and stabilization with medicinal red clay. The resulting formulation provides anti-inflammatory, antimicrobial, analgesic, antioxidant, and regenerative effects that accelerate wound healing. Experimental validation in an albino rat model demonstrated superior healing performance, reduced inflammation, and improved animal welfare compared with conventional zinc oxide treatment.

PE-90 **NAME(S): Hernan Franz Cordero Angulo / Ruth Aracelis Manzanares Grados**
ORGANIZATION: Universidad Privada del Norte
TITLE **A biodegradable agro-polymer biomaterial reinforced with fibers from Carludovica palmata and residues from Mauritia flexuosa**
This invention describes a biodegradable agropolymer biomaterial reinforced with fibers from Carludovica palmata (bombonaje) and residues from Mauritia flexuosa (aguaje), through the sustainable use of Amazonian plant resources. It uses aguaje waste as the primary raw material, combined with natural fibers and natural binders, to produce a material with flexibility, structural stability, and functional strength. The innovation addresses the underutilization of waste generated by the aguaje industry by transforming it into a value-added product. It also promotes the appreciation of Amazonian biodiversity and the development of sustainable alternatives to conventional materials.

PE-91 **NAME(S): Isabel Menacho Vargas / Doris Elida Fuster Guillen / Giomar Arturo Shiguay Guizado / Giuliana del Socorro Raggio Ramirez / Milagritos Josefina Saavedra Jaramillo / Carlos Enrique Bernardo Zárate**
ORGANIZATION: UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS
TITLE **Interactive Electronic Device for Neurocognitive Training Through an LED Matrix and Directional Joystick, with Rechargeable Battery and Hybrid USB–Solar Charging System**
Neurocognitive training requires interactive tools capable of combining visual memory, pattern recognition, spatial orientation, and basic mathematical representation in a compact system. This invention proposes an electronic device with a 7×5 LED matrix, display, joystick, physical buttons, acoustic feedback, and a control board with a programmable microcontroller. The user moves a cursor across the LED matrix, copies or recalls patterns, validates responses, and receives visual and auditory feedback. Its rechargeable battery, charging module, boost converter, solar panel, rear heat-dissipating backplate, and ventilation slots support autonomous and continuous operation.

PE-92 **NAME(S): Miguel Angel Caballero Vega**
ORGANIZATION: Grow Analytics S.A.C. (RUC
TITLE **Portable Encapsulated Electronic Device for Autonomous Monitoring of Commercial Refrigeration Equipment**
A low-cost, portable electronic device for autonomous monitoring of commercial refrigeration equipment. Housed in an IP65 enclosure, it integrates a microcontroller with built-in LTE Cat-1 connectivity and three correlated sensors—temperature (DS18B20), door-opening (reed switch), and interior light (LDR)—powered by a rechargeable 18650 battery with optional solar extension. Its own cellular connection works without local Wi-Fi, enabling deployment in small shops, pharmacies, and markets across emerging economies. By detecting cooling failures, open doors, and power outages in real time, it protects perishable goods and temperature-sensitive medicines for businesses that cannot afford industrial systems costing USD 150– 500.

PE-93 **NAME(S): Isabel Menacho Vargas / Claudia Noemi Rivera Rojas / Lina Elda Guillermo Morales / Doris Elida Fuster Guillen / Giomar Arturo Shiguay Guizado / Milagritos Josefina Saavedra Jaramillo**
ORGANIZATION: UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS
TITLE **Interactive Electronic Box with Visual Interface for Multidisciplinary Learning Activities**
Educational activities can become more engaging when digital instructions, physical actions, and immediate feedback are combined in one device. This invention proposes a semi-automatic interactive electronic box with a touchscreen, confirmation switch, movable lid, mechanical claw, LED indicators, rechargeable battery, and USB charging system. The user selects an option on the visual interface and confirms the response through a physical switch. Then, the system activates a sequence involving visual signals, lid movement, and mechanical interaction. By integrating digital, visual, and physical feedback, the device supports multidisciplinary learning activities in classrooms, workshops, and guided educational environments.

PE-94 **NAME(S): Michael David Garay Sanchez / Luis Antonio Flores Chacayan / Jhonatan Isaac Vargas Huaman / Katherine Susan Llanos Chacaltana / Miguel Alfredo Levano Stella**
ORGANIZATION: Universidad Privada del Norte
TITLE **Electronic device in the form of a bracelet for the identification of physiological and kinematic variations indicative of aggressive behavior**
This invention relates to a smart wearable bracelet designed to identify physiological and kinematic variations associated with aggressive behavior. The device integrates pulse, temperature, sound, accelerometer, and gyroscope sensors connected to an ESP32-based control unit. Artificial intelligence algorithms analyze biometric and movement data in real time to determine the user's emotional state. When indicators of potential aggression are detected, an audible alarm is activated to alert the user and nearby individuals. The invention provides a portable, non-invasive, and autonomous solution for behavioral monitoring, conflict prevention, and improved personal and social safety.

PE-95 **NAME(S): Cynthia Lisette Jo Rivero / Jorge Humberto Ramirez San Martin**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Method for Producing Balanced Fish Feed Based on Cocoa Bean Shell Flour**
A standardized process for producing pelleted fish feed incorporating cocoa bean shell flour as a functional ingredient is disclosed. The technology combines controlled drying, particle size standardization, isocaloric and isoproteic formulation, optimized mixing, and pellet stabilization. Experimental validation demonstrated superior weight gain (21.38 g), efficient feed conversion (0.67), specific growth rate of 4.01, and favorable liver health indicators, while promoting circular economy through valorization of cocoa-processing residues.

PE-96 **NAME(S): Reyes Gutierrez César Agusto / Peña Oscco Nicolas Fabricio / Rosales Papuico Rafael Hugo**
ORGANIZATION: Universidad Privada del Norte
TITLE **Free-fall teaching device with three ultrasonic sensors**
Free-fall teaching device with three ultrasonic sensors, designed for experimental physics education. It measures height, start and end of motion, automatically calculating time, speed and gravity via an Arduino-based system. It turns abstract concepts into real numerical data, encouraging active and kinesthetic learning. Low-cost and easy to assemble, it democratizes access to high-quality experimentation, enabling direct comparison between practical results and theory, and helping students immediately understand physical magnitudes and units.

PE-97 **NAME(S): MICHAEL PAUL GAMARRA NOLI / EDWIN DANILO PAREDES CORCUERA**
ORGANIZATION: UNIVERSIDAD CÉSAR VALLEJO
TITLE **PORTABLE WATER PUMPING DEVICE**
The Portable Water Pumping Device is a self-contained hydraulic solution designed to transfer water in emergency situations, natural disasters, and areas without access to electricity. The system uses a magnetic actuation mechanism, internal rotating structures, and a manual priming system to generate water flow without the use of motors, batteries, or fuel. Its portable, safe, and easy-to-transport design enables rapid deployment in rescue operations, humanitarian aid missions, rural communities, and agricultural applications, facilitating access to water in critical situations and isolated environments.

PE-98 **NAME(S): Licapa Redolfo Gladys Sandi / Farfán Chilicaus Gary Christiam / Borja Asencio Bella Fátima / Rojas Idrogo Juan Carlos**
ORGANIZATION: Universidad Nacional de Trujillo
TITLE **METHOD FOR REMEDIATING ACID MINE DRAINAGE USING CORN COB BIOCHAR WITH DOUBLE THERMAL ACTIVATION**
A method for remediating acid mine drainage (AMD) using corn cob biochar with double thermal activation, characterized in that it comprises: preparing and sieving corn cob precursor (1.5-2.5 mm), primary pyrolysis (370-420 °C), chemical activation with $FeCl_3$ (1:1 ratio, up to 12 h), drying, secondary thermal activation (470-520 °C under inert atmosphere), contacting the activated biochar (3-6 g/L) with AMD for 7- 15 min, and adjusting pH (6.0-7.0) followed by treatment with synthetic zeolite (1-3 g/L for 20-40 min). The invention achieves simultaneous and efficient removal of sulfates and heavy metals with rapid kinetics (<60 min), low dosage and industrial scalability.

PE-99 **NAME(S): Oscar Reátegui Arévalo / Sandy Marjory Aguirre Saldaña**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Method for Microencapsulation of Bioactive Compounds from Mauritia flexuosa**
This invention provides a standardized microencapsulation process for bioactive compounds extracted from Amazonian aguaje (Mauritia flexuosa) pulp and peel. The process integrates differential freeze-drying, ultrasound-assisted extraction, controlled concentration, ionic gelation, and final lyophilization to preserve thermosensitive carotenoids and polyphenols. The resulting microcapsules exhibit enhanced stability, protection during feed processing, and controlled release characteristics. The technology was developed for reproductive tilapia diets and demonstrated suitability for improving bioactive delivery in aquaculture nutrition.

PE-100 **NAME(S): Ohaira Ricra Chavez / Oscar Reátegui Arévalo**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Integrated Respirometric System for Assessing Bioplastic Biodegradation via Carbon Dioxide Capture and Quantification**
An integrated respirometric system for evaluating aerobic biodegradation of bioplastics through CO_2 capture and quantification. The invention combines miniaturized 100 mL reactors, fixed gas-flow architecture, independent CO_2 traps, and real-time flow verification within a single platform. The system improves measurement reproducibility, reduces resource consumption, and enables simultaneous testing of multiple materials. Validation demonstrated clear discrimination among cellulose (36.40%), starch-cocoa bioplastic (18.43%), and LDPE (1.58%) after 42 days under controlled composting conditions.

PE-101 **NAME(S): Mayumi Lizbeth Allcca Lucero / Isabel Menacho Vargas / Abel Fernando Huerta Menacho / Giuliana del Socorro Raggio Ramírez / Abel Alejandro Tasayco Jala / Imanol Donato Zela Aguirre**
ORGANIZATION: INNOVATION RESEARCH AND CREATIVITY S.A.C
TITLE **Wearable Wristband for Sequential Neuromotor Assessment Based on Inertial Sensors**
Sequential neuromotor assessment requires portable tools capable of detecting wrist movements and providing immediate guidance during structured tasks. This invention proposes a wearable wristband with a six-axis IMU sensor, vibration/impact sensor, LED backlighting system, haptic vibration motor, physical control buttons, and USB-C rechargeable power system. The device records linear acceleration, angular velocity, impacts, and movement sequences while generating visual and tactile feedback. A microcontroller processes sensor data, compares user movements with reference patterns, and indicates correct, incomplete, or incorrect execution, supporting neuromotor evaluation and training.

PE-102 **NAME(S): Rafael De la Cruz Casaño / Jhon Richard Espinoza Acosta / Victor Raul Nacion Naupay. / Carlos Enrique Requena Castro**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **CORN SHELLING MACHINE WITH DEHUSKING AND SORTING FUNCTIONS**
The problem is that the corn is shelled and sorted manually, leading to work-related injuries due to poor posture and a lack of ergonomic design. To address this, a machine has been designed that uses a rod-based shelling system inside a cylinder with slotted openings through which the separated kernels are discharged. The sorting system is driven by an eccentric disc-type crank mechanism that produces a cyclic motion of three semi-cylindrical screens, which separate the husks from whole or broken kernels, as well as top-quality kernels from second-grade kernels, with each having its own discharge chute.

PE-103 **NAME(S): Enmanuel Aliaga Villanueva / Jose Vladimir Cornejo Tueros / Juan Corilla Nuñez**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **TRIBOELECTRIC DEVICE FOR CONVERTING WIND KINETIC ENERGY INTO ELECTRICAL ENERGY USING ANTI-TURBULENCE PARTS AND ELECTRODES**
This invention relates to a triboelectric device that converts wind kinetic energy into electrical energy through the interaction of dielectric spheres and aluminum electrodes. Unlike conventional triboelectric wind harvesters, which often experience instability and efficiency losses under high wind speeds, the proposed design incorporates tangential airflow guides with strategically distributed perforations and specific angular geometries that reduce turbulence and stabilize airflow. This configuration enables efficient operation under strong and turbulent wind conditions, enhancing charge transfer and energy generation. The device is compact, portable, cost-effective, and suitable for renewable energy applications in both urban and remote environments.

PE-104 **NAME(S): Rafael De la Cruz Casaño / Yunior Camarena Suarez / Fredy Eduardo Coca Untiveros / Erik Limache Vilchez**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **IMPACT-TYPE COCONUT HUSK SHREDDER**
This project addresses the design and validation (prototype) of a mechanism for defibering coconut coir. The defibering machine consists of a stator with hammers inside a housing, a rotor with hammers for defibering, and a suction system to remove dust and light particles generated during the defibering process. The proposal responds to the increase in coconut production in Peru and the need for technologies to utilize its waste products, such as coir. Testing confirmed its technological feasibility, operational efficiency, and contribution to agricultural sustainability in the region.

PE-105 **NAME(S): Albert Jorddy Valenzuela Inga**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **INNOVATIVE METHOD FOR USING MINING TAILINGS IN THE MANUFACTURE OF PAVING BLOCKS**
This invention presents an innovative method for manufacturing paving blocks using mining tailings as a partial replacement for conventional aggregates. The process includes tailings characterization, material preparation, mixing, molding, vibration, curing, and compression testing to obtain durable paving blocks with compressive strengths of up to 30 MPa. Technology transforms mining waste into a valuable construction material, reducing environmental impacts associated with tailings disposal and the extraction of natural aggregates. By promoting circular economy principles, the invention offers a sustainable, cost-effective, and environmentally friendly solution for urban and rural pavement applications.

PE-106 **NAME(S): Bryan Antony Quinta Ccosi**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **Corn grain cleaning and sorting machine for the production of 150 kg/h in Cabanaconde**
This invention presents a modular machine for corn shelling, cleaning, and grain classification designed for small and medium-scale farmers. The system integrates a shelling mechanism, an inclined grain transport channel, and a dual-level oscillating screen system for efficient cleaning and size-based classification. Its finger-joint modular structure enables easy assembly, maintenance, and transportation without specialized tools. The machine improves grain quality, reduces post-harvest losses, lowers labor requirements, and provides an affordable solution for sustainable agricultural production and increased productivity.

PE-107 **NAME(S): Diego Ricardo Cajachagua Guerreros / Jhon Rodrigo Ortiz Zacarias / Sliver Ivan Del Carpio Ramirez**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **AUTONOMOUS ROBOT FOR ASSESSING NUTRIENT CONTENT, FLORA, AND ALTITUDE LEVELS IN SEEDLING PLOTS USING A COMBINATION OF COMPUTER VISION AND GPS**
The invention relates to an autonomous agricultural robot designed for the evaluation of soil nutrients, vegetation conditions, and altitudinal levels in crop fields through the integration of artificial vision, GPS positioning, IoT communication, and soil sensing technologies. The system autonomously navigates agricultural terrains, collects real-time data on soil moisture, temperature, conductivity, and crop conditions, and transmits the information remotely for analysis and decision-making. Unlike conventional monitoring systems, the proposed solution combines mobility, georeferenced inspection, and intelligent data acquisition in a single platform, improving agricultural productivity, resource efficiency, sustainability, and precision farming management.

PE-108 **NAME(S): Albert Jorddy Valenzuela Inga / Yadira Nicole Huaman Chamby / Romel Olivera Perez / Joel Contreras Nunez**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **Rainfall-Induced Landslide Monitoring and Early Warning System Using Integrated Moisture Sensors, Gyroscope, and LoRa Communication**
This invention develops a smart landslide monitoring and prevention system that integrates soil moisture sensors, a gyroscope, ESP32 microcontrollers, and LoRa communication technology for early risk detection in vulnerable areas. The system continuously monitors soil saturation and ground movement, generating automatic alerts when critical conditions are detected. With a communication range of up to 7 km and autonomous operation powered by solar energy and batteries, it enables real-time monitoring in remote locations. The technology helps reduce human casualties, infrastructure damage, and economic losses associated with landslides and debris flow disasters.

PE-109 **NAME(S): Rubisnol Felix Julian Daga, / Helder Alexis Mayta Leon, / Charly Kevin Cueva Ricse, / Sliver Ivan Del Carpio Ramirez**
ORGANIZATION: UNIVERSIDAD CONTINENTAL S.A.C.
TITLE **AUTONOMOUS ROBOT FOR GEOLOGICAL EXPLORATION AND SAMPLING IN UNDERGROUND MINES WITH SLAM NAVIGATION, A SAMPLING SYSTEM, AND EMBEDDED CONTROL FOR AUTONOMOUS RETURN**
Autonomous robot designed for geological exploration and sampling in underground mines, integrating 360° LIDAR sensor, RGB + infrared camera, and SLAM navigation algorithms for GPS-free 3D mapping. The system features a reinforced track-based mobility platform, an articulated robotic arm with gyroscopic gripper for precise sample collection, dual battery power supply, and an embedded Raspberry Pi controller with HMI interface. An automatic return protocol activates upon signal loss or low battery. The device operates fully autonomously in hostile conditions of humidity, dust, and irregular terrain, eliminating direct human exposure in high-risk underground zones.

PE-110 **NAME(S): Karen Esteincin Cuba Vargas / Rodrigo Rodolfo Pacotaipe Ventocilla / Duvan Julio Almonte Ccarita**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Intelligent automated medication dispensing system with multisensory validation, mouth-opening recognition, and active upper limb stabilization**
This invention relates to a smart automated medication dispensing system for safe assisted administration in patients with motor limitations or therapeutic adherence difficulties. The system integrates a sequential pill elevation and release mechanism, pressure and orientation sensors, facial monitoring camera, controlled administration nozzle, programmable alerts, and a stabilizing wristband with inertial sensing and compensatory vibration. An intelligent therapeutic validation module performs contextual facial recognition, mouth-opening validation, posture verification, inertial monitoring, and intake confirmation before authorizing medicine release. The invention improves medication safety, administration accuracy, patient autonomy, and continuous therapeutic supervision.

PE-111 **NAME(S): Carmen Eleana Ortiz Salas / Jorge Elias Alva Hurtado / Roberto Freddy Raucana Sulca / Nelly Alejandrina Huarcaya Junes / Grover Riveros Soto / Miguel Ángel Valverde Agreda**
ORGANIZATION: Research Center for Digital Transformation in Engineering (CITDI), National University of Engineering (UNI)
TITLE **The KUYUY Accelerograph and SIPA System: Towards Low-Cost, Real-Time Intelligent Seismic Monitoring in Peru**
KUYUY-SIPA is an intelligent seismic monitoring system developed in Peru that integrates a low-cost MEMS-based accelerograph, real-time telemetry, and automated signal processing. The platform continuously acquires, transmits, and analyzes ground-motion data through artificial intelligence algorithms capable of distinguishing seismic from non-seismic events. Validated through laboratory calibration, shaking-table testing, comparison with reference instruments, and real-world deployments, the system provides reliable seismic information for rapid risk assessment, seismic microzonation, and structural monitoring. KUYUY-SIPA offers an affordable and scalable solution to expand seismic instrumentation in developing countries.

PE-112 **NAME(S): Karen Esteincin Cuba Vargas / Fabrisio Daniel Cruz Medrano / Leonardo Rafael Arenas Campos / Alison Nicol Ocola De la Cruz / Sandro Eduardo Cutire Mauri / Diego Javier Alvarado Valdiviezo**
ORGANIZATION: Servicio Nacional de Adiestramiento en Trabajo Industrial (SENATI)
TITLE **Intelligent impact mitigation and stationary support system for quadruped robots using inflatable protective chambers and controlled-deployment stabilization actuators**
This invention relates to a smart impact mitigation and resting support system for quadruped robots. The system integrates inflatable protective air chambers, a compressed-air pneumatic subsystem, adaptive pressure regulation valves, vibration and inertial sensors, energy monitoring, and a retractable support platform driven by linear actuators. A predictive control module classifies impact, fall, instability, or rest conditions and automatically activates pneumatic protection or structural support. The system protects the robot from collisions, reduces mechanical wear, improves stability during shutdown or rest, and extends operational reliability in industrial, logistics, and autonomous inspection applications.

PE-113 **NAME(S): Maria Alejandra Rojas Torres / Ana Paula Velarde Torres / Cristian Elias Perez Orbegoso / Shirley Mirna De La Cruz Anticona**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Neonatal Cardiac Simulation Device with Electromechanical Contraction System and Extracorporeal Perfusion Circuit for Thiel- Embalmed Specimens**
This invention is a neonatal cardiovascular simulation device integrating preserved Thiel neonatal anatomy, synchronized electromechanical cardiac contraction, and extracorporeal perfusion within a closed-loop system. The technology reproduces realistic neonatal hemodynamic conditions through myocardial actuators, pressure and flow monitoring, and adjustable cardiac frequency. It enables advanced training in umbilical catheterization, neonatal cardiovascular interventions, and extracorporeal support procedures. The system provides a reproducible, safe, and high-fidelity environment for medical education, biomedical research, and neonatal device validation.

PE-114 **NAME(S): Shirley Mirna De la Cruz Anticona / Mario Rubén Pezua Espinoza**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Disposable Anatomical Vaginal Speculum with Lotus-Inspired Design and Integrated Dual Lidocaine Release via Microchannels**
A disposable anatomical vaginal speculum inspired by lotus flower opening mechanics was developed to improve gynecological examinations. The device incorporates flexible radial petals, a synchronized expansion mechanism, and a dual lidocaine delivery system combining surface-coated analgesic gel and microchannel-controlled release. This integrated design enables uniform anatomical expansion, localized anesthesia, and improved patient comfort. The technology reduces pressure concentration, minimizes tissue irritation, enhances procedural ergonomics, and supports safer, more efficient gynecological examinations.

PE-115 **NAME(S): Romina Maria Barrera Quispe**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Reusable Smart Dressing for Monitoring Chronic Wounds in Diabetic Patients**
This invention is a reusable smart wound dressing for diabetic chronic wound management that combines antimicrobial protection with real-time physiological monitoring. The system integrates humidity, temperature and pH sensors connected to an embedded processor and Bluetooth module for continuous data transmission. A removable electronic unit enables reuse while preserving wound sterility. The technology supports early detection of infection risks, optimizes clinical decision-making and facilitates remote patient monitoring through telemedicine platforms.

PE-116 **NAME(S): Angulo Osorio Javier Fernando / Chavez Salas Nadia Yunorvi / Esquicha Tejada Jose David / Mamani Machaca Elizabeth Susan / Sapaico del Castillo Cesar Augusto / Salas Arias Alejandra Pamela / Valverde Riveros María Fernanda / Velazco Meza Ana Lucia / Villegas Medina Jaime Enrique**
ORGANIZATION: Universidad Católica de Santa María
TITLE **Smart Station for the Automated Collection and Segregation of Solid Waste**
The present invention is a smart station for the automated collection and segregation of recyclable solid waste, especially Waste Electrical and Electronic Equipment, cardboard, and plastic. It integrates a structure with differentiated containers, an Ultra HD camera, a Raspberry Pi 5, servomotors, a photovoltaic panel, and a backup battery. Through a detection model based on artificial vision, the system recognizes the type of waste and automatically activates the lid of the corresponding container. Its purpose is to reduce segregation errors, prevent cross-contamination, and promote sustainable waste management in public spaces and educational institutions.

PE-117 **NAME(S): María del Rosario Rodas Ordoñez / Mariangella Mazzarri Ramos**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Smart Monitoring and Teleassistance Collar for Individuals with Disabilities**
The invention relates to a smart monitoring and teleassistance collar for people with disabilities that integrates GPS/GNSS geolocation, motion sensing, wireless communication, emergency activation, haptic feedback, and hybrid solar-assisted power supply in a single wearable device. The system enables real-time location tracking, automatic detection of falls and abnormal movements, and remote alert transmission. Its integrated ergonomic, energy-efficient, and accessible design improves user safety, autonomy, monitoring continuity, and remote caregiving effectiveness.

PE-118 **NAME(S): María del Rosario Rodas Ordoñez / Mariangella Mazzarri Ramos**
ORGANIZATION: UNIVERSIDAD CIENTÍFICA DEL SUR S.A.C.
TITLE **Portable Medical Device for Emergency Prevention and Alert in Patients with Nonsteroidal Anti-Inflammatory Drug Allergy**
A portable medical wearable device was developed to prevent medication-related emergencies in individuals with nonsteroidal anti-inflammatory drug (NSAID) allergies. The invention integrates a medical alert display, wireless communication module, vibration-based emergency notification system, internal storage of critical medical information, and a protected compartment containing emergency corticosteroid medication. Upon intentional activation, the device automatically deploys visual, tactile, and wireless alerts while providing immediate access to treatment. The technology improves patient identification, emergency response, and medication safety in critical situations.

PE-119 **NAME(S): VEGA ANTICONA ALEXANDER YUSHEPY / TELLO DE LA CRUZ ELMER / CASTILLO CHUNG ALDO ROGER**
ORGANIZATION: UNIVERSIDAD CÉSAR VALLEJO S.A.C.
TITLE **TILTING FURNACE WITH INTEGRATED ADJUSTABLE STIRRING SYSTEM AND TEMPERATURE CONTROL FOR COMPOSITE MATERIAL CASTING**
The invention relates to a tilting furnace with an integrated adjustable stirring system and temperature control designed for the production of metal matrix composites through stir casting. The equipment combines an electric furnace, a height-adjustable mechanical stirring system, and a tilting pouring mechanism within a single compact unit. This configuration enables the safe and efficient execution of melting, reinforcement incorporation, mixture homogenization, and molten metal pouring processes. The invention improves material quality, operational safety, energy efficiency, and reduces space requirements and operating costs compared to conventional systems that use separate equipment.

PE-120 **NAME(S): CHUQUILLANQUI CASTRO, Jan Carlos / QUISPE REPUELLO, Jhon Anderson**
ORGANIZATION: UNIVERSIDAD NACIONAL DE HUANCAVELICA
TITLE **Robotic Vehicle for Excavation, Seeding, and Irrigation with Embedded Web Control**
This invention consists of a multifunctional, solar-powered, web-controlled robotic vehicle designed to automate three essential agricultural operations—soil tilling, precision seeding, and localized irrigation—in a single continuous cycle. The system integrates a tracked chassis, dynamic stabilization, helical tilling, seed metering, and a servo-driven irrigation arm, all managed by an integrated microcontroller with a local Wi-Fi web interface. It operates autonomously in rural fields without internet or external power, using photovoltaic panels and a rechargeable battery. GPS-based mapping records every treated point, enabling traceable, low-cost precision agriculture for small and medium-sized farms.

PE-121 **NAME(S): LINDA FLOR VILLA RICAPA / JENNY MIRIAM CAMARENA HILARIO / MARI LUZ PALACIOS MANRIQUE / PAOLO ANDREE CAYETANO TERREL / KAROL LISSET QUISPE GUTIERREZ**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Neonatal Nasal Protection Device with Integrated Sensors**
This invention introduces a neonatal nasal protection device designed for infants receiving oxygen therapy through nasal cannulas. The flexible medical-grade silicone structure adapts to the infant's facial anatomy while reducing pressure, friction, and moisture accumulation. Integrated temperature, humidity, pressure, and contact sensors continuously monitor skin conditions and transmit data wirelessly through a Bluetooth-enabled module. The device provides real-time monitoring, enabling healthcare professionals to detect potential skin injuries early, improve patient safety, and enhance the effectiveness of neonatal respiratory care.

PE-122 **NAME(S): CORDOVA MAYO MIRIAM ROSARIO / HERHUAY VILCAHUAMAN JOSUE SAUL / VIVANCO VASQUEZ HECTOR ARTURO / NUÑEZ FLORES MITCH SMITH / FERNANDEZ TACZA JANELA SAHORI**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Smart Chair for Detection of Physiological Incongruences in Hearings**
This invention is a smart chair designed for court hearings to discretely record a user's physiological and behavioral signals during testimony. It integrates pressure sensors, rPPG for heart rate, infrared for facial thermal changes, and a respiration sensor, alongside a camera and directional microphone. An internal electronic module with an AI processor synchronizes and analyzes data in real-time to identify physiological inconsistencies. The non-invasive design allows for continuous multimodal monitoring without disrupting legal proceedings, providing critical information directly to judges through a discrete interface.

PE-123 **NAME(S): FLORES ESPINOZA CARLOS GERARDO / CRISPIN JURADO ABEL / REYNOSO OSCANOA JAVIER / BAQUERIZO SANCHEZ LUIS ALBERTO / NINAHUANCA ZAVALA YINA MILAGRO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Automatic Concrete Control and Curing System**
This invention is an automated system for monitoring and regulating concrete curing conditions in real-time. It integrates internal and external sensors to track temperature and humidity within the concrete mass and its environment. A central processing unit analyzes this data to autonomously activate a hydraulic module, which applies water via precision drip nozzles when specific thresholds are met. Housed in a weather-resistant structure, the system includes a self-sufficient energy module with solar panels and batteries, ensuring continuous operation on construction sites without manual intervention

PE-124 **NAME(S): BARZOLA CAPCHA ELIZABETH BEATRIZ / JARA RUPAY DÉBORA NICOLE / CHUQUIPA PARRAGA ANTHONY JOSÉ / VASQUEZ HUAMANCAJA ESLI RUTH / OLIVERA BORDAES KARINA ROSARIO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Portable Dynamic Topographic Surveying Device – Ankle Type**
This invention is an ankle-worn portable device for dynamic topographic surveying. It integrates a GPS module with triaxial inertial sensors (accelerometer, gyroscope, and magnetometer) and an internal processor using data fusion algorithms. This configuration allows real-time correction of natural leg oscillations during walking, enabling continuous recording of precise geographic coordinates and orientation. Featuring wireless communication, haptic feedback, and a weather-resistant design, it facilitates efficient data collection in challenging terrains for civil engineering and geology without the need for bulky stationary equipment.

PE-125 **NAME(S): SANCHEZ MATTOS WALDIR ALEXIS / RAFAEL ROSALES YANET SILVIA / PALOMINO ORIHUELA ADREAN / OCHOA ALIAGA ALEJANDRO OVIDIO / SANCHEZ GUZMAN CARLOS ROSARIO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Multifunctional Whiteboard Teaching Tool for Geometric Education**
This invention is a multifunctional handheld tool for whiteboard teaching, specifically for geometry. It integrates writing, erasing, leveling, laser projection, and linear measurement into a single ergonomic casing. Key features include a refillable ink tip, an integrated eraser, a bubble level, and a laser emitter with a selector for horizontal, vertical, or cross-line patterns. The device includes magnetic zones for hands-free use on metallic boards and an engraved ruler. It provides a portable solution that enhances teaching precision and efficiency by combining multiple pedagogical instruments into one compact device, optimizing classroom demonstrations.

PE-126 **NAME(S): BUSTINZA ZUASNABAR EDWARD EDDIE / PAREDES YAURI JEFFERSON LUIS / FLORES YUPANQUI DIEGO ARTURO / GUERRA FLORES JOHN / ARANDA ROJAS HERBERTH**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Intelligent System for Detection of Aggressive Behaviors in Domestic Environments**
This invention is an intelligent system for the early detection of aggressive behavior in homes through the integrated analysis of visual, acoustic, kinetic, and physiological signals. It utilizes a central AI unit with a multimodal processor to correlate data from facial cameras, directional microphones, and movement sensors. Key components include a dynamic analyzer to track emotional evolution and an adaptive profile that learns household patterns. By executing proportional automated responses, such as dissuasive lights or alerts, the system prevents the escalation of domestic conflicts while ensuring user privacy via anonymization filters.

PE-127 **NAME(S): DAVILA HONORIO DUANY / CABRERA MONTALVO ABRAHAMS MOISES / VALVERDE CALERO JOSE LUIS / ORIHUELA SOLANO VALERIA DE FATIMA / RAFAEL VILLANUEVA BORIS ELIEL**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Ergonomic Chair with Intelligent Postural Analysis and Correction System**
This invention is an ergonomic chair featuring an intelligent system for real-time postural analysis and correction. It integrates a distributed sensor module (pressure, tilt, position, lumbar, edge, and weight) with an AI-driven intelligence module. When poor posture is detected, the system executes active corrections through a multi-axial actuator module (backrest, height, lumbar, lateral, and armrests). It employs a staged intervention strategy, providing progressive visual, auditory, or haptic alerts before mechanical adjustments, effectively reducing musculoskeletal injury risks in professional office environments.

PE-128 **NAME(S): GALVEZ HUAIRA DANIEL ROY / BELTRÁN ZÁRATE ANDREA JIMENA / TOMAS VELASQUEZ ANGELY XIOMARA / HOSPINAL P. ESCAJADILLO JANE / OLIVERA ACUÑA WILLIAMS RONALD**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Smart Oral Hygiene Device with Replaceable Electrochemical pH Cartridge**
This invention is an intelligent oral hygiene device that integrates mechanical cleaning with real-time salivary pH measurement. It features a toothbrush head with a specialized cavity for a replaceable electrochemical cartridge containing an ISFET sensor, a reference electrode, and a microcapillary chamber for sample stabilization. An internal electronic module processes these signals, providing immediate visual feedback to the user via an LED indicator. This system allows for continuous, non-invasive monitoring of oral biochemical conditions during daily brushing routines, enhancing preventive dental care through precise chemical analysis.

PE-129 **NAME(S): MANTARI MINCAMI LIZET DORIELA / MEDRANO VEGA ALISON / LAIME HUARCAHUAMAN DAMARIS / NOLASCO QUIÑONES YESENIA / HUACHO OSORIO ZULMA OLIMPIA**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Multisensory Educational Device for Braille Learning with Interchangeable Embossed Sheets and Teacher Supervision Module**
This invention is a multisensorial Braille learning device designed as a physical book integrating tactile, auditory, and electronic elements. It features a reading module for interchangeable embossed sheets with orientation markers, secured by a specialized fastening system. Integrated pressure sensors detect student interaction patterns, while a vibration motor provides haptic guidance. A central microcontroller synchronizes audio narration with tactile feedback. The system includes a teacher interface with a screen and controls for speed and voice recording, plus WiFi/Bluetooth connectivity for data management.

PE-130 **NAME(S): HADI MOHAMED MOHAMED MEHDI / RAMOS PIÑAS DAVID / DAVILA HONORIO DUANY / TAPIA SILGUERA RUBEN DARIO / SÁNCHEZ GUZMÁN CARLOS ROSARIO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Integrated Ecological Equipment for Environmental Water Capture and Adaptive Environmental Data Management**
This invention is an autonomous ecological system for atmospheric water harvesting and adaptive environmental data management. It integrates a collection module with condensation surfaces, a multi-stage treatment unit (sedimentation and disinfection), and an environmental sensor array (temperature, humidity, air quality, and pressure). A central microcontroller dynamically manages water capture and energy consumption based on real-time environmental variables. Powered by solar energy, the device provides a sustainable water source while generating critical datasets via wireless communication, making it ideal for urban and rural areas with limited water access.

PE-131 **NAME(S): QUISPE EULOGIO CARLOS ENRIQUE / RODRIGUEZ HUANCA FRANCISCO HALLEY / ANCCO GOMEZ EDITH / RIVERA PALOMINO CECIL AUGUSTO / MAGUIÑA JIMENEZ JHAN CARLO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Optimized Mechanism for Pet Hair and Dust Collector Device for Indoor Use**
This invention is an optimized autonomous mechanism for collecting pet hair and fine dust in indoor environments. It integrates a high-efficiency cyclonic suction system with a multi-stage filtration unit, including HEPA filters, to trap microscopic allergens and improve air quality. The device features specialized rotating brushes and entry nozzles designed to lift hair from textiles and upholstery without tangling. Equipped with LIDAR navigation and proximity sensors, it ensures uniform surface coverage. Its modular structure facilitates easy maintenance, while a high-density Li-ion battery provides extended operation.

PE-132 **NAME(S): Victor Caballero Rugel**
ORGANIZATION: IN4 S.A.C. (PE)
TITLE **MECHANICAL HAPTIC ALERT SYSTEM**
Mechanical Haptic Alert System is an innovative wearable device that mechanically alerts users before they touch their face, helping reduce the transmission of infectious diseases and improve hygiene habits. Unlike electronic or movement-restricting solutions, it delivers adjustable passive haptic feedback while preserving natural arm motion, requiring no batteries or electronics. Its lightweight, reusable, ergonomic and low-cost design enables applications in healthcare, laboratories, food processing, manufacturing, education and public environments, providing a practical and scalable solution for infection prevention and behavioral awareness.

PE-133 **NAME(S): CALDERON SAMANIEGO SEVERO SIMEON / TORRES RUIZ FRANCO JESUS / OLIVERA BORDAES KARINA ROSARIO / BARZOLA CAPCHA ELIZABETH BEATRIZ / SILVA MURILLO JEFRIN MARLON**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Public Streetlight Monitoring System Using Energy Consumption Sensors for Real-Time Fault Detection**
This invention is an integrated monitoring system for public lighting designed for real-time fault detection using energy consumption sensors. The compact module, installed directly on lighting poles, integrates measurement, data processing, and wireless communication. It features an electronic board with current and voltage sensors to continuously record consumption, identifying anomalies such as voltage drops or overloads that indicate lamp or ballast failure. Powered by the urban grid, it transmits real-time data to external platforms for remote supervision and automatic alerts, optimizing maintenance and urban energy efficiency.

PE-134 **NAME(S): FLORES ESPINOZA CARLOS GERARDO / NINAHUANCA ZAVALA YINA MILAGRO / MUNIZ PAUCARMAYTA ABEL ALBERTO / CASTRO CAYLLAHUA FIDEL**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Improved Electronic Housing for Gas Detection and Multiparametric Water Monitoring in Septic Tanks**
This invention is an improved electronic housing for the simultaneous detection of harmful gases and multiparameter water monitoring in septic tanks. It integrates gas sensors (methane, hydrogen sulfide) and a submersible water quality module (pH, turbidity, temperature, dissolved oxygen) into a single compact, hermetic body. Featuring an internal microcontroller and wireless communication (Wi-Fi/Bluetooth), the system enables real-time data transmission and remote supervision. Designed with an IP67 rating and a hybrid solar-powered system, it ensures durability and energy autonomy, optimizing maintenance and safety in basic sanitation and wastewater treatment environments.

PE-135 **NAME(S): GUERRA CONDOR WILHELM VLADIMIR / ARAGÓN PIZARRO ANGELA JESSICA / MIRANDA TORPOCO CAROLINA / ARONI VILCA ANGELICA CAROLINA / VELIZ PALOMINO MAYBEE YOMIRA**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Specialized Preventive and Alert System Module for People with Stroke Propensity**
This invention is a specialized portable module for continuous physiological monitoring in people prone to strokes. It integrates high-sensitivity sensors for real-time heart rate and blood oxygen measurement. An internal electronic board analyzes risk patterns and triggers a multimodal alert system (vibration, acoustic signals, and LED lights) upon detecting anomalies. Featuring wireless connectivity for telemedicine integration and a manual emergency button, the device ensures immediate notification to both users and caregivers, significantly reducing medical response times and improving patient safety in daily contexts.

PE-136 **NAME(S): TICSE ALFARO DUSTIN DOUGLAS / LOPEZ ROBLES ZENON MANUEL / POMA LAGOS LUIS ALBERTO / CASTILLO PAREDES HEBERT CARLOS / ALANIA RICALDI PIT FRANK**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Foldable Geometry Tool with Articulations that Simulate Real 3D Figures**
This invention is a folding geometry tool for interactive learning of 3D mathematical concepts. It features articulated arms made of ABS polymer or light alloy, connected by joints allowing 180° rotation. The mechanism integrates return springs for automatic repositioning and mechanical locks to stabilize various figures such as cubes, prisms, and pyramids. Supported by a non-slip base and a protective frame, this modular device facilitates tactile and visual exploration of vertices, edges, and symmetry. It offers a durable, versatile alternative to static teaching materials for schools and universities.

PE-137 **NAME(S): LOPEZ GOMEZ HENRI EMMANUEL / SANCHEZ SOTO JUAN MANUEL / SILVA INFANTES MANUEL / MARTIN MARCELO JULIA MARLENI**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Automated Garment Classification Equipment Using Optical and Weight Sensors on Conveyor Belt**
This invention is an automated system for classifying garments using optical and weight sensors integrated into a conveyor belt. It features a calibrated load cell for weight measurement and high-resolution cameras to identify color, texture, and labels. A central microcontroller processes this data to activate automatic diverter gates, sorting clothes into specific categories without interrupting the workflow. Its modular design reduces manual labor, enhances inventory precision, and provides real-time traceability. It is optimized for the textile industry, industrial laundries, and recycling centers, supporting efficient material management and the circular economy.

PE-138 **NAME(S): ROMERO GIRON HILARIO / CORDOVA MAYO MIRIAM ROSARIO / CHACHI VICUÑA EDITH ALEJANDRINA / LEIVA SANTIVAÑEZ CAMILA MILENA / VILLA RICAPA ANDERSON JHOEL**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Portable Smart Bracelet Device for Physiological Monitoring of Reactions in People with Autism**
This invention is a smart bracelet designed for real-time physiological monitoring of individuals with Autism Spectrum Disorder (ASD). It integrates biometric sensors to record heart rate (PPG), skin conductance (GSR), body temperature, and movement patterns associated with stress or emotional states. An internal microcontroller uses specialized correlation algorithms to identify anomalies and trigger early alerts via Bluetooth or Wi-Fi to caregivers and clinicians. Featuring an ergonomic, hypoallergenic design and local data storage, the device provides an objective, non-invasive tool to facilitate timely interventions and improve the user's quality of life.

PE-139 **NAME(S): VIA Y RADA VITTES JOSE FRANCISCO / VILCHEZ GALARZA NILTON DAVID / CUADROS ESPINOZA JOSE ANTONIO / HUAMAN HUARINGA NAZZIA MASIEL**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Interactive Motivational Robot with Daily Assistance System and Modular Structure of External and Internal Components**
This invention is an interactive motivational robot featuring a daily assistance system and a modular internal/external structure. Designed for domestic, educational, and therapeutic environments, it uses an anthropomorphic design to provide visual and auditory communication (messages, symbols, and stimuli) that encourage daily activities. Its modular architecture allows for easy maintenance, functional scalability, and low energy consumption. Equipped with an autonomous mobility base and IoT connectivity, the robot offers personalized, real-time motivational interaction, significantly improving user adherence to routines and overall quality of life. (97 words).

PE-140 **NAME(S): VILLA RICAPA LINDA FLOR / CAMARENA HILARIO JENNY MIRIAM / PALACIOS MANRIQUE MARI LUZ / CAYETANO TERREL PAOLO ANDREE**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Ergonomic Coupling Device with Air Bags for Posture Correction in Beds During Sleep**
This invention is an ergonomic coupling device for conventional beds designed to correct posture during sleep using inflatable airbags. The modular system features strategically distributed airbags in the lumbar, dorsal, and cervical zones that can be independently adjusted to modify firmness and support. Managed by a central microcontroller and a silent mini-compressor, the device regulates internal pressure to provide personalized comfort. It reduces risks of musculoskeletal and circulatory issues, such as lumbar pain, while offering a portable, easy-to-install solution for domestic, hospital, and rehabilitation environments.

PE-141 **NAME(S): MANTARI MINCAMI LIZET DORIELA / CAMAYO DEL PINO LUIS ANTONIO / VILLAVERDE LEON KEILY NADIA / POMA GARCIA LETIZIA JUDITH / CALDERON VILCHEZ ROSSMERY CECILIA**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Magnetic School Calendar with Interchangeable Icons for Children with ASD**
This invention is an inclusive magnetic school calendar designed for children with Autism Spectrum Disorder (ASD). It facilitates visual organization of daily routines to promote autonomy and reduce anxiety. The system includes an enameled metallic panel with a polymer coating and a modular grid. It features interchangeable icons representing school, recreational, and self-care activities using high-contrast colors. The device also includes customizable icons for personal photos, a rear storage compartment, and an organizing module. Its foldable structure ensures stability and portability.

PE-142 **NAME(S): GUTIÉRREZ MARTÍNEZ FREDI / RECUAY SALAZAR CARLOS ALBERTO / ROJAS BUJAICO RAFAEL WILFREDO / GUTIERREZ MEZA FREDI PAUL / VERASTEGUI VELASQUEZ GRACIELA SOLEDAD**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Automated Cutlery Sterilizing Robot Device with Voice Recognition and IoT Control**
This invention is an automated cutlery sterilizer designed for the safe and efficient sanitization of kitchen utensils. It utilizes a UV-C radiation system and internal air circulation to eliminate pathogens and residual moisture. Key features include a voice recognition module for touchless operation and IoT connectivity (Wi-Fi/Bluetooth) for remote monitoring and smart home integration. Housed in a durable ABS casing, the device includes safety sensors, an electronic control board, and battery backup. It offers a reliable, ergonomic, and energy-efficient solution for both domestic and commercial environments.

PE-143 **NAME(S): CHIPANA LOAYZA PIERRE / CALDERON VILLEGAS LUIS ALFREDO / CORDOVA CALERO HEIDI VIVIANA / CONDOR CARRANZA LUIS MARIO / CHIPANA PAZ PIERELLA NATALI**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Circular Urban Module for Rainwater Harvesting and Sustainable Self- Irrigation of Collective Green Areas**
This invention is a circular urban module designed for rainwater harvesting and the sustainable self-irrigation of collective green spaces. It integrates collection, storage, and distribution systems into a single body that functions as public furniture. Rainwater is captured via a sloped surface with grates, filtered to remove debris, and stored in an internal tank. The system autonomously distributes water through gravity and regulated valves to surrounding soil, eliminating the need for external hydraulic connections or pumps. It provides an ecological, low-maintenance solution for urban green area maintenance.

PE-144 **NAME(S): GUTIÉRREZ MARTÍNEZ FREDI / RECUAY SALAZAR CARLOS ALBERTO / ROJAS BUJAICO RAFAEL WILFREDO / GUTIERREZ MEZA FREDI PAUL / VERASTEGUI VELASQUEZ GRACIELA SOLEDAD**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Improved Industrial Chocolate Extruder Tool with Bain-Marie Mechanism**
This invention is an improved industrial chocolate extruder featuring a bain-marie heating system to ensure thermal homogeneity and continuous flow. It includes a stainless steel hopper, an optimized screw conveyor, and an extraction nozzle with a filtering grid to ensure a smooth texture. The heating system combines a water jacket with auxiliary electrical resistances, regulated by temperature sensors and an electronic control board. This design prevents unwanted crystallization, reduces energy consumption, and simplifies maintenance, making it ideal for large-scale industrial production of chocolates and derivatives.

PE-145 **NAME(S): BUSTINZA ZUASNABAR EDWARD EDDIE / GUERRA FLORES JOHN / ARANDA ROJAS HERBERTH / FLORES YUPANQUI DIEGO ARTURO / TAPIA ESPIRITU CRISTOPHER VALENTINO**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Furniture Fixation Module with Fan and Filter System for Fine Dust Absorption and Purification**
This invention is an autonomous module for furniture designed to absorb and purify fine dust from work surfaces. It consists of two main systems: a suction and filtration unit featuring a multilayer filter (metal mesh, electrostatic fibers, and activated carbon) and a fixing and control unit. Managed by an integrated microcontroller, it monitors filter saturation via differential pressure sensors and provides visual alerts. This compact solution improves air quality in domestic, office, and industrial environments without requiring structural modifications to existing furniture.

PE-146 **NAME(S): MANTARI MINCAMI LIZET DORIELA / ROMERO GIRON HILARIO / QUISPE EULOGIO CARLOS ENRIQUE / HADI MOHAMED MOHAMED MEHDI / ASTO PEÑA MEYLINN VALENTINA**
ORGANIZATION: UNIVERSIDAD PERUANA LOS ANDES
TITLE **Autonomous Intruder Repellent with IoT and Integrated Environmental Monitoring for Agricultural Fields and Public Spaces**
This invention is an autonomous security and monitoring system designed for agricultural and public spaces. It integrates 360° motion detection, acoustic deterrents, and climatic sensors (anemometer and rain sensor). Managed by a microcontroller with adaptive algorithms, the device optimizes energy consumption and protects its structural integrity during extreme weather. Powered by solar energy, it features IoT connectivity via MQTT for real-time remote monitoring and data logging. This sustainable, low-maintenance solution effectively deters diverse intruders while providing valuable environmental data for informed decision-making

PE-147 **NAME(S): Jenny Rosalyn, Huerta León / Jhonnel Samaniego Joaquin / Javier Alonso, Sánchez Siesquen / Mario Christian, Aguirre Gihua**
ORGANIZATION: María Auxiliadora University
TITLE **Retractable Esophageal Cannula for Rodents**
Laboratory rodents require oral administration devices that are both safe and adaptable to different anatomical sizes. Conventional fixed-length cannulas increase the risk of esophageal injury and require multiple device sizes. This invention introduces a retractable esophageal cannula featuring a telescopic adjustable body, ergonomic curved section, rounded safety tip, and direct syringe connector. The device improves dosing accuracy, enhances operator efficiency, and minimizes animal trauma during oral gavage procedures. Its reusable and adaptable design provides an innovative solution for biomedical, pharmacological, and toxicological research laboratories.

PE-148 **NAME(S): Carlos Martín Calderón Tovar / Mathew Cristobal Correa / Andre Emiliano Bautista Orellana / Fernando Whills Camayo Huamanculi / Jose Luis Benito Uscuchagua / Patricia Guisela Tovar Sanchez / Isaac Isaias Paucar Huaman / Erlin Jhon Barrientos Porta / Stanley Bruss Mauricio Carbajal / Carlos Manuel Roman Rimache / Luis Orlando Alvarez Acuña**
ORGANIZATION: Inventor Independiente
TITLE **Self-Centering Friction Dynamometer Brake for Multi-Diameter Vertical Shafts**
The invention is a self-centering friction dynamometer brake for vertical shafts of multiple diameters. Two opposing spiral guide discs move V-shaped jaws simultaneously toward the shaft, automatically centering it and applying controlled friction. A manual lever, bevel gears, and a dynamometer allow the braking reaction force to be measured so that torque and mechanical power can be calculated. The system is intended for testing vertical-axis turbines, rotating machinery, and laboratory equipment.

PE-149 **NAME(S): Jenny Rosalyn, Huerta León / Javier Alonso, Sánchez Siesquen / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani**
ORGANIZATION: María Auxiliadora University
TITLE **Multi-Well Agar Punching Device for Petri Dishes with Leveling System and Interchangeable Punches**
Conventional agar punching methods are labor-intensive and often produce inconsistent well dimensions, affecting the reproducibility of microbiological assays. This invention presents a multi-well agar punching device that integrates interchangeable punches, an automatic leveling mechanism, and simultaneous pressure operation to produce uniform wells with a single action. Its modular, sterilizable design improves accuracy, reduces processing time, and standardizes laboratory procedures. The device offers significant advantages for microbiology, pharmaceutical research, biotechnology, and quality control laboratories seeking greater efficiency and experimental reliability.

PE-150 **NAME(S): Jenny Rosalyn, Huerta León / Jhonnel Williams, Samaniego Joaquin / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani**
ORGANIZATION: María Auxiliadora University
TITLE **Inflatable Modular Drying Device with Autonomous Microclimate Control for Medicinal Plant Materials**
Conventional plant drying systems often require electricity, rigid structures, or external equipment, limiting their use in rural and remote areas. This invention introduces an inflatable modular drying device with autonomous microclimate control for medicinal plant materials. The system combines passive solar heating, phase change materials (PCM), natural convection, and humidity monitoring to maintain optimal drying conditions without external power. Its portable, foldable, and modular design enables rapid deployment while preserving the quality and bioactive compounds of medicinal plants. The device provides a sustainable, low-cost solution for post-harvest processing and field applications.

PE-151 **NAME(S): CALCINA SOTELO Armando Felipe / CAMAYO LAPA Bécquer Frauberth / FLORES RAMOS Omar Pablo / OCHOA SOSA Salomé / VILCATOMA SÁNCHEZ Amador Godofredo / TAIPE CASTRO José Antonio / ASTO HINOJOSA Roberto César / MUÑOZ GUERRA Luis Enrique**
ORGANIZATION: National University of the Center of Peru
TITLE **Ozone Generator for Virus and Bacteria Disinfection**
The invention relates to an ozone generator for the disinfection of viruses and bacteria using a forced-air reactor with high-voltage electrical discharge technology. The system integrates an air inlet nozzle, injection and exhaust cooling fans, copper and aluminum electrodes housed inside a borosilicate glass chamber, and an electronic ballast with a flyback converter to generate ozone efficiently from atmospheric oxygen. Continuous airflow enhances ozone production while cooling the reactor, improving operational stability and performance. The transparent reactor allows plasma visualization and operator safety. The design offers a compact, efficient, low-maintenance, and cost-effective solution for indoor air disinfection applications.

PE-152 **NAME(S): MORALES SANTIVAÑEZ Wilfredo Víctor / LOZANO PAULINO Yovany Damisela / TAIPE CASTRO José Antonio / MUÑICO CASAS Edmundo / CAIRO HURTADO Timoteo / RAMÓN LLULLUY Miguel**
ORGANIZATION: UNIVERSIDAD NACIONAL DEL CENTRO DEL PERÚ
TITLE **Maize Shelling and Grain Classification Machine**
The present invention addresses the limitations of conventional maize processing machines, which are characterized by product losses, inefficient grain classification, and safety risks for operators during the feeding process. As a solution, a machine was developed that integrates shelling, grain classification, and collection into a single operation. The system incorporates an inclined shelling cylinder with a helical shaft, multi-size sieves for grain classification, discharge channels, and an integrated access step to improve operator safety. This technology enhances grain quality and uniformity, reduces processing time and operating costs, increases agricultural productivity, supports sustainable mechanization, strengthens post-harvest efficiency, and improves maize producers.

PE-153 **NAME(S): Jenny Rosalyn, Huerta León / Marleny Flor, Capcha Siccha / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani**
ORGANIZATION: María Auxiliadora University
TITLE **Hybrid-Powered Multichamber Emulsification System with Integrated Thermal Control**
Conventional emulsification systems often provide limited thermal management and depend exclusively on electrical power, restricting process control and operational flexibility. This invention introduces a portable multichamber emulsification system integrating independent thermal conditioning chambers, a central high-shear homogenization chamber, programmable electronic control, and a hybrid power supply combining grid electricity, rechargeable batteries, and optional solar energy. The system enables controlled heating and cooling throughout the emulsification process, improving emulsion stability, particle size uniformity, and preservation of temperature-sensitive active ingredients. It provides an efficient, versatile, and sustainable solution for cosmetic, pharmaceutical, and laboratory-scale production.

PE-154 **NAME(S): Jenny Rosalyn, Huerta León / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani / Erik Luis Arnao Ambrocio**
ORGANIZATION: María Auxiliadora University
TITLE **Dynamic Self-Balancing Centrifuge with Sectorized Mass Compensation and Hybrid Magneto-Mechanical Support**
Conventional laboratory centrifuges require precise manual balancing to minimize vibrations and ensure safe operation. This invention introduces a dynamic self-balancing centrifuge integrating a sectorized mass compensation mechanism with angular motion restrictions and a hybrid magneto-mechanical support system. Independent mobile compensating masses redistribute automatically within predefined sectors to correct rotor imbalance while magnetic-assisted support reduces residual vibrations transmitted to the structure. The combined system improves rotational stability during acceleration, steady operation, and deceleration, reducing mechanical wear, increasing operational safety, and extending equipment lifespan. The invention provides a reliable and innovative solution for clinical, pharmaceutical, industrial, and research laboratories.

PE-155 **NAME(S): Jenny Rosalyn, Huerta León / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani / Erik Luis Arnao Ambrocio**
ORGANIZATION: María Auxiliadora University
TITLE **Integrated Device for Sterile Cutting, Storage, and Controlled Dispensing of Filter Paper Discs for Antimicrobial Susceptibility Testing**
Conventional antimicrobial susceptibility testing requires separate tools for cutting, storing, sterilizing, and dispensing filter paper discs, increasing handling steps and contamination risks. This invention introduces an integrated device that combines disc cutting, sterile storage, and controlled individual dispensing within a single unit. A beveled cutting edge produces uniform discs that are automatically transferred into an internal sterile chamber and sequentially released through an axial dispensing mechanism without intermediate handling. The device improves aseptic conditions, enhances workflow efficiency, standardizes microbiological procedures, and provides a practical solution for clinical, pharmaceutical, research, and microbiology laboratories.

PE-156 **NAME(S): Jenny Rosalyn, Huerta León / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani / Erik Luis Arnao Ambrocio**
ORGANIZATION: María Auxiliadora University
TITLE **Smart Hermetic Closure Device with Magnetic Seal Verification and Integrated Environmental Monitoring**
Conventional storage containers indicate only whether a lid is closed, without verifying the actual integrity of the hermetic seal or monitoring storage conditions. This invention introduces a smart closure device that combines conditioned magnetic seal verification with integrated environmental monitoring. The system validates hermeticity only when a predefined compression of the sealing element is achieved, ensuring objective confirmation of an effective seal rather than simple lid closure. Simultaneously, environmental sensors monitor critical storage parameters, while an electronic processing unit provides real-time status through a visual interface. The invention improves product preservation, storage safety, and reliability for pharmaceutical, biological, chemical, and laboratory applications.

PE-157 **NAME(S): Jenny Rosalyn, Huerta León / Mario Christian, Aguirre Gihua / Gianella Rosario Cruz Toledo / Lisbet Yocelin Huamani Huamani / Erik Luis Arnao Ambrocio**
ORGANIZATION: María Auxiliadora University
TITLE **Radial Multichannel Pipetting Device with Equidistant Distribution for Simultaneous Liquid Dispensing**
Conventional multichannel pipettes are primarily designed for linear or rectangular microplate formats, limiting their use in laboratory procedures involving circular sample arrangements. This invention introduces a radial multichannel pipetting device featuring an equidistant distribution system connected to a central fluid manifold. A single axial actuation simultaneously transfers liquid through multiple radial channels toward uniformly spaced dispensing tips arranged around a common central axis. The innovative geometry enables synchronized and homogeneous liquid dispensing into circularly arranged containers, reducing manual repositioning, minimizing operational errors, improving workflow efficiency, and expanding the applicability of multichannel pipetting in microbiology, biotechnology, pharmaceutical, chemical, and research laboratories.

PE-158 **NAME(S): Katherine Ivette Calderón Mayo / Aldo Stanlee Rojas Neyra / Manolo Clemente Fernández Díaz**
ORGANIZATION: FARMACOLOGICOS VETERINARIOS S.A.C.
TITLE **A RECOMBINANT LIVE IMMUNOGENIC COMPOSITION COMPRISING THE NEWCASTLE DISEASE VIRUS (NDV) THAT EXPRESSES THE S1 SUBUNIT OR THE RECEPTOR-BINDING DOMAIN (RBD) OF THE SARS-COV-2 SPIKE PROTEIN**
A live recombinant Newcastle disease virus (NDV)-based immunogenic composition is proposed as a SARS-CoV-2 vaccine. Two reverse-genetics constructs, rNDV-LS1- HN-RBD and NDV-LS1-S1-F, express RBD and S1 antigens on the viral surface while maintaining a lentogenic safety profile. Intranasal immunization in hamsters induced anti-RBD IgG and neutralizing antibodies; rNDV-LS1-S1-F achieved 100% SARS-CoV-2 seroneutralization at 1:160, supporting a scalable protective vaccine platform.

PHILIPPINES

PH-01 **NAME(S): AL-RHASID A. PANASANG**
ORGANIZATION: MINISTRY OF SCIENCE AND TECHNOLOGY - BARMM
TITLE **Acoustic Fish Aggregating Enhancer: Boosting Catch of Large Fish in Payao through Targeted Sound Wave Propagation**
This invention is an eco-friendly, solar-powered acoustic device designed to boost the catch of Yellowfin Tuna, Marlin, and other large pelagic fish around traditional payaos (fish aggregating devices). By propagating pre-recorded acoustic frequencies—specifically the underwater biological sounds of schooling prey and target predator fish—stored on a microSD card, it actively lures high-value species toward the payao's core. The self-sustaining system features an integrated solar panel, a high-efficiency soundboard, a transducer speaker, and a rechargeable 18650 lithium battery inside a durable, waterproof casing, bridging grassroots practicality with acoustic science to dramatically improve municipal fishing yields.

PH-02 **NAME(S): MATTEO RAPHAEL A. GOCO**
ORGANIZATION: Holy Infant Academy of Calapan
TITLE **SAFE-RIDE: Safety Alert and Forensic Evaluation for Responsible Intelligent Driving Equipment**
Road accidents from alcohol intoxication, overspeeding, and reckless driving demand immediate, scalable interventions beyond traditional manual enforcement. This study introduces Safe Ride, an integrated safety device providing real-time monitoring and proactive accident prevention. The system integrates four hardware modules—a breath analyzer with ignition-lock capabilities, a speedometer/ accelerometer, a GPS locator, and a buzzer alarm—linked to a mobile application that tracks location and alerts emergency contacts. Testing occurred in laboratory and simulated environment. Test results confirmed reliable alcohol detection, accurate speed tracking, and seamless remote alert transmission. Safe Ride offers a low-cost, comprehensive safety solution, aimed to save lives.

PH-03 **NAME(S): CASSANDRA ELISE A. GOCO**
ORGANIZATION: HOLY INFANT ACADEMY OF CALAPAN
TITLE **PROJECT FLEATHER - Development and Characterization of Rosa indica-Based Bioleather as a Sustainable Alternative to Synthetic Leather**
Project Fleather investigates producing sustainable bio-leather from Rosa indica (rose) petal waste and a cassava starch binder, addressing toxic tanning pollution and floriculture biomass waste. Three formulation trials varied binder-to-plasticizer ratios to optimize material performance. The bio-leather was evaluated against specific thresholds for tensile strength (≥10 N), water absorption (≤30%), and 30-day composting biodegradation (≥40% mass loss). Maximizing this formulation advances circular bioeconomy principles by proving that post-consumer floral waste streams can be successfully valorized into functional, eco-conscious materials capable of replacing environmentally degrading synthetic and animal-based leathers.

POLAND

PL-01 **NAME(S): Marcin Wekwejt, PhD / Anna Melnyk / Justyna Kozłowska, PhD / Anna Ronowska, PhD**
ORGANIZATION: Student Research Group ‘Materials in Medicine’, Gdańsk University of Technology
TITLE **MG²-MULTISET Bone Cement: A Multicomponent Dual-Setting Injectable Magnesium Phosphate–Guar Gum Cement with Enhanced Functional and Handling Properties**
This invention presents a dual-setting injectable bone cement based on magnesium phosphate cement integrated with a guar gum hydrogel formed via borate-mediated cross-linking. The system incorporates calcium carbonate to create a secondary inorganic phase and glucono-δ-lactone for controlled acidification and to regulate setting kinetics. Unlike conventional cement systems based on ionic polymers, this approach employs a non-ionic polysaccharide, with borax serving as both a cross-linking agent and hydration retarder. Finally, sorbitol is introduced as a plasticizer to enhance injectability and handling. The resulting multicomponent biocomposite exhibits improved cohesion, structural integrity, cytocompatibility, and suitability for minimally invasive orthopedic applications.

PL-02 **NAME(S): Mateusz Górski / Oskar Norbert Bar / Radosław Dariusz Moskal**
ORGANIZATION: Technikum nr 3 w Zespole Szkół nr 3 im. Hutników Ostrowieckich
TITLE **GraySave!**
GraySave! is a low-cost gray water recycling system that collects water from showers and washing machines, disinfects it using UV sterilization, and reuses it for toilet flushing. The project aims to reduce potable water consumption, lower water and wastewater bills, and promote environmental sustainability. The system uses two storage tanks, a pump, a UV sterilizer, and a water-level controller for automatic operation. Calculations show that a typical four-person household can fully cover toilet flushing demand with recycled gray water, saving about 33 m³ of water and approximately $140 annually, with the installation cost recovered in around two years.

PL-03 **NAME(S): Anna Choińska-Pulit, PhD, Eng. / Justyna Sobolczyk-Bednarek, PhD, Eng. / Dominika Kufka, PhD / Amelia Zielińska, PhD / Marcin Maksymowicz, MSc, Eng.**
ORGANIZATION: "Poltegor-Institute" Opencast Mining Institute
TITLE **Compost Mixture and Method for Its Production**
The invention relates to a compost mixture for improving soil properties of degraded areas, and to a method for its production. The compost mixture comprises 20 wt. parts of white poultry feathers, 60 wt. parts of wheat straw, 20 wt. parts of low-calorific brown coal, preferably lignite, and water to achieve a moisture content of 50-60%. The production method comprises shredding the components, mixing them, adjusting the moisture content, and composting the mixture for six weeks under controlled mixing and aeration conditions. The resulting compost provides an effective route for valorizing poultry feather waste into a soil-improving product.

PL-04 **NAME(S): GERARD WIECZOREK**
ORGANIZATION: King Faisal University
TITLE **An eco-friendly hybrid 3 x 1 brush cutter-lawn mower**
The invention is an eco-friendly hybrid 3-in-1 brush cutter-lawn mower that combines multiple gardening functions in one machine. It uses both a combustion engine and an electric motor, which can operate together and/or independently depending on operating needs. The hybrid system is intended to reduce toxic exhaust emissions while allowing electric operation without direct exhaust fumes. The electric motor also drives the cutting blades, starts the combustion engine, and powers an oil-piston compressor for inflating tires. The cutting system combines a forward-positioned disc acting as a scythe with a conventional blade, helping protect the blade from stones and other debris. A three-blade cutting element operating at three levels improves airflow, grass discharge, and grass catcher filling. The machine is also designed to make mowing easier for elderly or disabled users who may find conventional brush cutters difficult to operate, providing a multifunctional and lower-emission solution for garden, lawn, orchard, and similar maintenance applications.

PL-05 **NAME(S): Stefan Ptak / Mateusz Masłowski / Kamil Pomykała / Marek Czupski / Rafał Moska / Tomasz Topór / Grażyna Żak / Michał Wojtasik**
ORGANIZATION: Oil and Gas Institute – National Research Institute (INiG-PIB)
TITLE **Corrosion Inhibitor for Geothermal Processes Conducted in Oil Reservoirs Using Carbon Dioxide**
The invention concerns a corrosion inhibitor for geothermal processes carried out in depleted oil reservoirs using carbon dioxide. The formulation protects pipelines, equipment and fittings during CO_2 injection and heat recovery from reservoirs containing crude oil and formation water. It is compatible with hydrocarbons and formation water at elevated temperatures, does not stabilize emulsions and enables rapid phase separation. It does not form deposits, suspensions or gels, while reducing corrosion and mineral scale formation on steel components of the installation.

PL-06 **NAME(S): Stefan Ptak / Mateusz Masłowski / Kamil Pomykała / Marek Czupski / Rafał Moska / Tomasz Topór / Grażyna Żak / Michał Wojtasik**
ORGANIZATION: Oil and Gas Institute – National Research Institute
TITLE **Corrosion Inhibitor for Geothermal Processes Conducted in Natural Gas Reservoirs Using Carbon Dioxide**
The invention concerns a corrosion inhibitor for geothermal processes conducted in depleted natural gas reservoirs using carbon dioxide. The formulation protects pipelines, equipment and fittings during CO_2 injection and heat recovery from reservoirs containing natural gas and formation water. It is compatible with hydrocarbons and formation water at elevated temperatures and does not form deposits, suspensions or gels. The inhibitor dissolves in the process media, remains stable in formation water, reduces corrosion caused by CO_2 and other corrosive agents, and limits mineral scale formation on steel components of geothermal installations.

PL-07 **NAME(S): Tomasz Siuda**
ORGANIZATION: Oil and Gas Institute – National Research Institute
TITLE **Double-Row Gas Burner for Hydrogen Combustion**
The invention is a gas burner with two rows of cylindrical outlet openings designed for diffusion combustion of pure hydrogen in a gas boiler equipped with a spiral heat exchanger. Separate internal flow paths supply hydrogen and air, which meet mainly at the burner outlet surface. The burner is intended for negative-pressure combustion chambers with the fan located downstream. Its geometry maintains the designed mean excess-air ratio within ±13% as chamber pressure changes. Diffusion combustion in micro-slots reduces the risk of flame flashback and enables adaptation of new or existing cylindrical combustion chambers for hydrogen-fired water-heating appliances.

PL-08 **NAME(S): MAŁGORZATA SZYMCZEK / DAWID BUŁA / ŁUKASZ KOPERNIK / KSAWERY GRABOŚ / ŁUKASZ SUROWY**
ORGANIZATION: Silesian University of Technology / OPA S.A.
TITLE **Lightweight Composite Flameproof Cable Connector Enclosure for Mining Applications**
The innovation is a lightweight composite flameproof cable-joint enclosure for use in explosive atmospheres, particularly in underground mining. Its key feature is a metallic deflector that limits the impact of internal arc faults by redirecting hot gases and reducing thermal and mechanical loading on the enclosure cover. The convex cover geometry improves resistance to explosion pressure, while the reinforced cover-to-body joint supports sealing integrity and flameproof protection. The solution simplifies the enclosure structure, enhances operational safety and reliability, and is intended for medium-voltage mining power systems rated at 6 kV and above.

PL-09 **NAME(S): Bartłomiej Jeż**
ORGANIZATION: Czestochowa University of Technology
TITLE **Amorphous Iron Alloy for Low-Loss Transformer Cores**
The invention concerns a soft-magnetic amorphous iron-based alloy with the chemical composition Fe65Co9.5Hf2Zr2Si1.5B20, intended for low-loss transformer cores. Rapid solidification at a cooling rate of 10^5–10^6 K/s prevents crystallization and produces an amorphous structure. The alloy combines high saturation magnetization and magnetic susceptibility with a low coercive field, enabling easy remagnetization and operation at high frequencies. Its key advantage over conventional amorphous ribbons is the retention of good magnetic properties while the total content of ferromagnetic elements remains below 75%. The material offers an alternative to crystalline Fe-Si sheets in transformer applications.

PL-10 **NAME(S): MARCIN NABIAŁEK / SERGIJ ARESTENKO / FELIKS KUSAJEW / BARTŁOMIEJ JEŻ**
ORGANIZATION: Silesian University of Technology / OPA S.A.
TITLE **Device for Drying Titanium Scrap**
The invention is a device for drying titanium scrap after mechanical washing. It uses a rotating drum with specially designed triangular internal mixing elements and a forced circulation system of heated air to ensure rapid and uniform moisture removal. Controlled heating minimizes oxidation of the titanium surface and helps preserve the chemical purity of the recycled material. Compared with conventional high-temperature drying methods, the device improves process efficiency, reduces material losses, energy consumption and environmental impact, and supports the production of recycled titanium suitable for high-value industrial and potentially biomedical applications.

PL-11 **NAME(S): Łukasz Janus / Julia Radwan-Pragłowska / Aleksandra Sierakowska-Byczek / Klaudia Kuźmiak**
ORGANIZATION: Cracow University of Technology
TITLE **AgroSysIT – Mobile Spectrophotometric–Spectrofluorometric Device for Quantitative Soil Analysis and Contamination Assessment**
AgroSysIT is an innovative dual-use device for rapid, quantitative soil analysis, integrated with an application for automatic interpretation and archiving of results. In civilian applications, it supports precision fertilization, improves crop efficiency and contributes to mitigating the effects of the global food crisis. In crisis and defence-related applications, it can be used for field assessment of soil contamination in war-affected areas, disaster zones and environmentally degraded regions, helping to identify land that is safe for agriculture, reconstruction and further use.

PL-12 **NAME(S): Weronika Wałczyk / Magdalena Jankowska / Klaudia Trembecka-Wójciga / Joanna Ortyl**
ORGANIZATION: Cracow University of Technology
TITLE **Highly Filled Zirconia Resin with a Bimodal Particle Size Distribution for 3D Printing of Implants and Bone Scaffolds**
The developed photocurable resin is a highly filled ceramic–polymer composition intended for the precision DLP 3D printing of components used in implantology. It contains zirconia particles with a bimodal particle size distribution comprising micro- and nanoscale fractions. An appropriate ratio of both fractions enables the smaller particles to fill the spaces between the larger ones, thereby increasing the packing density of the ceramic phase and improving the homogeneity of the composition. This particle arrangement allows suitable rheological properties to be maintained for the DLP process while simultaneously reducing the content of the organic phase. Following curing and thermal treatment, components with high dimensional accuracy, reduced processing shrinkage, and favorable mechanical properties can be obtained. The composition may be used for the fabrication of implants and customized structures intended for contact with bone tissue.

PL-13 **NAME(S): Maciej Pilch / Dawid Kiesiewicz / Małgorzata Noworyta / Szymon Żydowski / Mateusz Rociński / Filip Petko / Joanna Ortyl**
ORGANIZATION: Cracow University of Technology
TITLE **Innovative wind turbine repair systems using novel photocurable composites integrated with spray application and UV-light curing systems**
An innovative spray-applied, photocurable repair system has been developed, the key element of which consists of novel repair composite formulations designed for the rapid reconstruction of damaged wind turbine structures. The compositions are based on urethane acrylate resins containing appropriately selected comonomers, a photoinitiator absorbing visible light at wavelengths of up to 450 nm and dispersed reinforcement in the form of glass, carbon and aramid fibres. The developed formulation provides a high viscosity suitable for spray application, rapid and selective curing with UV and visible light (blue light) and a material characterised by high mechanical strength, chemical resistance and very good adhesion to composite and steel substrates. Localised photocuring enables the precise reconstruction of the geometry of damaged components without uncontrolled material flow, which constitutes a significant advantage over conventional chemically cured repair materials. The composite was designed for use with lightweight spray application and UV-curing systems. This enables automated repairs to be carried out in difficult-to-access locations while significantly reducing the time and cost associated with wind turbine maintenance.

PL-14 **NAME(S): Maciej Pilch / Dawid Kiesiewicz / Małgorzata Noworyta / Szymon Żydowski / Mateusz Rociński / Aleksandra Watycha / Sebastian Kotowicz / Kamil Pulit / Karolina Kuczyńska / Jakub Pietraszewski / Joanna Ortyl**
ORGANIZATION: Cracow University of Technology
TITLE **Innovative 3D-printed connectors for heat-recovery ventilation systems made from thermally insulating**
The solution concerns a new class of connectors for mechanical ventilation systems with heat recovery, manufactured by additive technology from thermally insulating photocurable resin composites. The developed components include 45°, 90° and 180° elbows, reducers, 3-, 6- and 9-channel manifolds and straight or curved duct sections with elliptical cross-sections. Their internal geometry is designed to minimize local pressure losses and reduce aerodynamic resistance to airflow. The structural material consists of photocurable polymer systems modified with glass microspheres and functional fillers limiting heat transfer by conduction and radiation. The polymer matrix composition, photoinitiator type, filler content and the topology and degree of wall infill are subject to optimization. The components are cured using UV radiation and evaluated through aerodynamic and thermal tests in a model heat-recovery ventilation system. The solution enables the geometry of the installation to be adapted to specific spatial constraints, while reducing its dimensions, energy losses and the required thickness of the thermal insulation layer without compromising the expected thermal insulation performance.

PL-15 **NAME(S): Monika TOPA-SKWARCZYŃSKA / Jakub PIETRASZEWSKI / Filip PETKO / Mariusz GALEK / Joanna ORTYL**
ORGANIZATION: Cracow University of Technology
TITLE **Next-Generation TiO 2 -Modified Photopolymer Resins for Precision Biomedical 3D**
This invention introduces an advanced photocurable resin engineered with precisely optimized titanium dioxide (TiO_2) nanoparticles to enable high-resolution, high-performance biomedical 3D printing. Unlike conventional photopolymer formulations, the developed material exploits the controlled light-scattering properties of TiO_2 to accelerate the initial stages of photopolymerization while maintaining excellent dimensional stability and print fidelity through careful optimization of filler concentration and printing parameters. The invention establishes, for the first time, a comprehensive relationship between TiO_2 loading, curing kinetics, and printer optical architecture, allowing the resin formulation to be tailored specifically for both LCD and DLP additive manufacturing systems. This approach enables the fabrication of complex biomedical structures with enhanced processing reliability and superior geometric accuracy. Furthermore, the presence of TiO_2 provides a foundation for future multifunctional biomaterials due to its recognized biocompatibility, chemical stability, and potential antibacterial activity. By integrating materials engineering with process optimization, the invention delivers a next-generation platform for manufacturing patient-specific medical and dental devices, tissue engineering components, and other precision biomedical products where reproducibility, accuracy, and functional performance are essential.

PL-16 **NAME(S): Bożena Kukfisz / Przemysław Wysoczyński / Paweł Gromek / Robert Piec / Michał Szota / Mateusz Banaś / Wiktor Gawroński / Rafał Wróbel**
ORGANIZATION: Fire University, Institute of Safety Engineering
TITLE **Development of assumption for an integrated system of collecting and processing rescue knowledge for phases preparation, prevention, response and recovery for the purposes of fire and civil protection'**
The invention aims to develop and pilot-test a comprehensive set of tools for crisis rescue operations. The project focuses on creating practical planning materials and achieving two scientific objectives: developing an open, standardized decimal classification system for rescue operations, similar in concept to the Polish Classification of Activities (PKD), and applying modern engineering tools to describe and organize rescue processes.

PL-17 **NAME(S): Sebastian Banaszek / Michał Szota**
ORGANIZATION: Institute of Geodesy and Cartography
TITLE **Photogrammetric survey method with 3D marker**
Photogrammetric surveys of buildings and structures remain limited because traditional standards have not kept pace with digital and unmanned technologies. Conventional reference points may shift, reducing measurement accuracy, while high-resolution cameras, sensors, and automated image-analysis tools are not always fully utilized. The proposed 2D/3D reference marker offers a precise, stable, and highly detectable solution. It supports accurate three-dimensional positioning in any coordinate reference system and allows permanent or temporary installation. Its optimized geometry, colors, and physical depth improve automatic recognition, stereoscopic measurement, and visibility from various angles and altitudes. Weather-resistant materials ensure long-term field use, while easy relocation supports repeatable monitoring. Modular, interchangeable components and optional extensions, including GNSS integration, make the marker adaptable to modern photogrammetric surveying applications.

PL-18 **NAME(S): Magdalena Zabochnicka / Michał Szota**
ORGANIZATION: Czestochowa University of Technology / Fire University
TITLE **Biofilm with nanosilver as an additive**
The invention relates to a method for producing a nanosilver-containing film. Powdered carboxymethylcellulose (0.05–5% by weight) is combined with sodium alginate powder, agar-agar powder, or a mixture thereof (1–20% by weight), glycerol (0.4–4% by weight), and water—preferably distilled or demineralized—in an amount sufficient to bring the total composition to 100% by weight. The resulting mixture is stirred for 1–30 minutes. Powdered silver particles measuring 5–100 nm are then added in an amount of 1–70% by weight. The mixture is preferably stirred for an additional 1–30 minutes before being foamed or immediately thermoformed to produce the film.

QATAR

QA-01 **NAME(S): Faozia Abdulla A A Al-Malki**
ORGANIZATION: ALthumama Primary School for Girls
TITLE **Smart Flexible Neck Support System for Tech Neck Prevention and Pain Relief**
The Smart Flexible Neck Brace is an innovative wearable device designed to reduce neck pain caused by prolonged use of computers, tablets, and smartphones, commonly known as "Tech Neck." The brace combines an adaptive air-support mechanism with pressure sensing technology to detect forward head posture and gently restore proper neck alignment. Integrated vibration massage modules help relax neck muscles and reduce stiffness and discomfort. Unlike conventional neck braces, the design offers improved flexibility, comfort, and user adaptability. The invention aims to support healthy posture, prevent cervical strain, and enhance well-being for students, office workers, and technology users.

QA-02 **NAME(S): Najla Mohammed S M Mishaab / Wejdan Mohammed S M Mishaab**
ORGANIZATION: Almeshaf Primary School for Girls
TITLE **Smart Step: An IoT-Enabled Smart Walker for Enhancing Safety and Independence of Individuals with Mobility Challenges**
Smart Step is an innovative IoT-enabled smart walker designed to enhance the safety, independence, and quality of life of individuals with mobility challenges. The system integrates obstacle detection sensors, posture-monitoring technology, fall detection with real-time alerts, a live camera, remote-call functionality, activity tracking, night lighting, and entertainment features within a single assistive device. When hazards or abnormal movements are detected, the walker provides immediate warnings and emergency notifications to caregivers. Field testing demonstrated its effectiveness in improving user safety, mobility confidence, and independence. The solution offers an affordable, scalable, and user-centered approach to advancing assistive mobility technology and inclusive healthcare.

QA-03 **NAME(S): Sara Nasser A A Al-Shaibi**
ORGANIZATION: Almeshaf Primary School for Girls
TITLE **Smart Posture Collar for Children: Promoting Healthy Neck Position During Digital Device Use**
The Smart Posture Collar is an innovative wearable device designed to help children maintain a healthy neck posture while using smartphones, tablets, and computers. The collar utilizes a laser distance sensor and ESP32 microcontroller to continuously monitor head position. When excessive forward head tilt is detected, the device instantly alerts the child through vibration, sound, and light signals, encouraging immediate posture correction. A Wi-Fi–connected mobile application records posture data, tracks alerts, and provides visual statistics for parents and educators. The invention supports digital well-being, promotes healthy habits, and helps prevent neck and spinal problems associated with prolonged screen use.

QA-04 **NAME(S): Nayla Fahad S A Althani**
ORGANIZATION: Muallemi
TITLE **Smart Solar Chicken Coop with Bicycle-Powered Cleaning System**
Commercial chicken coops are often expensive, difficult to clean, and poorly adapted to hot climates such as Qatar. High temperatures can negatively affect chicken welfare and productivity, while daily cleaning requires significant time and effort. Small households and schools need an affordable, sustainable, and easy-to-maintain poultry housing solution. The Smart Solar Chicken Coop is a low-cost sustainable poultry housing system designed for hot climates. The project integrates a solar-powered energy system, passive cooling tower, bicycle-powered chain and gear transmission, and a conveyor belt cleaning mechanism. Recycled materials including bicycle parts, plastic barrels, and palm leaves were used to reduce cost and environmental impact. The prototype successfully housed four live chickens and demonstrated effective ventilation, cleaning, and renewable energy use. The total estimated cost was QAR ==750 compared with a commercial chicken coop costing QAR 2999, achieving approximately 75% cost reduction while providing additional innovative features.

QA-05 **NAME(S): Nayla Fahad S A Althani**
ORGANIZATION: Qatar Academy
TITLE **Development of a Natural Aloe Vera–Mashmoom Edible Coating for Fresh Fig Preservation**
This project developed a biodegradable edible coating using Aloe Vera gel and Mashmoom (Ocimum basilicum) extract to extend the shelf life of fresh figs. Forty figs were divided into four treatment groups: Control, Aloe Vera, Mashmoom, and Aloe Vera–Mashmoom (50:50). Weight loss, visual quality, and fungal development were monitored over nine days. The Aloe Vera–Mashmoom treatment showed the best overall preservation performance, reducing weight loss to 26.6% compared with 38.8% in the untreated control while maintaining better fruit appearance and delaying spoilage. The innovation utilizes safe, natural, and locally available plant materials from Qatar and offers a sustainable alternative to synthetic preservatives.

QA-06 **NAME(S): Zainab Shahzad / Ala Alardah / Mennatalla Kuna / Marwa Al-Ani / Dr. Noora Al-Qahtani**
ORGANIZATION: Qatar University
TITLE **Clean Water: Investigating, Monitoring, and Remediating PFAS Contamination in Qatar's Water Systems**
Per- and polyfluoroalkyl substances (PFAS) are persistent contaminants that threaten drinking water quality and are difficult to remove using conventional desalination processes. This project investigates the occurrence, transport, and partitioning of PFAS within Qatar's desalination-linked water systems. It develops an engineered metal-oxide-functionalized biochar for targeted PFAS adsorption under Gulf-specific salinity conditions. The study evaluates the effects of molecular structure, water chemistry, and competing ions on removal efficiency and generates decision-support data for monitoring and early-warning systems. By integrating environmental chemistry, advanced materials engineering, and water treatment science, the project provides an innovative, scalable approach to improving water safety and PFAS risk management.

QA-07 **NAME(S): Najeeha Momin / Fatima Wyne / Hanan Adil Horanieh / Ramzil Abdul Rahim / Amna Osman / Prof. Uvais Qidwai / Dr. Noora Al-Qahtani**
ORGANIZATION: Qatar University
TITLE **Development of an Immersive, Non-Wearable Hybrid Projection System to Support Rehabilitation and Well-Being in Geriatric Institutional Care**
Patients undergoing rehabilitation, particularly older adults, often experience anxiety, depression, social isolation, and reduced motivation that can hinder recovery. Although virtual reality has demonstrated therapeutic benefits, conventional head-mounted displays may increase the risk of falls, induce motion sickness, and reduce usability among geriatric populations. This project presents an immersive, non-wearable hybrid projection system that combines a curved panoramic screen, a gimbal-mounted rotary projector, and real-time camera-based head tracking to deliver adaptive therapeutic environments without requiring wearable devices. The proposed platform enhances patient comfort, safety, accessibility, and engagement while providing a cost-effective, clinically practical solution for rehabilitation and well-being in institutional geriatric care.

QA-08 **NAME(S): Maisha Zaman / Reema Rauff / Mennatalla Kuna / Marwa Al-Ani / Ala Alardah / Dr. Noora Al-Qahtani**
ORGANIZATION: Qatar University
TITLE **A Multi-Contaminant Framework for Assessing Soil–Plant–Food Transfer of Emerging Pollutants in Gulf Arid Agriculture**
This invention presents a Gulf-specific multi-contaminant framework for assessing the transfer of emerging pollutants through the soil–plant–food pathway in arid agricultural systems. The framework targets four priority contaminant groups: microplastics, heavy metals, per- and polyfluoroalkyl substances (PFAS), and phthalates. It accounts for regional environmental conditions, including sandy soils, high salinity, extreme temperatures, limited freshwater availability, and increasing use of reclaimed water, which influence contaminant transport, retention, bioavailability, and plant uptake. By integrating advanced analytical methods, soil characterization, and cumulative risk assessment, the framework supports sustainable agriculture, food safety, environmental monitoring, and evidence-based decision-making across Gulf ecosystems.

QA-09 **NAME(S): Nayla F. Al Thani**
ORGANIZATION: Qatar Academy Doha
TITLE **SaharaCool™: An Integrated Smart Cooling Ecosystem for Traditional Gulf Clothing**
SaharaCool™ is an integrated smart cooling ecosystem developed specifically for traditional Gulf clothing. The system combines a Smart Thobe, Smart Abaya, and a solar-powered smart tote bag with concealed ventilation fans and swappable rechargeable batteries. The design improves thermal comfort while preserving the traditional appearance and cultural identity of Gulf garments. Experimental evaluation using digital temperature measurements and FLIR thermal imaging demonstrated improved cooling performance under outdoor conditions. The proposed system integrates wearable technology, renewable energy, and cultural preservation into a practical, lightweight, and low-cost solution with potential applications in education, healthcare, tourism, and outdoor occupation

QA-10 **NAME(S): Nayla F. Al Thani**
ORGANIZATION: Qatar Academy Doha
TITLE **ShelfSense AI: An Intelligent Platform for Standardized Food Quality Monitoring, Temporal Dataset Generation, and AI-Assisted Analysis**
ShelfSense AI is an intelligent research platform that standardizes food quality monitoring using a controlled imaging chamber, computer vision, OCR, artificial intelligence, and temporal analysis. The platform captures standardized images and weight simultaneously, extracts visual features, compares observations over time, and generates automated reports and structured temporal datasets. Unlike conventional systems, ShelfSense AI combines hardware, software, AI, and scientific experimentation within one affordable educational platform. It supports reproducible laboratory research, AI education, and future collaborative dataset generation for schools, universities, and research laboratories.

QA-11 **NAME(S): Essa Almaadeed**
ORGANIZATION: Qatar Academy Doha (Member of Qatar Foundation)
TITLE **Dawwir (دوّر) — Doha Recycling Guide: A Bilingual Location-Based Web App for Finding the Nearest Recycling Points in Qatar**
Dawwir (Arabic for “recycle”) is a free bilingual Arabic/English web application that removes the two barriers stopping most residents of Doha from recycling: “Can this material be recycled?” and “Where do I take it?” Using the browser Geolocation API and a curated database of official recycling points, Dawwir instantly ranks nearby drop-off locations by distance and shows exactly which materials each point accepts, with step-by-step sorting guidance. Built with HTML/CSS/JavaScript and hosted free on GitHub Pages at zero operating cost, Dawwir directly supports the sustainability goals of Qatar National Vision 2030. (92 words)

QA-12 **NAME(S): Essa Almaadeed**
ORGANIZATION: Qatar Academy Doha (Member of Qatar Foundation)
TITLE **Dawwir Sense: A Solar-Powered IoT Fill-Level Sensor for Smart Recycling Bins**
Dawwir Sense is a low-cost, fully solar-powered IoT device that measures how full a recycling bin is and reports it live. A waterproof JSN-SR04T ultrasonic sensor mounted under the bin lid measures the distance to the waste surface; an ESP32 microcontroller converts this to a fill percentage and transmits it over Wi-Fi to a cloud database. The companion Dawwir web app displays every bin on a live map as “available” or “full,” so residents avoid wasted trips and collection teams optimise emptying routes. A 5V solar panel with Li-ion battery storage lets the device run autonomously outdoors. (97 words)

ROMANIA

RO-01 **NAME(S): Mihail Aurel TITU / Ion MARGINEAN / Stefan TITU / Oana BOGORIN-PREDESCU / Adrian BOGORIN-PREDESCU / Alexandru Marcel MOLDOVAN / Constantin OPREAN**
ORGANIZATION: “Lucian Blaga” University of Sibiu, Romania
TITLE **Dyadic and Triadic Robotic Structure in Long-Haul Aircraft Seats for Eliminating Passengers' Joint Stress**
The invention pertains to a series of independent assemblies with robotic functionality, configured in the form of two- and three-seat benches designed to serve as passenger seating units in long-haul aircraft. Beyond their primary seating function, these assemblies are engineered to deliver subtle, robotically actuated repetitive movements and actions promoting bodily mobility in situ — acting upon the skeletal framework of the seated human body throughout the entire cruising phase of flight. The amplitudes and frequencies of these movements are deliberately calibrated so as not to interfere with passengers' comfort, routine in-flight activities, or sleep during air travel, with the overarching objective of eliminating joint stress arising from the prolonged immobility imposed by the constrained individual space available to each passenger.

RO-02 **NAME(S): Rîpanu Marius-Ionuț / Slătineanu Laurențiu / Guriță Alexandru**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Punching pliers**
The invention relates to punching pliers meant to enable the evaluation of the force required to make holes in thin semi-finished products by punching. According to the invention, the punching pliers are provided with a dial gauge, placed in a sufficiently rigid I-shaped support (9) assembled by screws or by riveting at one end, on a lever (1) of the punching pliers, at the other end of the support (9) there being a hole into which a bushing (10) of the dial gauge is inserted as well as a screw, the rotation of which enables the gauge to be immobilized by a clamp-type subsystem, and a feeler (11) is initially in contact with the lever (1) of the punching pliers, lever whose small deformation during the punching process will be sensed by the gauge, enabling, based on a previous calibration, the evaluation of the value of the force required for the punching process, under preset conditions, of a semi-finished product (5) made of a certain material.

RO-03 **NAME(S): Burlacu Andrei / Vizitiu Robert-Ştefan / Seghedin Neculai-Eugen**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Compact system for defrosting roadways and pedestrian pathways**
The invention relates to a compact system for highly efficient defrosting of roadways and pedestrian pathways, operating with an ecological non-polluting working medium, without consumption of thermal or electrical energy from the outside, by using gravitational heat pipes. The compact system for defrosting roadways and pedestrian pathways consists of a gravitational pipe (1) made of aluminum alloy with high thermal conductivity, with the role of taking over the thermal energy of the soil, which uses a working fluid (2), (BUTAN), the heat flow received by a vaporizer (3) being transported through an adiabatic zone (4) protected by a layer (5) of thermal insulation, to a condensation zone (6), with the shape of a funnel in order to increase the heat transfer surface and, at the same time, to allow an easy return of the condensation water to the vaporization zone, which, in its turn, will transfer the heat flow to a layer (7) of asphalt or concrete which is in intimate contact therewith.

RO-04 **NAME(S): Corneliu Munteanu / Bogdan Istrate / Oana-Diana Popescu / Vasile-Iulian Antoniac / Maria-Daniela Vlad**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Magnesium-Calcium Biodegradable Alloys With Controlled Addition Of Gadolinium (Mg-Ca-Gd)**
The invention relates to five biocompatible biodegradable alloys based on magnesium-calcium with controlled gadolinium addition Mg-Ca-Gd, meant for biodegradable implants to be used in the medical field, especially in orthopaedics. According to the invention, the alloys have the following chemical compositions, expressed as mass percentage: alloy 1 - 99% Mg, 0.5% Ca and 0.5% Gd; alloy 2 - 98.5% Mg, 0.5% Ca and 1% Gd; alloy 3 - 98% Mg, 0.5% Ca and 1.5% Gd; alloy 4 - 97.5% Mg, 0.5% Ca and 2% Gd; alloy 5 - 96.5% Mg, 0.5% Ca and 3% Gd.

RO-05 **NAME(S): Seghedin Neculai-Eugen / Ionescu Adrian-Gabriel**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Customized adjustable total temporomandibular prosthesis for children suffering from ankylosis**
The invention relates to a total temporomandibular prosthesis customized to adjust the mandibular complex, meant to be applied in the cases of children suffering from ankylosis. According to the invention, the prosthesis comprises a mandibular branch component (1) fixed to a mandible (2) which has at the rear part some fixing edges (3) and at the front part a clamping means (4) for the mounting or easy replacement of a condylar capsule (5) which contains a distraction mechanism (10) consisting of a pinion (11) which drives a one-way coupling (13) and a rack (12) to move a condylar head structure (17) in the rear-vertical direction, in order to articulate with a concave articulation surface (8) fixed to the anatomical structure by a fastening frame provided with some holes (7).

RO-06 **NAME(S): Bocăneţ Ana-Maria / Chitariu Dragoş-Florin / Păduraru Emilian**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Equipment for breaking-compacting chips and separating-collecting the cooling-lubricating liquid in machine tools**
The invention relates to an equipment used for breaking and compacting metal chips resulting after machining by chip removal and also for separating the cooling-lubricating liquid from said chips. According to the invention, the equipment comprises two subassemblies: a breaking subassembly consisting of a box (1) with the role of feeding the chips, two sets of rotary breaking cutters (2) fixed on two spindles (3) driven by a motorgear (4) located outside a housing (5), some air nozzles (7) for directing the chips and separating the cooling-lubricating liquid, an inclined box (8) provided at the bottom with a metal wire mesh (9) for taking over the chips and separating the liquid, a second set of air nozzles (11) which direct the air towards the metal wire mesh, a box (10) for collecting the liquid, and a second subassembly for breaking and compacting the chips, consisting of a precinct (12) where a compaction plate driven by a pneumatic cylinder (13) compacts the chips into a solid block, removing the cooling-lubricating liquid, the chip block being discharged by the opening of a drop shutter (14).

RO-07 **NAME(S): Dimitrie-Cristian FODOR / Neculai-Eugen SEGHEDIN**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **Active Self-Adaptive Prosthesis For Lower Limb**
The invention concerns an adjustable lower-limb prosthetic system designed specifically for children. The device continuously takes into account various physical measurements of the user and automatically adapts to preserve proper anthropometric balance between the two sides of the body during growth. By maintaining equal lower-limb length, it helps prevent or minimize gait abnormalities and other biomechanical complications that may develop over time. In addition, the prosthesis reduces the need for regular replacement with new, larger models, often required annually, and consequently decreases the frequency of appointments with prosthetic care professionals.

RO-08 **NAME(S): VIZUREANU Petrică / BĂLŢATU Mădălina Simona / SANDU Andrei Victor / ACHITEI Dragoș Cristian / PERJU Manuela Cristina / Corina Ioana MOGA / BURDUHOS-NERGIS Dumitru Doru**
ORGANIZATION: Gheorghe Asachi Technical University of Iasi
TITLE **A new generation of metallic biomaterials as health solution for a sustainable life**
A new generation of metallic biomaterials as health solution for a sustainable life“ aims to obtain a new alloys system containing Titanium, Molibdenum, Niobium and Tin (Ti-Mo-Nb-Sn), with characteristics suitable for medical applications. The new generation of biomaterials will overcome the limitations of the titanium, cobalt and stainless-steel alloys as: high elasticity model and low corrosion resistance and biocompatibility. Hence, to achieve long-term stability and rapid osseointegration in orthopedic implants, surface modification of the implant surface is required. In this sense, the new titanium-based alloys will undergo specific heat treatments to obtain alloys with good mechanical properties intended for orthopedic applications.

RO-09 **NAME(S): Dumitru Eugen Colbu / Ion SANDU / Viorica Vasilache / Irina Crina Anca SANDU / Amir Ghavidalesfahlan / Gheorghe Colbu / Ioan Gabriel Sandu / Nicoleta Colbu / Andrei Victor SANDU**
ORGANIZATION: Alexandru Ioan Cuza University of Iasi
TITLE **Process for stopping insecto-fungal attacks in old wooden artifacts**
The invention relates to a process for treating old wood artifacts in order to stop insecto-fungal attack, to be applied in workshops for preservation-restoration of art works and antique furniture. According to the invention, the process consists of the following succsessive stages: sanitizing, cleaning and consolidating the surfaces to be treated, using a solid dispersion consisting of wax : paraffin or colophony : teak wood crumbs in a gravimetric ratio of 5.0:3.5:1.5, in fluid state, at a temperature of 64...66°C, by brushing in several layers, after which teak wood veneer sheets of 1.0...1.5 mm are applied by lining in one or two layers, with polymeric adhesive films of acrylic or collagen type and then, on the veneer-lined surfaces, cellulosic or urea-formaldehyde transparent films are applied, and possibly dispersions of acrylic copolymer and fine crumb teak wood in a ratio of 1:1 in dilutant, at three concentration levels, in order to provide a final thickness of the applied layer of 200 µm, at the most.

RO-10 **NAME(S): Andrei ZAMĂ / Viorel PALEU**
ORGANIZATION: S.P.E.E.H. Hidroelectrica S.A. Romania
TITLE **Device for Determining Optimal Preload of Bearings with Shape Memory Alloy Modules**
The Patent application describes a device for testing preloaded bearing assemblies using Shape Memory Alloys modules. The aim of the device is to determine and confirm the optimum preload required in order to ensure ideal operating parameters for bearings used in multiple applications. To determine the optimum bearing preload, an active preload method is employed, by the means of Shape Memory Alloys modules. The modules come in the form of disc springs, fabricated from an Fe-28 Mn-6 Si-5 Cr alloy. Applications: improving the rotational precision of machine tool spindles, automotive gearboxes & differentials, electric motor bearing assemblies, reducing thermal equilibrium time in CNC machining centers, actuators and robotics, aerospace industry etc.

RO-11 **NAME(S): Mihnea Cosmin COSTOIU / Florin MICULESCU / Aura-Cătălina MOCANU / Anișoara CÎMPEAN / Andreea-Mădălina PANDELE / Nicolae Dan BATALU / Ștefan Ioan VOICU / Andreea-Mariana NEGRESCU / Valentina MITRAN / Aurora ANTONIAC / Augustin SEMENESCU / Marian MICULESCU**
ORGANIZATION: National University of Science and Technology POLITEHNICA Bucharest
TITLE **Manufacturing process of some 3D printed composite products based on biogenic hydroxyapatite, polylactic acid and graphene nanoplates, intended for bone regeneration**
The invention relates to the manufacturing process of 3D printed scaffold-type composite products based on biogenic hydroxyapatite powder, graphene nanoplates and polylactic acid intended for the personalized reconstruction of bone defects, with modulated physico-chemical properties by controlling the related PLA/HA/GNP ratios, including the preliminary isolation by thermal route of the hydroxyapatite from bovine bones. The porosity of the products with regular geometry is predefined in the 0 – 50% range and of those with random geometry is defined by the dimensional characteristics of the organic fibres.

RO-12 **NAME(S): ANTONIAC Vasile Iulian / VOICU Ioan Stefan / COSTOIU Mihnea Cosmin / ANTONIAC Aurora Mioara / MATEȘ Ileana Mariana / STREZA Alexandru / SEMENESCU Augustin**
ORGANIZATION: National University of Science and Technology POLITEHNICA Bucharest
TITLE **COMPOSITE COATING FOR DEGRADATION CONTROL OF MEDICAL MAGNESIUM ALLOYS**
The invention relates to a composite coating material made of cellulose acetate, hydroxyapatite particles and magnesium particles for controlling the biodegradation of magnesium alloys for medical purposes.

RO-13 **NAME(S): Holhoș Nicoleta-Alina / Nemeș Ovidiu / Pop Liliana-Mariana / Fărăgău Tudor-Ștefan-Victor**
ORGANIZATION: Technical University of Cluj-Napoca
TITLE **Hemp Fiber and Mycelium-Based Composite Material Reinforced with Metal Wire Mesh and Method of Preparation**
This invention relates to the field of bio-based composite materials produced by using fungal mycelium as a natural binding agent for lignocellulosic plant substrates. The composite material is obtained by allowing fungal mycelium to colonize a fibrous plant-based substrate. The mycelium, derived from selected fungal species, develops an interconnected hyphal network that acts as a natural matrix, binding the plant particles into a strong and cohesive structure without the need for synthetic adhesives. The plant substrate may consist of hemp fibres, hemp wool, or agricultural straw. To improve the mechanical performance of the material, the composite panels are reinforced with a centrally embedded stainless-steel wire mesh.

RO-14 **NAME(S): Pîslă Doina Liana / Vaida Liviu Călin / Bîrlescu Iosif / Crăciun Cristea Florin / Gherman Bogdan George / Graur Florin / Plitea Nicolae**
ORGANIZATION: Technical University of Cluj-Napoca
TITLE **Automated Medical Instrument for Radiofrequency Ablation**
The invention relates to an automated medical instrument for radiofrequency ablation which employs an ablation needle mounted in the instrument holder, having two degrees of mobility. The first degree of freedom is for inserting and retracting the needle, and the second one is for inserting and retracting the antennas inside the ablation needle cannula. The instrument is designed to be guided by a positioning and orientation device relative to the patient's position, which may be a hand-held setting device or a medical robot that fixes the instrument prior to insertion and keeps it fixed throughout the entire period of the ablation procedure, thus increasing the precision of needle positioning for the ablation procedure.

RO-15 **NAME(S): Ciupan Cornel / Filip Ioan / Ciupan Emilia / Ciupan Mihai**
ORGANIZATION: Technical University of Cluj-Napoca
TITLE **Thermoplastic Composite Selection Method for Powering an Automatic Thermoforming Line**
The method involves dividing the products into classes with a representative benchmark, then static studies are performed by the FEA method, the minimum wall thickness is determined so as to meet simultaneously the requirements of the FOS and displacement, for each available composite material, after which determines the cost of the section. Select the composite that offers the minimum section cost, and for any other part of the part group representative, the FEA analysis will be made only with the material selected for the representative part and the wall thickness that satisfies the technical restrictions will be determined.

RO-16 **NAME(S): Andreea HEGYI / Adrian-Victor LĂZĂRESCU / Claudiu-Sorin DRAGOMIR / Cristian PETCU / Alexandra-Marina BARBU / Mircea-Iosif RUS / Tudor Panfil TOADER / Alexandra CSAPAI / Carmen-Teodora FLOREAN / Brăduț-Alexandru IONESCU**
ORGANIZATION: N.I.R.D. URBAN-INCERC
TITLE **Process for Producing an Alkaline-Activated Fly Ash-Based Geopolymer Binder with Self-Cleaning Capacity**
The process for producing an alkaline-activated fly ash-based geopolymer binder with self-cleaning capacity offers a sustainable alternative to conventional cementitious materials. The binder is synthesized by activating fly ash with alkaline solutions, transforming industrial waste into a high-performance construction material while reducing carbon emissions. Self-cleaning properties are achieved through the incorporation of photocatalytic additives, which degrade organic pollutants and maintain cleaner surfaces under light exposure. The resulting geopolymer binder exhibits excellent mechanical strength, chemical resistance, and long-term durability. This innovative approach supports waste valorization, enhances environmental performance, and promotes the development of eco-friendly, multifunctional materials for modern construction applications.

RO-17 **NAME(S): Mircea-Iosif RUS / Aivaz Ainur KAMER / Larissa Margareta BATRANCEA**
ORGANIZATION: N.I.R.D. URBAN-INCERC
TITLE **Financing Green Construction: A Conceptual Framework Linking Sustainable Investments And Financial Performance**
This conceptual study examines the role of green financing in promoting sustainable investments and improving financial performance in the construction sector. It proposes an integrated framework explaining how green financial instruments facilitate investments in energy-efficient technologies, renewable energy, and sustainable building practices. These investments enhance operational efficiency, reduce environmental impacts, strengthen competitive advantages, and support long-term financial value creation. The framework also highlights the importance of ESG principles and public policies in accelerating the transition toward sustainable construction. The proposed model provides a theoretical foundation for future empirical research and practical guidance for managers, investors, and policymakers.

RO-18 **NAME(S): Corneliu BIRTOK BANEASA**
ORGANIZATION: Politehnica University of Timisoara, Faculty of Engineering Hunedoara
TITLE **A-S-F super-aspirated air filter**
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.

RUSSIA

RU-01 **NAME(S): Golub Nikolai Alekseevich / Ryabushko Vitaly Ivanovich / Kapranova Larisa Leonidovna / Dikareva Juliya Dmitrievna / Balandina Yulia Vasilievna**
ORGANIZATION: A.O. Kovalevsky Institute of Biology of the Southern Seas of RAS
TITLE **Method for obtaining a lyophilized product from the mollusk Mya arenaria**
A method for producing a lyophilized protein hydrolysate from the bivalve mollusk Mya arenaria harvested from the Sea of Azov. The whole mollusk with shells and interstitial fluid is ground, subjected to alkaline hydrolysis (1% NaOH, 60°C, 3 h), filtered, neutralized with citric acid to pH 5.61, concentrated to 12.2% solids, centrifuged, frozen at –60°C, and freeze-dried by sublimation at –30°C to –38°C for 12 h and desorption at 30°C under vacuum for 14 h. The process eliminates the annealing step, accelerates drying, and yields a low-salt (<6%) hydrolysate powder with extended shelf life, suitable for dietary supplements.

SAUDI ARABIA

SA-01 **NAME(S): Layth Swaied Alzahrani**
ORGANIZATION: King Faisal School
TITLE **An AI-Enhanced Arabic Language Platform for Providing Personalized Health Education and Psychological Support to Brain Tumor Patients**
This project is an AI-powered healthcare support system that leverages fine-tuned Generative Pretrained Transformers (GPT) to provide personalized education and psychiatric assistance for Arabic-speaking brain tumor patients. A domain-specific dataset was collected and preprocessed to enhance medical accuracy and empathetic response generation. The system was deployed through an interactive chatbot and evaluated using quantitative metrics (precision, recall, F1 score) and qualitative expert review from King Faisal Specialist Hospital. Results demonstrated strong performance in both accuracy and completeness, highlighting the model's effectiveness in delivering reliable medical information and structured emotional support.

SA-02 **NAME(S): Hanan Abdulah Al-Ghamadi**
ORGANIZATION: Jeddah of University
TITLE **Grounded Research Structure (GRS)**
An Innovative Bottom-Up Approach for Designing Scientific Research and Discovering Theories. The Innovative Idea: Applying the principles of grounded theory to the design of the research structure itself, so that the study begins with detailed empirical data from the bottom, then gradually clusters and rises to form the research chapters and ultimately the theory. From particulars to universals from bottom to top. Advantages of This Theory: The first model to apply grounded theory principles to the design of the research structure. A bottom-up construction of knowledge from particulars to universals. A dynamic and flexible methodological model. Enhanced ability to discover new scientific theories. Raises the qualitative value and scientific importance of research.

SA-03 **NAME(S): Anas Bassam Barnawi**
ORGANIZATION: College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU)
TITLE **Onco-Track Micro-Drain (OTMD) – Biohybrid Pleural Drain for Lung Cancer Monitoring**
Onco-Track Micro-Drain (OTMD) is a biohybrid chest-drain system for real-time monitoring after lung cancer surgery. It integrates a sealed transparent bio-cartridge within a standard pleural drain, containing engineered non-pathogenic bacteria that respond to cancer-associated markers such as lactate. When these markers diffuse into the cartridge, the bacteria emit a light signal detected by an external photodetector and converted into a clinical risk indicator. OTMD aims to provide continuous, sensitive, and early detection of possible residual disease during postoperative drainage.

SA-04 **NAME(S): Anas Bassam Barnawi**
ORGANIZATION: College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU)
TITLE **AdenoGlyco-Challenge: Functional Glycan-Based Screening for Early Colorectal Adenomas**
AdenoGlyco-Challenge is a noninvasive diagnostic system for early colorectal adenomas. The patient ingests a colon-targeted capsule containing a defined panel of diagnostic glycans that interact with the mucus-associated gut microbiome. After 6–24 hours, a stool or FIT-compatible sample is analyzed for glycan depletion and labeled cleavage products. These results are combined into an AdenoGlyco Score to identify normal versus adenoma-associated patterns. By detecting functional mucus–microbiome changes before bleeding occurs, this test may improve early screening and guide colonoscopy referral.

SA-05 **NAME(S): Jana Khaled Alotibi**
ORGANIZATION: King Saud university
TITLE **Date Palm Fiber Bio Scaffolds for Meniscus Cartilage Regeneration**
This innovation presents a novel method for meniscus cartilage regeneration using nanocellulose fibers extracted from Saudi date palm wast. Cartilage injuries lack self healing capabilities, and current synthetic or animal based options suffer from short lifespans, high costs, or immune rejection. By chemically treating palm fibers to isolate pure cellulose and structuring them into 3D anatomical bio scaffolds, this project mimics natural collagen alignment. The resulting highly biocompatible scaffold acts as a temporary matrix that guides stem cell growth to build natural tissue while gradually degrading, offering a 70% cost reduction and promoting medical sustainability.

SA-06 **NAME(S): Moaaz Abdulrazack Amir / Baraa Abdulrazack Amir / Amaar Abdulrazack Amir**
ORGANIZATION: Imam Abdulrahman Bin Faisal University
TITLE **3D-Printed Dermatoscope with Variable Polarization**
We present an affordable dermatoscopic training tool, the first of its kind, a 3D printed dermatoscope with integrated variable polarization. The device is fabricated by fused deposition modeling for a total cost of less than $30 USD and provides clinical standard 10x magnification, polarization switching in a mechanical lever-controlled manner, LED illumination and a UV Wood lamp equivalent. Variable polarization allows the visualization of epidermal and deep dermal structures. This device allows for the removal of the financial barriers of commercial dermatoscopes ($500–$1,800) for medical students and trainees in resource-limited settings, promoting equitable access to dermatological diagnostic education worldwide.

SA-07 **NAME(S): Moaaz Abdulrazack Amir / Baraa Abdulrazack Amir / Amaar Abdulrazack Amir**
ORGANIZATION: Imam Abdulrahman Bin Faisal University
TITLE **Syringe Sleeve with Multimodal Feedback for Visually Impaired Users**
This device enables visually impaired users to accurately measure liquid doses, thus enhancing the safety of medication self-administration and user independence in other non-medical tasks. The designed product attaches to standard-sized syringes and features raised ridges, braille indices, and large font English numbers. The product is designed to accommodate several varying volumes of syringes (1ml–50ml) and has a central channel which shows color cues indicating the drawn amount of medication, intended for low-vision users. It contains no electronic components, ensuring affordability and reusability. This innovative product represents a practical advancement in accessible devices which aim to increase inclusiveness.

SA-08 **NAME(S): Awatif Omar Alhawsawi**
ORGANIZATION: Independent Inventor
TITLE **AASF- Alhawsawi Adaptive Safety Flooring**
AASF (Alhawsawi Adaptive Safety Flooring) is a patent-pending adaptive flooring concept designed for moisture detection and response. Upon exposure, the flooring provides a visible warning and simultaneously adapts surface conditions to support safer movement. This passive approach occurs based on the physical and chemical properties of the materials without the need for electricity or sensors, which may reduce infrastructure and maintenance requirements. The flooring is also designed to withstand the demands of healthcare environments, frequent cleaning and heavy equipment movement. Once dry, the flooring returns to its original state. Potential applications include hospitals, rehabilitation centers, and long-term care facilities.

SA-09 **NAME(S): Mohammed Altaha / Lamees A. Alhajri / Amjad M. Alramadan / Ali A. Al-Eid / Sharefa M. Alshawi**
ORGANIZATION: King Faisal University
TITLE **NeuroStrat AI: Digital Neurological Screening & Risk Stratification App**
Neurodegenerative diseases, including Parkinson's Disease and Dementia, progress silently for years before clear symptoms appear, and diagnosis is often made after irreversible neurological damage has occurred. Neurostrat AI is a phone-based screening app for elderly and high-risk patients. It uses phone cameras and sensors to assess gait, facial movement, speech, and cognitive tasks through simple repeated tests. It can be used in primary care clinics with staff guidance or at home to identify early neurological abnormalities and support early clinical referral. It integrates multiple neurological tools into one standardized digital screening system, enabling early detection using widely available phone technology.

SA-10 **NAME(S): Yara Sultan Alturise**
ORGANIZATION: Qassim University – College of Medicine
TITLE **Self-Applying Smart Wound Dressing for Rapid Wound Management Using Sequential Release via 3D-Bioprinted Multilayer Hydrogel Capsules (3D-MHC)**
A self-applying smart wound dressing utilizing 3D-bioprinted multilayer hydrogel capsules for sequential therapeutic release. The dressing provides four integrated functions: hemostasis using chitosan, antimicrobial protection using Manuka honey, pain relief using lidocaine, and tissue regeneration using zinc hydrogel. The controlled time-dependent release system reduces dressing changes, lowers infection risk, improves patient comfort, and enhances healing outcomes. The technology offers a cost-effective, easy-to-use solution suitable for hospitals, emergency care, home care, and chronic wound management.

SA-11 **NAME(S): Abdullah Afif Alshakhs / Sokinah Nasser Almusalami / Raid Alhayaza**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **PatchPal: AI-Powered Eye Patch Compliance App for Children with Amblyopia**
PatchPal is an AI-powered mobile application designed to improve adherence to amblyopia patch therapy in children. It uses the phone's front camera to monitor patch wear in real time while allowing the child to use any content freely. The app's value lies in a seamless, child-friendly system that combines passive monitoring with gamification and interactive rewards. While the core technology is simple and accessible, compliance remains poor because patching is difficult and often feels coercive. PatchPal avoids restricting children to a single app or VR environment, instead creating a free, engaging, and internally motivating experience that supports better treatment adherence.

SA-12 **NAME(S): Rawan Al-Abdulqader / Nouf Al-Abdulqader / Abdullah Alshakhs / Jumanah Qedair / Razan Al-Abdulqader**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **iFRESH: AI-Powered Mobile Application for Dry Eye Disease Monitoring and Prevention**
iFRESH is an AI-powered mobile application that non-invasively monitors and prevents the progression of Dry Eye Disease (DED), which affects up to 50% of the global population. Using the device's front camera passively during regular screen use, iFRESH continuously analyzes blinking patterns and eye rubbing behavior in the background without requiring the user to open the app. It integrates the clinically validated OSDI questionnaire to assess dry eye severity and enforces the 20-20 screen break rule. The app delivers personalized reminders and generates exportable clinical-grade reports. Built on ResNet-50 and SVM models using MediaPipe and OpenCV, iFRESH requires no additional hardware and is accessible to any smartphone user.

SA-13 **NAME(S): Ahmad AlShalabi / Dr. Aliyah Fakim**
ORGANIZATION: King Abdullah University of Science and Technology
TITLE **Capturing Air, Cultivating Earth: Photocatalytic Urea Synthesis from CO_2 and N_2 from thin air Using Metal–Organic Framework Heterojunctions (MOFs)**
Urea fertilizer production via the Haber–Bosch process consumes 2% of the world energy and emits over 300 million tonnes of CO_2 annually. This project presents a solar-powered alternative: a novel Metal–Organic Framework (MOF) heterojunction — PCN-222@MIL-125-NH_2 — that converts atmospheric CO_2 and N_2 into urea using only sunlight at ambient conditions. The heterojunction achieved 7.63 mmol/g/h urea production, while a physical mixture produced none. This offers a cleaner, scalable fertilizer route which aligns with five UN Sustainable Development Goals.

SA-14 **NAME(S): Jawaher Turki Bin Khunaysir / Fatimah Ahmed Alwohimed / Madhawi Abdulrahman Alismail**
ORGANIZATION: King Faisal University
TITLE **Oculomo: A Smart Eye Patch and Digital Monitoring Platform for Amblyopia Treatment Adherence**
Amblyopia is the leading cause of preventable permanent vision loss in children. Although eye patch therapy has been the standard treatment for over a century, poor adherence remains a major challenge, with treatment failure rates exceeding 60% and adherence dropping below 30% by week 12. Oculomo is a smart eye patch and digital monitoring platform that accurately tracks real wear time using a capacitive touch sensor and ESP32-C3 microcontroller. The system provides instant caregiver alerts, objective adherence reports, and child-friendly rewards. By improving treatment adherence,Oculomo aims to improve outcomes and reduce preventable vision loss in children

SA-15 **NAME(S): Reema Alhadlaq**
ORGANIZATION: Manarat Al Riyadh National School
TITLE **EcoFit Limb: Smart Sustainable Prosthetic Limb for Diabetic Amputees**
EcoFit Limb is a smart and sustainable prosthetic limb designed to improve the quality of life of diabetic amputees. The system integrates temperature, pressure, and glucose-monitoring sensors with an ESP32 microcontroller and TinyML-based analysis to detect early signs of infection, excessive pressure, and other health risks. Real-time alerts allow users to take preventive action before complications become severe. The prosthetic is built using sustainable materials and aims to provide an affordable, accessible, and technologically advanced solution for healthcare and rehabilitation. Its design enhances safety, comfort, mobility, and long-term patient outcomes.

SA-16 **NAME(S): Awatif Omar Alhawsawi**
ORGANIZATION: Independent Innovator
TITLE **FARIS: Fall-Associated Risk and Instability Screening – A Novel Dynamic Clinical Framework for Inpatient Fall Prevention**
Patient falls remain a leading cause of preventable harm, often occurring when instability emerges between routine assessments despite conventional score-based tools. FARIS (Fall-Associated Risk and Instability Screening) is a novel trigger-based framework that addresses this gap by activating high-risk precautions when any single trigger is detected across three MSU domains: Medications/Medical Interventions, Symptomatic Instability, and Urgency-Driven Mobility, replacing delayed scoring with real-time judgment. Requiring no additional hardware, it can be implemented using existing hospital documentation systems and was disseminated via an SSRN preprint, receiving early international recognition prior to formal expert validation process currently in progress.

SA-17 **NAME(S): Abdulhamid Ibrahim Alabadi / Shahad Mohammed Alshammary / Lana Sulaiman Alduhami / Shahla Adel Alhatlani / Zahra Ibrahim Alabadi / Huda Azmi Allouzi**
ORGANIZATION: King Faisal University / Qassim University / Imam Abdulrahman Bin Faisal University
TITLE **PanicPatch: AI-Powered Closed-Loop Retroauricular-Auricular Smart Patch for Early Detection and Automatic Support During Panic-Related Physiological Escalation.**
PanicPatch is a screenless, skin-adhered smart patch positioned behind the ear with a soft auricular contact extension. It continuously measures pulse-derived features, skin temperature, and motion, then compares them with each user's personalized baseline. Motion-aware analysis helps distinguish panic-related physiological escalation from physical activity. When sustained risk is detected, the system may deliver low-intensity transcutaneous auricular vagus nerve stimulation under validated safety limits, reassess the physiological response, and stop automatically when stability returns. PanicPatch integrates discreet sensing, local intelligence, closed-loop intervention, and continuous reassessment to support earlier and more independent panic management in daily life.

SA-18 **NAME(S): Rital Almashhour / Mayan Sindi / Eyad Abdulaziz / Jawaher Alghamdi / Arwa Alzahrani**
ORGANIZATION: King Abdulaziz University
TITLE **Ai-powered prediction of multiple sclerosis using cytokine biomarker**
Multiple Sclerosis (MS) is a chronic autoimmune disease that affects the central nervous system, and predicting its progression remains a major clinical challenge. This project presents an Artificial Intelligence (AI)-based system that uses cytokine biomarkers and machine learning to estimate disease progression. Cytokine data are collected, preprocessed, and analyzed using predictive models, including XGBoost and Random Forest, to identify patterns associated with disease outcomes. The system evaluates key inflammatory biomarkers and generates accurate, data-driven predictions that support healthcare professionals in clinical decision-making. By combining immunological biomarkers with AI, the proposed solution offers a faster, more reliable, and more accurate approach to predicting MS progression than traditional assessment methods, enabling earlier intervention and improved patient care.

SA-19 **NAME(S): Shaima Haitham Fayez Al-Shaalani Al-Ghamdi**
ORGANIZATION: Hind Bint Utbah High School, Ministry of Education, Kingdom of Saudi Arabia
TITLE **SomnoLight-Delta: An Intelligent Closed-Loop Wearable System for Personalized Early-Stage Insomnia Support**
SomnoLight-Delta is an innovative, non-invasive closed-loop smart eye mask proposed to support personalized management of early-stage insomnia. The system integrates dry micro-EEG and PPG sensors to continuously monitor real-time brain activity and heart rate variability (HRV). Unlike conventional fixed-frequency devices, an embedded microcontroller executes a closed-loop algorithm that dynamically adjusts photostimulation within the delta-wave range (1–4 Hz) based on physiological feedback. The system also features automatic stimulation shut-off upon detecting stable slow-wave sleep and a smart UV-C docking station for wireless charging and hygienic maintenance.

SA-20 **NAME(S): RAZAN AEDH OMAIR ALHULI / RAHAF DEEB MOHAMMED ALGHAMDI / SARAH SAAD ALGHAMDI / RENAD FAHAD QALIL ALGHAMDI**
ORGANIZATION: Al-Baha University
TITLE **CARE-GUARD AI - An Intelligent Point-of-Care System for Real-Time Nursing Documentation and Missed-Care Prevention**
CARE-GUARD AI is a smart, point-of-care system that closes the gap between when nursing care is delivered and when it is documented. Nurses confirm each care task at the bedside with a single tap and an NFC badge, creating an instant, verified, tamper-resistant record synced to the EHR via HL7 FHIR. A two-layer AI engine — rule-based alerts plus a predictive machine-learning model — continuously monitors the care plan and flags tasks at risk of becoming overdue before they cause harm. By targeting the system-level causes of missed nursing care, CARE-GUARD AI improves patient safety, infection control, documentation accuracy, and legal protection for nurses.

SA-21 **NAME(S): Faisal Majed Sultan**
ORGANIZATION: University of Jeddah
TITLE **From palm to protein: can dates help fight leukemia? A molecular docking study on natural compounds from dates targeting the BCL2 gene**
Acute myeloid leukemia (AML) progression is driven partly by BCL2, which prevents cancer cell death. Venetoclax, the leading BCL2 inhibitor, faces growing resistance, highlighting the need for new therapeutic agents. This study evaluated gibberellin A1 and gibberellin A3, natural compounds from dates, as potential BCL2 inhibitors. Molecular docking (AutoDock Vina) was performed against the BCL2–venetoclax complex (PDB: 6O0K), with binding interactions analyzed using Discovery Studio and drug-likeness assessed via SwissADME. Both compounds showed strong BCL2 binding affinities exceeding venetoclax, along with favorable drug-like properties, suggesting gibberellin A1 and A3 as promising natural BCL2 inhibitors for AML.

SA-22 **NAME(S): Aryam Emad Dahlawi**
ORGANIZATION: King Abdulaziz university
TITLE **Gastro Ai**
This research explores the development of an Artificial Intelligence (AI)-based approach for the early diagnosis of gastrointestinal diseases. The study focuses on utilizing machine learning techniques to analyze medical data, such as clinical records, diagnostic images, and patient-related information, to identify early disease indicators and improve detection accuracy. Delayed diagnosis remains a significant challenge in gastrointestinal healthcare, often affecting treatment effectiveness and patient outcomes. This research aims to investigate how AI technologies can support healthcare professionals by providing predictive insights, enhancing diagnostic decision-making, and enabling timely interventions. The proposed approach contributes to advancing precision medicine and improving the quality of gastrointestinal disease management through innovative healthcare solutions.

SA-23 **NAME(S): Abdulkrim Mater Alanzai / Meshari D. Alanazi**
ORGANIZATION: Jouf University
TITLE **SolarFusion AI™: An Intelligent PV–TEG Hybrid Energy Platform with Reconfigurable Thermal Metasurface for Adaptive Heat Harvesting**
SolarFusion AI™ is an intelligent hybrid renewable-energy platform that combines photovoltaic (PV) panels, thermoelectric generators (TEGs), artificial intelligence, and a novel Reconfigurable Thermal Metasurface (RTM) to maximize solar energy utilization. Unlike conventional PV–TEG systems with passive thermal interfaces, the proposed invention dynamically redirects waste heat toward the most efficient thermoelectric modules while continuously optimizing cooling and power extraction through AI-driven thermal management. This adaptive architecture simultaneously improves photovoltaic efficiency, increases electrical power generation, reduces thermal degradation, and extends system lifetime. SolarFusion AI™ provides a scalable solution for high-temperature environments, utility-scale solar farms, smart buildings, and next-generation renewable-energy infrastructures.

SA-24 **NAME(S): Turki Saleh Al-Jbab / Meshari D. Alanazi**
ORGANIZATION: Jouf University
TITLE **SkyLink AI™: An Autonomous AI-Driven UAV-RIS Platform for Intelligent 6G Wireless Coverage Expansion**
SkyLink AI™ is an autonomous aerial communication platform that combines artificial intelligence, unmanned aerial vehicles (UAVs), and Reconfigurable Intelligent Surface (RIS) technology to provide intelligent wireless coverage in underserved and emergency environments. Unlike conventional UAV communication systems, the proposed platform continuously analyzes network demand, user distribution, signal quality, environmental conditions, and flight dynamics to autonomously determine the optimal UAV position and RIS beam configuration. The system delivers adaptive wireless coverage with minimal infrastructure deployment, enabling rapid network restoration, enhanced communication reliability, reduced operational costs, and sustainable connectivity for future 5G, 6G, disaster recovery, smart cities, and remote-area applications.

SA-25 **NAME(S): Ibrahim Alsalhy / Abdullah Almazyad / Turki Saleh Al-Jbab / Meshari D. Alanazi**
ORGANIZATION: Jouf University
TITLE **SolarMind™: An AI Self-Learning Dual-Axis Photovoltaic Tracking System for Intelligent Energy Optimization**
SolarMind™ is an AI-powered dual-axis photovoltaic tracking system that maximizes solar energy harvesting through intelligent self-learning algorithms and adaptive real-time positioning. Unlike conventional solar trackers that rely solely on fixed control logic or light sensors, the proposed system continuously analyzes solar irradiance, historical tracking patterns, environmental conditions, and system performance to optimize panel orientation with minimal unnecessary movement. By integrating artificial intelligence, predictive tracking, and adaptive energy management, SolarMind™ increases photovoltaic efficiency, reduces actuator energy consumption, extends mechanical lifespan, and provides a scalable smart solution for residential, commercial, agricultural, and off-grid renewable energy systems.

SA-26 **NAME(S): Mohannd Rabei / Yazeed Ibrahim**
ORGANIZATION: Jouf University
TITLE **SolarRide™: An Intelligent Solar-Integrated Mobility Platform for Self-Sustaining Electric Scooters**
SolarRide™ is an intelligent solar-integrated mobility platform designed to enhance the operational autonomy of electric scooters through continuous on-board renewable energy harvesting. The invention combines a lightweight photovoltaic canopy, maximum power point tracking (MPPT), and an optimized energy management architecture that simultaneously extends battery range and improves rider comfort by providing solar shading. Unlike conventional electric scooters that rely solely on grid charging, SolarRide™ enables supplemental charging during parking and daytime operation, reducing charging frequency, operating costs, and carbon emissions. The system offers a scalable, environmentally sustainable solution for next-generation urban transportation in regions with high solar irradiance.

SA-27 **NAME(S): Yazan Alnusayri / Faris Majid**
ORGANIZATION: Jouf University
TITLE **EcoTherm-X: An Intelligent Modular Thermoelectric Cooling System for Sustainable Localized Climate Control**
EcoTherm-X is an environmentally sustainable thermoelectric cooling system designed to provide efficient localized climate control without using conventional refrigerants or mechanical compressors. The system integrates multiple thermoelectric modules with an optimized liquid-assisted heat dissipation architecture, intelligent temperature regulation, and a compact modular design to maximize cooling performance while minimizing maintenance and environmental impact. Operating on low-voltage DC power, the invention is suitable for vehicles, portable cabins, electronic enclosures, and off-grid applications powered by renewable energy. EcoTherm-X offers a practical alternative for next-generation localized cooling where reliability, sustainability, silent operation, and scalability are essential.

SA-28 **NAME(S): Dr. Lara Samhan / Dr. Sara Samhan / Dr. Baraa Alghalyini / Dr. Nidal Nasser**
ORGANIZATION: Alfaisal University
TITLE **SmartTear: Portable Tear-based Biosensing System for Non-Invasive Biomarker Detection**
SmartTear is a breakthrough portable tear based biosensing system designed for non invasive monitoring of key health biomarkers like glucose, electrolytes, and cholesterol. Traditional blood-based tracking methods cause physical discomfort, low compliance, being invasive and prior tear sensing alternatives suffer from design complexity and poor sample quality. SmartTear solves this using a microfluidic cotton swab sampling tip paired with a smartphone application. Utilizing low power Bluetooth and on device machine learning, the system validates samples, executes local analytics, and ensures user privacy. This comprehensive end to end platform delivers accessible, reliable, and routine health tracking.

SA-29 **NAME(S): Dr. Lara Samhan / Dr. Areej Al-Wabil**
ORGANIZATION: Alfaisal University
TITLE **AI Eyeglasses Equipment Connected Wirelessly to an Earbud for the Blind People**
This revolutionary assistive technology redesigns mobility for completely blind individuals helping more than 42 million blind people worldwide. It features a lightweight AI eyeglass frame with an integrated wide-angle bilateral cameras that maps surroundings up to ten meters away. To prevent cognitive fatigue, the frame uses localized vibrating nodes on the temples to signal oncoming obstacles, and the vibration intensity increases when the danger increase. Meanwhile, wireless earbuds provide real time audio feedback and identify friends using three-dimensional facial mapping. Equipped with solar cells on the frame for continuous outdoor charging, this system bridges critical sensory gaps. It replaces traditional canes, granting users outstanding physical safety, true navigational independence, and newfound dignity.

SA-30 **NAME(S): Dr. Lara Samhan / Dr. Sara Samhan / Dr. Baraa Alghalyini / Dr. Areej Al-Wabil**
ORGANIZATION: Alfaisal University
TITLE **EchoLens AR: Augmented Reality AI Avatar Sign-Language & Haptic Safety Eyewear for the Deaf**
EchoLens AR is a revolutionary smart-eyewear solution designed to empower the global deaf community of over 70 million deaf people worldwide. Utilizing waveguide augmented reality (AR), it projects a private, real-time AI sign-language avatar visible exclusively to the wearer that results from microphone inputs, converting spoken words instantly into signs. For vital physical protection, the eyewear integrates a dual-color HUD alert system (green for ambient safety, red for danger) paired with directional, dynamic haptic frame vibrations. EchoLens AR seamlessly bridges the communication barrier while securing physical safety and independence in driving, public transit, and daily workplace environments.

SA-31 **NAME(S): Nada Ghouth / Nahlah Ghouth / Sara Adil Alqazanli / Toqa Abdullah Al-Ali**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **KneeGuard: Closed-Loop Vascular-Safety Knee Brace with Real-Time Swelling and Perfusion Monitoring and Protocol-Driven Automatic Release for Chronic Users**
KneeGuard is a smart, closed-loop knee brace designed to protect high-risk chronic users from the consequences of dangerous swelling and perfusion changes. It combines wearable bioimpedance and perfusion sensors with a personalized safety algorithm that detects distress, issues warnings, and can trigger graded loosening or emergency release while alerting clinicians. This transforms conventional braces from passive support devices into active vascular-safety systems, aiming to reduce complications, enable safer home recovery, and integrate with remote rehabilitation and digital health pathways.

SA-32 **NAME(S): Amani Al Abdullah / Hala Alshammari / Nouf Alenezi / Zahraa Albarraqi**
ORGANIZATION: King Faisal University
TITLE **CompliAI**
CompliAI is a browser-based, context-aware AI governance layer that analyzes prompts, file attachments, business context, and organizational policies before requests are submitted to AI models. Unlike traditional data loss prevention solutions, CompliAI performs real-time risk assessment and dynamically applies governance actions based on organizational policies. Depending on the assessed risk, the system can allow, warn, redirect users to approved internal AI platforms, or block prohibited interactions while providing clear policy guidance. This approach helps organizations protect sensitive information, support regulatory compliance, reduce AI-related risks, and enable secure enterprise AI adoption without disrupting employee workflows.

SA-33 **NAME(S): Zahra Hussin Al-hudaibi / Raghad Majeed Almatar / Fatma Abdulrhman AlShuaibi**
ORGANIZATION: King Faisal University, Al-Ahsa, Saudi Arabia
TITLE **DermaGuide AI: Precision Biopsy Guidance for Early Skin Cancer Detection**
DermaGuide AI is an AI-powered smart dermatoscope that transforms conventional skin lesion assessment into a complete biopsy guidance workflow. Unlike existing dermatoscopes that primarily assist with lesion visualization or diagnostic prediction, DermaGuide AI identifies the most suspicious region within a lesion, guides physicians to the optimal biopsy site using an integrated LED localization system, and records the exact biopsy location through a digital Biopsy Navigation System for accurate follow-up. An integrated distance sensor standardizes image acquisition to ensure consistent imaging across patient visits. By combining AI analysis, real-time biopsy guidance, standardized imaging, and longitudinal biopsy tracking within a single device, DermaGuide AI aims to improve diagnostic accuracy, reduce unnecessary repeat biopsies, and support more precise, efficient skin cancer care.

SA-34 **NAME(S): Maryam Saeed AlRamadhan / Noor Mohammed Alshakhs / Shumoukh Saleh Alanzi / Maryam Saleh Alnajim**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **Built-In FAST: Multi-Modal Edge AI Software System for Continuous Passive Stroke Detection**
Built-In FAST is an innovative multi-modal Software-as-a-Medical-Device (SaMD) solution that converts consumer smartwatches and smartphones into clinical-grade stroke-detection systems without extra hardware. Running continuously and passively, it utilizes smartwatch accelerometers calibrated to an individual's kinetic baseline to detect unilateral arm-motion asymmetry. To eliminate the standard 78% false-alarm rate of single-sensor systems, a secondary active verification loop triggers an edge-AI facial symmetry scan and vocal phonetic analysis on the smartphone. Once verified, the system immediately alerts the user or a nearby bystander with real-time stroke metrics and GPS location, guiding them through the emergency response and accelerating the path to hospital care.

SA-35 **NAME(S): Maryam Alqudihi / Asma Alharbi / Ali Alali**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia & Princess Nourah bint Abdulrahman University (PNU), Riyadh, Saudi Arabia
TITLE **RetinaShield AI: An AI-Powered Surgical Safety Tool for Retinal Microsurgery**
Retinal microsurgery relies primarily on visual feedback, with no real-time safety guidance: up to 80% of tool-retina interaction forces fall below surgeons' tactile perception, and in one clinical series, the incidence of retinal injury following internal limiting membrane peeling was reported to be 53.3%. RetinaShield AI is an AI-powered surgical tool that combines intraoperative OCT, a reusable smart sensorized handle, and predictive AI to detect retinal injury risk before it occurs, delivering real-time visual, audio, and haptic alerts while preserving the surgeon's full manual control - a practical, affordable alternative to costly robotic systems, extending safer retinal care worldwide.

SA-36 **NAME(S): Dhuha Mohammed Albjais / Rowd Naif Alanazi / Ghaida Mohammed Aldighishem / Subha Afif Alshakhs**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia.
TITLE **EyeBou – An AI-Powered Digital Vision Screening Platform for Early Detection of Amblyopia in Children**
EyeBou is an AI-powered, hardware-free digital vision screening platform that detects early signs of amblyopia ("lazy eye") in children aged 3-7 using only a smartphone or tablet camera. Framed as an interactive game, it tests each eye separately through alternating monocular occlusion while an on-device AI analyzes four evidence-based behavioral indicators: object tracking, reaction time, visual discrimination, and eye movement. The platform generates an explainable 0-100 risk score and referral recommendation. By removing the need for specialised clinical equipment, EyeBou makes early, low-cost amblyopia screening accessible to families, schools, and healthcare providers worldwide.

SA-37 **NAME(S): Anwar Alkhalaf / Khadijah Alkhalaf / Nebras Alsultan / Zainab Alkhalaf**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **SteriLink™ Sentinel A Smart IV Connector Sleeve for Safer IV Access**
SteriLink™ Sentinel is an innovative, reusable smart IV connector sleeve designed to standardize vascular access disinfection and eliminate Catheter-Related Bloodstream Infections (CRBSIs). Operating as a retrofit sleeve over existing luer-lock connectors, it utilizes embedded sensors to verify proper alcohol exposure and drying times, providing real-time visual guidance to medical staff. Additionally, NFC technology automates compliance tracking and digitizes audit trails for hospital administration. By transforming manual disinfection into an objectively verified, data-driven procedure, SteriLink™ Sentinel seamlessly protects patients and optimizes nursing workflows without disrupting standard clinical operations.

SA-38 **NAME(S): Aeshah Emad Bushaqraa / Noor Afif Alshakhs / Zainab Ali Alali / Subha Afif Alshakhs / Sara Abdulrahman Alrajhi**
ORGANIZATION: King Faisal University (KFU), Al-Asha, Saudi Arabia
TITLE **MEDRAPID: Advanced Dual-Action Hemostatic Capsule**
MEDRAPID is a revolutionary, dual-action hemostatic capsule designed to control deep, penetrating wound bleeding in emergency situations. It utilizes a medical-grade gelatin capsule packed with highly compressed, sterile cellulose plant fibers infused with vasoconstrictors (Adrenaline/Phenylephrine) and antifibrinolytics (TXA). Upon contact with blood, the capsule dissolves within seconds, releasing the expanding fibers to apply mechanical pressure while delivering targeted pharmacological action deep inside the cavity. This intuitive, zero-training solution stops severe hemorrhage instantly, prevents infection, leaves no chemical residue, and reduces application time by over 80%.

SA-39 **NAME(S): Nada Muhareb Almutairi / Aqeelah Mohammed AlSadah / Zainab Hussain AlDarisi / Shaykhah Khaled Alsalem / Albanin Mahdi Alqattan**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **SAVORA**
SAVORA is a standalone medical emergency app transforming any first responder's smartphone into a secure medical radar. By shifting data retrieval away from the victim's device, SAVORA displays critical health profiles (blood type, allergies, pacemakers) instantly using a unique dual-fingerprint verification framework (National ID integration). It addresses the crucial "Golden Hour" bottleneck, ensuring 100% data access even if the patient's phone is locked, shattered, or dead. Operating independently of victim hardware, SAVORA eliminates bystander hesitation, prevents lethal medical errors, and coordinates with smart cities to clear emergency traffic corridors, drastically maximizing global trauma survival rates by up to 40%.

SA-40 **NAME(S): Majd Alhazmi / Manar Almansour / Fatima Alaqoul**
ORGANIZATION: King Faisal University (KFU), Al-Ahsa, Saudi Arabia
TITLE **ScleraCheck**
ScleraCheck is a hardware-free, skin-blind smartphone web application engineered to reduce clinical racial disparities in neonatal jaundice screening. Melanin masks tissue yellowing in dark skin-toned infants, leading to delayed diagnoses of Kernicterus (irreversible brain damage). ScleraCheck turns the infant's eye into an objective biological baseline. Utilizing mobile face-mesh tracking, it isolates the sclera, executes a bi-phasic ambient light-subtraction capture routine, and maps digital Blue-Channel reflectance to estimate serum bilirubin with promising results. High risk results trigger the generation of a clinical summary and recommend referral to local pediatric telehealth services.

SA-41 **NAME(S): Layan Alhuthali**
ORGANIZATION: Majmaah Chamber of Commerce
TITLE **SignTalk AI: Intelligent Real-Time Speech-to-Sign Language Translation System**
Hearing loss represents one of the most common sensory impairments globally. SignTalk.ai is proposed to serve as an accessible bidirectional wearable communication tool that provides both speech-to-sign translation and sign-to-speech translation along with environmental sound awareness in one discreet platform. To describe the concept, system architecture, technical framework, and proposed validation plan for SignTalk.ai. SignTalk.ai proposes a wearable approach to a persistent communication barrier affecting DHH individuals. By combining bidirectional translation, environmental sound awareness, and support for Saudi Sign Language, the system may improve communication access, independence, safety, and social participation in health care, education, employment, and daily life.

SA-42 **NAME(S): Dr. Qasem Ahmed Almulihi / Dr. Abdullah Afif Alshakhs / Dr. Hussain Ali Alali / Dr. Hisham Alessa, CEO of Prince Saud Bin Jalawi Hospital, Al-Ahsa Health Cluster - Saudi Health Holding Company**
ORGANIZATION: Al-Ahsa Health Cluster – Saudi Health Holding Company
TITLE **Smart Central Line Safety: Color-Confirmed Venous Access with Automatic Guidewire Lock**
Smart Central Line Safety is a central venous catheter needle integrated with an oxygen-sensitive colorimetric sensing strip that objectively distinguishes venous from arterial blood in real time. A platinum-porphyrin dye embedded in a biocompatible polymer matrix reacts to blood oxygen partial pressure, producing a yellow signal for venous blood and blue for arterial blood in under one second. This color output directly and mechanically controls a guidewire locking mechanism: only venous confirmation unlocks the guidewire, physically preventing inadvertent arterial cannulation that may lead to amputation. This converts a subjective visual judgment call into a mandatory, objective mechanical safety checkpoint during central line insertion.

SA-43 **NAME(S): Abdullah Salah Mohammed Alshaikh**
ORGANIZATION: AlHussan National Schools
TITLE **Development of a Point-of-Care Colorimetric Biosensor for Non-Invasive Detection of Bladder Cancer Biomarkers (NMP22 and BTA) in Urine**
This project proposes a non-invasive point-of-care colorimetric biosensor for detecting the bladder cancer biomarkers NMP22 and BTA in urine. The design uses gold nanoparticles (AuNPs) with oriented antibody conjugation through Protein A/G to generate a visible colorimetric response after target binding. The work includes scientific design, theoretical modeling, simulation and analytical planning. An IRB approval (E-25-10452) was obtained at King Saud University under the academic supervisor as Principal Investigator. Advanced experimental validation remains pending because of the high cost of specialized materials and laboratory work.

SERBIA

RS-01 **NAME(S): Milorad Kovačević**
ORGANIZATION: Innovator – sport coach
TITLE **The Period of Conception of Supreme Atheism**
By tracking consequences for more than 100 000 people from Serbia and from the whole world,and especially for young athletes under the influence of COEN waves,starting 1982 up until now. The accuracy is 99 %

RS-02 **NAME(S): Dr Mladen Ćosić**
ORGANIZATION: PileTech-Center
TITLE **From Curves to Surfaces – 3D Performance-Based Technology for Structural Assessment**
The invention presents an original 3D Performance-Based Technology for Structural Assessment using multidimensional nonlinear response surfaces instead of conventional 1D curves. The framework integrates GMRS, ARSS, DRSS, NSPA, INDA, Drift and Interstorey Drift Surfaces for advanced seismic and nonlinear structural evaluation. Additional parameters, including Ductility Area Coefficient (DAC) and Target Displacement Envelope (TDE), enable assessment from initial condition to collapse under complex loading scenarios. The technology provides continuous visualization of drift and damage evolution, improves retrofit decision-making, and is applicable to buildings, bridges, and soil–structure interaction systems worldwide, including seismic rehabilitation, resilience assessment, and advanced engineering diagnostics applications globally.

RS-03 **NAME(S): Academician Milan Bojovic / Academician prof. Dr Dragan Vucinic**
ORGANIZATION: The Serbian Management Association
TITLE **Liquid Cleaning Concentrate**
Our invention belong organic chemical. This is mean for cleaning in dirty industries. Its application is widespread. Especially good clean oil, grease, resin, tar...One litre of concentrate is mixed with 100 litres of water so it is too economical mean for cleaning. The PH value of the Concentrate is 11,1 according to the certificate of the State Institute for Toxicology of Montenegro.

SINGAPORE

SG-01 **NAME(S): Rochana Sirivadhanabhakdi**
ORGANIZATION: Tanglin Trust School
TITLE **AquaSense**
AquaSense is a solar-powered water quality monitor deployed in irrigation canals in Wang Noi County, Ayutthaya, Thailand. It detects salinity levels that fall within FAO safety thresholds but still cause measurable crop damage — making an invisible threat visible and actionable for smallholder farmers protecting Thailand's agricultural heritage.

SG-02 **NAME(S): Justin Fu / Chen Guoyi**
ORGANIZATION: Singapore American School
TITLE **Cubolic: IoT-Based Health Clustering System**
This project presents Cubolic, an IoT-based clustered health management and medication reminder system. Cubolic integrates hydration monitoring and medication reminders into a single smart device supported by a cloud platform. It employs a weight sensing module for accurate detection of medication usage events, while a circular LED ring provides reminder signals through color and light patterns. Beyond single-device operation, Cubolic is designed to support multi-device clustering, enabling coordinated management for caregivers and medical staff. The system emphasizes offline robustness, visual clarity, and scalability for personal and institutional settings.

SPAIN

ES-01 **NAME(S): Miriam de Diego Mambrilla / Juan Jose Cermeño**
ORGANIZATION: N/A
TITLE **A tire everything, for everyone**
This project introduces an adaptative tire adhesion system that uses air pressure To deploy traction elements integrated into the tread. The mechanism can activated manually, semi-automatically, or automatically depending on vehicle requeriments. It improves grip on different surfaces and weather conditions while Maintaining normal tire performance. The concept is appicable to a wide range of vehicles and operating environments.

SRI LANKA

LK-01 **NAME(S): Mohamed Macbool Misharif Ahamath**
ORGANIZATION: AK/KM/Addalaichenai MMV National School
TITLE **Smart Spectacle System Utilizing Artificial Intelligence for Visually Impaired Persons**
The invention relates to an AI-powered smart spectacle system designed to assist visually impaired persons through voice-guided interaction. The device integrates an ESP32-CAM vision module, ESP32-S3 AI controller, GPS navigation, OCR text reading, object detection, currency recognition, and multilingual voice assistance. Users interact through voice commands while receiving real-time spoken feedback. The system supports both online and offline operation and is designed as a compact wearable platform that enhances mobility, independence, accessibility, and environmental awareness for visually impaired individuals.

SUDAN

SD-01 **NAME(S): Mohammed Mohammed Hussain**
ORGANIZATION: Sea Ports Corporation
TITLE **Safe Landing**
Safe Landing It is a unique invention that addresses many of the aviation disasters that occur to passenger aircraft, which leave behind many tragedies and lead to the loss of many lives among the passengers and crew responsible for piloting the aircraft. The importance of this invention lies in saving the aircraft, as it makes landing highly safe, unless the cause of the disasters stems from one of three reasons, which are: 1-The aircraft suddenly collided with a rock or a tower in a rocky terrain. 2-The aircraft being hit from the outside by a divect weapon. 3-An explositon occuring from with in the aircraft.

SD-02 **NAME(S): Mohammed Mohammed Hussain**
ORGANIZATION: Sea Ports Corporation
TITLE **Intelligent Self-Rescue**
Intelligent Self-Rescue Since human life is the fundamental basis of existence, all innovations and inventions are mobilized to preserve it and ensure comfort. It is therefore imperative that we exert our utmost efforts to protect human life from the hazards and disasters that threaten it. With this in mind, we conceived an invention—an essential safety device for one of the most vital modes of passenger maritime transport. This invention enables passenger vessels to initiate self-rescue in the event of any catastrophic emergency without reliance on external assistance, which may be delayed and consequently lead to further loss of life before the internationally recognized distress signal “SOS” – Save Our Souls – can be issued. This is achieved through the optimal utilization of these devices by the ship’s crew or the captain. This does not imply that such vessels lack safety equipment in their design; rather, it provides an additional layer of security and enables immediate situational awareness, as the circumstances permit no delay in saving passengers’ lives.

SWEDEN

SE-01 **NAME(S): Dr. Adrian Jose Cabezas Morales**
ORGANIZATION: Nano Control AB
TITLE **Innovative Technology for Reducing Particulate Matter (PM) Emissions from Aircraft Ground Operations**
A new invention has been integrated with Nano Control’s patented clean air technology to capture ultrafine and nano particulate matter (PM) generated during aircraft ground operations. The patented technology has been developed and validated in demanding industrial environments, including construction (Skanska), mining (Metso), and heavy-duty transportation (Scania). The new invention minimizes the long-range transport of airborne contaminants, reduces the spread of hazardous particles, improves air quality within and around airport areas, and contributes to the reduction of global warming. It is easy to use, requires no specialized maintenance, operates with low energy consumption, and is highly scalable.

TAIWAN R.O.C.

TW-01 **NAME(S): Wang Ci Sian / Chen Yen-Po / Lin Shin-Wei / Chen Yen-Lien / Chen Chin-Chu**
ORGANIZATION: Grape king Bio
TITLE **Next-Gen Hair-Growth Probiotics: High-Efficiency DHT-Reducing Lactic Acid Bacteria for Androgenetic Alopecia Solutions**
This invention presents a pioneering probiotic solution for precise hormonal management. Dihydrotestosterone (DHT) is the primary factor leading to follicle shrinkage and hair loss. We have successfully identified four patented strains—GKL9, GKJ2, GKS3, and GKA4—that possess the exceptional ability to fully transform and reduce DHT levels. The core value of this technology lies in its high specificity: it targets DHT without affecting other vital hormones such as Testosterone or Progesterone. This discovery provides a safe, natural alternative for preventing androgenetic alopecia and addressing endocrine imbalances like hyperandrogenemia. By bridging gut health with precision aesthetics, these "targeted probiotics" offer a new paradigm for personal care and wellness.

TW-02 **NAME(S): TSA INTERNATIONAL CO., LTD**
ORGANIZATION: TSA INTERNATIONAL CO., LTD
TITLE **PetsTimes 85% Grain-free Chicken Recipe**
PetsTimes 85% Grain-free Chicken Recipe is formulated around fresh, traceable air-chilled chicken as its primary ingredient, achieving a minimum of 48% crude protein and just 12% carbohydrate content, challenging the common assumption that imported cat food outperforms domestically made formulas. The recipe is grain-free, gluten-free, and built on a single animal protein source, designed to reduce potential allergen exposure. It incorporates SPD patented fish oil and LAB2PRO patented probiotics, both established functional ingredient technologies, along with natural yucca extract and taurine to support digestive function, coat condition, and heart health. The formula complies with AAFCO and FEDIAF international pet food nutrition standards and undergoes a two-stage inspection process for quality assurance. PetsTimes 85% Grain-free Chicken Recipe reflects a considered, specification-driven approach to redefining domestically made cat nutrition.

TW-03 **NAME(S): TSA INTERNATIONAL CO., LTD**
ORGANIZATION: TSA INTERNATIONAL CO., LTD
TITLE **PetsTimes 95% Premium Deep-Sea fish oil**
PetsTimes 95% Premium Deep-Sea Fish Oil is sourced from Peruvian raw material and processed using patented SPD extraction technology developed by its pharmaceutical-grade fish oil manufacturer. This enzymatic purification process replaces traditional distillation and supercritical extraction methods, substantially reducing residual odor while improving extraction efficiency and oil clarity, resulting in Omega-3 purity above 95% with EPA+DHA levels exceeding 80%. The formula uses the highly absorbable rTG molecular form, offering superior bioavailability compared to conventional TG and EE forms. The product passes freshness and purity testing across acid value, peroxide value, anisidine value, and TOTOX indicators, along with contaminant screening for heavy metals. It holds certification from USP and EDQM, and is recognized by GOED, Friend of the Sea, and IFOS, reflecting a rigorous, technology-driven approach to pet fish oil quality.

TW-04 **NAME(S): Chen Chin-Chu / Li I-Chen / Li Tsung-Ju / Lu Ting-Yu / Chen Yen-Po**
ORGANIZATION: Grape king Bio
TITLE **Sanghuangporus sanghuang MyoSSTM mycelium - An Innovative Fungal Solution for Boosting Physical Performance and Mitigating Fatigue**
This project demonstrates that Sanghuangporus sanghuang mycelium (MyoSSTM) effectively enhances exercise performance and mitigates fatigue. While traditional research on Sanghuang largely focuses on anti-cancer and anti-inflammatory properties, our team discovered its groundbreaking potential to boost physical endurance and reduce exercise-induced fatigue, pioneering an innovative direction for novel sports supplements. Animal studies verified that MyoSSTM significantly extends exhaustive running time in mice and increases glycogen storage in both liver and muscle tissues. Furthermore, it effectively decreases lactic acid accumulation, accelerates lactate clearance, and lowers serum blood urea nitrogen (BUN) levels, achieving a remarkable anti-fatigue effect. In conclusion, MyoSSTM optimizes energy metabolism to elevate physical performance and combat fatigue.

TW-05 **NAME(S): Yung-Hsiang Lin**
ORGANIZATION: TCI Co. Ltd.
TITLE **TCI099 Sleep-Support Postbiotic**
Sleep disorders have become a global public-health crisis: over 30% of adults report insomnia symptoms and about 16% meet the criteria for clinical insomnia; in China alone more than 300 million people are affected. Insomnia costs Canada roughly US$19.6 billion and the United States over US$207.5 billion (about 1% of GDP) in lost productivity every year. Yet conventional sleeping pills and exogenous melatonin often bring dependency and next-day grogginess, leaving a gap for a solution that is both effective and naturally sustainable.

THAILAND

TH-01 **NAME(S): Thanadej Promploy / Thanyathip Prasert**
ORGANIZATION: Bangkok preparatory and secondary international school / Traill international school
TITLE **Zeolock system**
In countrysides and rural areas, oxygen is a rare medical substance for hospitals and other medical institutes as they are located far away from oxygen producing facilities. Furthermore, the chemical substance that enables the oxygen concentrator to function: Zeolite 13x is a valuable resource that can be costly to purchase. Not only that, zeolite can be reused only a handful of times before needing to be replaced. Because of this, our goal is to invent a technique that optimizes the usage of zeolite and production of oxygen. This is done by inserting acrylic dishes and a tube to control airflow. Not only does this greatly reduce the amount of zeolite needed, the system also allows for production of high purity oxygen gas. Furthermore, this system can be used for other filtrating devices

TH-02 **NAME(S): Maiyasit Wattanakasemphat**
ORGANIZATION: Rajsimawitthayalai
TITLE **Fluorescence Nanocomposites & AI for lung Cancer Screening**
CURCUBREATH-AI is a low-cost, non-invasive lung cancer screening device detecting Nonanal gas in exhaled breath using curcuminoid-based fluorescent nanocomposites integrated with a hydrophobic molecular gate to eliminate 95-99% humidity interference. An ESP32 microcontroller reads signals from SGP40 (VOCs), MQ-3 (alcohol), and MQ-7 (CO) sensors. Multimodal AI (Random Forest/XGBoost) analyzes sensor data with patient demographics, achieving 94.7% accuracy (n=150), comparable to CT Scan but at 50x lower cost. Field-tested with 37 village health volunteers, 95% could operate independently. This innovation enables proactive community-based screening, reducing late-stage detection and healthcare inequality.

TH-03 **NAME(S): Assoc. Prof. Worapong Boonchouytan / Asst.Prof. Nutjired Kheowsakul / Asst.Prof. Korrapat Chalermwong / Asst. Prof. Jaran Tamjai**
ORGANIZATION: Rajamangala University of Technology Srivijaya (RUTS)
TITLE **Vacuum-Based Moisture Reduction Machine for Stingless Bee Honey**
This invention presents a vacuum-based moisture reduction machine designed for stingless bee honey processing at the community enterprise level. The system combines low-temperature heating, vacuum pressure control, and continuous slow-speed stirring to reduce honey moisture content below 18% within 60 minutes while preserving color, aroma, viscosity, and bioactive compounds. The machine is compact, energy-efficient, and affordable for small-scale producers. Compared with conventional heating or natural evaporation methods, the developed system provides faster processing, improved product stability, and higher commercial value. The invention supports sustainable honey production and quality standardization for local and international markets.

TH-04 **NAME(S): Banpawat Prasongsook / Sippaphas Toviwat / Sunya Nuchapong / Wongsapat Tangchitrdamnoenkarn**
ORGANIZATION: Bangkok Christian College
TITLE **An IoT-Based Smart Incentive Spirometer with Biofeedback Gamification for Respiratory Rehabilitation**
AEROFLOW is an innovative, IoT-enabled smart incentive spirometer designed to transform respiratory rehabilitation. Utilizing a precision Venturi design combined with advanced pressure sensors, the system integrates density, pressure, and time to perform high-fidelity lung volume calculations with an automated noise-calibration system. To combat the high non-compliance rates typical of traditional devices, AERO features a biofeedback mobile application ("AERO-DRAKE") that gamifies lung exercises using an interactive dragon character. The system guides patients through structured breathing protocols targeting Functional Residual Capacity (FRC) support.

TH-05 **NAME(S): Nantha Sedtinwong**
ORGANIZATION: Krutoo Home Education
TITLE **Waste-to-Catalyst Innovation: Iron Mill Scale-Derived Photo-Fenton Materials for Wastewater Treatment**
This study presents the upcycling of iron mill scale waste from the steel industry into an efficient photo-Fenton catalyst by combining it with g-C3N4 through a co-calcination method. The resulting Fe(scale)/g-C3N4 composites were evaluated for Rhodamine B degradation in wastewater under photo-Fenton conditions. The composites showed significantly enhanced degradation performance compared with pristine g-C3N4 and iron scale alone, with the 50 wt% Fe(scale)/g-C3N4 sample exhibiting the highest activity. Enhanced performance was attributed to improved charge separation via heterojunction formation. The reaction followed an S-scheme photo-Fenton mechanism, where hydroxyl radicals were identified as the dominant reactive species.

TH-06 **NAME(S): Thanita Sedtinwong**
ORGANIZATION: Concord College, UK
TITLE **Turning Sugarcane Waste into Structural Reinforcement for Sustainable Cement Mortars**
Sugarcane filter cake (FC), a by-product of the sugar industry, suffers management challenges but offers value-added potential. This work converts FC into biochar (FCB) and applies as a cement additive. Mortars containing 0-10 %wt FCB were evaluated, with 7.5 wt% giving optimal performance, achieving 45.3 MPa compressive strength, 58% higher than the control after 28 days. The improvement is due to the micro-filler effect, pore refinement and enhanced hydration. The enhancement of pozzolanic activity in concrete upon incorporation of filter cake biochar was confirmed by increased calcium silicate hydrate (C–S–H) formation, resulting in improved compressive strength. Thus, FCB shows strong potential as a sustainable additive for low-carbon cement-based materials.

TH-07 **NAME(S): Ms.Peemnara Weladee / Ms.Hannah Hanita Suzuki**
ORGANIZATION: Montfort College
TITLE **An Organic Clear Aligner Cleaner Derived from Northern Thai Pigmented Rice Extract**
Bacterial accumulation on clear aligners contributes to white spot lesions, caries, and gingivitis. Current cleaning products rely on synthetic chemicals, prompting demand for natural alternatives. This invention presents an organic aligner cleaner formulated from brown rice extract (Bue Sa Kor) of Northern Thailand. Three indigenous colored cultivars were evaluated using enzyme-assisted ultrasonic extraction. Brown rice demonstrated the highest total phenolic content, flavonoid content, and antioxidant activity, and was consequently selected for product development. The prototype effectively reduces pathogenic bacterial accumulation on aligner surfaces, offering a sustainable, plant-based innovation that enhances aligner hygiene while promoting the socioeconomic value of native Thai agricultural heritage.

TH-08 **NAME(S): Miss Napaphat. Datpratoom / Miss Nachakanok Tangphet / Miss Supitchaya Piamchon / Mr.Prapon Leelakanok / Miss Nattapornkawin Sangpanich**
ORGANIZATION: Montfort College Chiang Mai / Chiang Mai University Demonstration School / Strisrinan School
TITLE **Project Development of Ma-Khueng herbal mouthwash for the elderly**
This project aims to develop herbal mouthwash with Ma-Khueng solution for the elderly. This product may be reduce bad breath, prevent tooth decay, decrease bacteria in the oral cavity. According to a study on the medicinal plant, Zanthoxylum rhetsa (Roxb.) DC (Ma- Khueng), a genus of Zanthoxylum belonging to the Rutaceae family. It was found the main component was alkaloids and secondary was lignans, coumarins, and amides. These component which are biologically active in inhibiting bacteria, anti-inflammatory, antifungal, anti-oxidant and inhibition of cancer cells. Let's experiment with oil extraction according to folk methods at a concentration of 1% and prepare it into a solution from 2 types in 4 recipes, as follows: Mouthwash mixed with 5 % and 10% solution from Ma-Khueng seeds, another one solution from Ma- Khueng seeds and seed shells in concentrations of 5% and 10%. These were found that Ma-Khueng seeds mouthwash in concentrate 5% have appropriate physical characteristics and properties. It has a sweet taste, cool, pH 6.8, clear liquid, light brown, and dissolves well in water, stable at room temperature. Therefore, it suitable development to herbal mouthwash product for the elderly.

TH-09 **NAME(S): Miss Thanchanok Sumpun / Miss Nutsarun Payuyong / Miss Kornkanok Srisarat**
ORGANIZATION: Montfort College Chiang Mai & The Prince Royal's College
TITLE **Dragon Blood Tea Face Mask**
The increasing demand for natural skincare products has encouraged the development of cosmetic formulations derived from plant-based ingredients. This study aimed to develop and evaluate a facial mask containing Dragon Blood extract and tea extract as natural active ingredients for skin nourishment and protection. Dragon Blood extract, obtained from Croton lechleri resin, is rich in proanthocyanidins and phenolic compounds that exhibit strong antioxidant and anti-inflammatory properties, while tea extract provides additional antioxidant activity and skin-soothing effects. The face mask formulation was prepared by incorporating Dragon Blood extract and tea extract into a biodegradable mask base. Physical properties, pH stability, appearance, and user satisfaction were evaluated. Antioxidant activity was assessed using standard free-radical scavenging methods. The results indicated that the developed mask possessed good stability, suitable skin compatibility, and enhanced antioxidant activity compared with the control formulation. Participants reported improved skin hydration, softness, and overall skin appearance after regular use.

TH-10 **NAME(S): Asst. Prof. Dr. Uraiwan Sookyung / Asst. Prof. Dr. Suradet Matchawet / Asst. Prof. Dr. Anuwat Worlee**
ORGANIZATION: Materials Processing Technology Research Unit, Department of Industrial Engineering, Faculty of Engineering, Rajamangala University of Technology Srivijaya, Thailand
TITLE **The VOC-Free Bioboards from Natural Rubber and Waste Paper for Healthy Indoor Environments**
This invention presents a VOC-free bio-based composite board developed from natural rubber and recycled office paper waste for safe indoor applications. Unlike conventional wood-based panels that rely on synthetic adhesives containing formaldehyde and volatile organic compounds (VOCs), the proposed material uses natural rubber as a non-toxic binder, reducing health risks associated with indoor air pollution. Recycled paper fibers are utilized as sustainable reinforcement to minimize waste and promote resource efficiency. The developed composite board provides an environmentally friendly alternative for interior decoration materials while supporting public health, waste reduction, and value-added utilization of natural rubber and paper waste in Thailand.

TH-11 **NAME(S): Haritchanan Thongarunyik**
ORGANIZATION: Ruamrudee International School
TITLE **FoodSafe**
FoodSafe is a portable multiplex electrochemical biosensor that simultaneously detects multiple food allergens in under 60 seconds. Using electrochemical impedance spectroscopy (EIS) and interchangeable antibody-coated probes, it identifies allergens such as peanuts and shellfish, even in cooked or processed foods. The reusable device delivers clear, on-site results, reducing reliance on inaccurate food labels and lowering the risk of accidental allergic reactions. Designed for restaurants, schools, homes, and travel, FoodSafe provides a fast, affordable, and practical solution that improves food safety and confidence for individuals with food allergies.

TH-12 **NAME(S): Intutch Vikman Kamollertvara**
ORGANIZATION: Brentwood College School
TITLE **Neuroflex™ Adaptive Rehabilitation Device**
A robotic system designed for safe knee and leg rehabilitation in the supine position. It supports patients recovering from stroke, paralysis, orthopedic surgery, and mobility-related disorders. The system uses a force-sensing footplate to measure patient effort and movement intention in real time. This data is processed through adaptive admittance control, allowing patient force to be converted into smooth therapeutic motion. Neuroflex™ supports passive, active-assistive, resistive, and controlled-speed rehabilitation. Healthcare professionals can adjust force limits, motion range, virtual mass, damping, and stiffness to match each patient's condition. Neuroflex™ promotes active participation, improves rehabilitation consistency, reduces therapist workload, and expands access to personalized rehabilitation.

TH-13 **NAME(S): Inteera (Piper) Vikman Kamollertvara**
ORGANIZATION: Brentwood College School
TITLE **Bamboo Shield / Bioactive Powder for Pressure Ulcer Prevention**
BAMBOOSHIELD™ is a bamboo-derived moisture-responsive protective powder developed to help prevent pressure ulcers in bedridden patients. Although up to 95% of pressure ulcers are preventable, they affect over 2.46 million patients annually, and generate more than USD 26.8 billion in healthcare costs each year. Unlike conventional prevention methods, BAMBOOSHIELD™ targets the biological cascade underlying tissue breakdown through five mechanisms: antimicrobial, antioxidant, anti-inflammatory, skin-barrier repair, and moisture-responsive protection. ASTM-E2149 antimicrobial validation has been completed, while ISO 10993 biocompatibility studies are ongoing. With applications in hospitals, long-term care, and home-healthcare, BAMBOOSHIELD™ offers a solution for the USD 19.8 billion global wound-care market.

TH-14 **NAME(S): Weeranda Kiatlertpongsa / Nutvarit Manorotchaturong / Nicharee Pukbuakao / Ramida Chivapornthip**
ORGANIZATION: Prismax Academy
TITLE **MycoMaris: Marine-Mushroom Regenerative Wellness Textile Platform**
MYCOMARIS™ is a regenerative wellness textile platform designed to improve comfort for people with chronic kidney disease (CKD), elderly individuals, and users with sensitive skin. It integrates crustacean shell derived chitosan, oyster mushroom beta-glucan, and a self-crosslinking polyurethane nano-network to provide durable, metal-free, smart-release bioactivity triggered by sweat, friction, pH changes, or bacteria. Unlike conventional antimicrobial textiles that rely on heavy metals, MYCOMARIS™ is a skin-friendly alternative that is also environmentally sustainable. This product offers strong commercial potential through finished products, ingredient branding, toll coating, and licensing across healthcare, wellness, baby care, and functional apparel markets.

TH-15 **NAME(S): Ramida Chivapornthip**
ORGANIZATION: St. Andrew International School Bangkok
TITLE **ZeroSore SensePad: An Early-Warning Pressure Sore Detection System**
ZeroSore SensePad is a 3-zone smart pressure-injury prevention system for bedridden and elderly patients. Thin, flexible pads placed under the upper body, sacrum/hips, and heels continuously monitor pressure, temperature, and time. A risk-scoring program combines these readings with patient profile data to trigger simple green/yellow/red alerts at the bed, nurses' station, and future mobile app. Instead of relying on blind two-hour turning schedules or visible skin redness, ZeroSore helps caregivers prioritize patients earlier, reduce nurse workload, and prevent avoidable pain and treatment costs.

TH-16 **NAME(S): Milinda Chivapornthip**
ORGANIZATION: Astra Academy International School
TITLE **BiteRight AI: AI-Powered Smart School Lunch Ecosystem**
BiteRight AI is an AI-powered smart school lunch ecosystem designed to reduce food waste, improve child nutrition, and help schools control food costs. Students pre-order meals and choose portions through an app. At lunch, an RFID tap shows cafeteria staff the correct portion. After meals, an AI camera scans leftovers, identifies rejected food types, and turns the data into dashboards for schools and nutrition reports for parents. By connecting pre-meal choices, serving accuracy, and post-meal analytics, BiteRight AI helps schools cook smarter, waste less, and build zero-waste habits.

TH-17 **NAME(S): Pimchuta Thiensirisak**
ORGANIZATION: Amnuaysilpa School
TITLE **Breathe Free-Smart Cap**
Air pollution and PM2.5 exposure have become major health concerns for children worldwide. During periods of poor air quality, children are often advised to stay indoors or wear face masks, limiting their ability to participate in outdoor activities, exercise, and social interaction. This challenge inspired the development of BREATHE FREE: The Smart Cap, a wearable clean-air solution designed to help children breathe cleaner air while maintaining their freedom to learn, play, and explore. The Smart Cap integrates four key functions into a single wearable device: a lightweight micro-fan, a replaceable HEPA filtration system, an air-curtain mechanism that creates a localized clean-air zone around the breathing area, and a real-time PM2.5 monitoring sensor with simple visual alerts. Together, these components help reduce exposure to airborne particulate matter while providing children with immediate awareness of surrounding air quality. Unlike conventional solutions that require prolonged mask use or activity restrictions, BREATHE FREE focuses on protecting children's health without compromising comfort, mobility, or quality of life. The innovation also promotes environmental awareness and healthy behavior among young users. Beyond childhood applications, the concept has potential for adaptation to outdoor workers, urban residents, and other populations exposed to air pollution. BREATHE FREE demonstrates how child-centered innovation can provide a practical, scalable, and socially impactful approach to improving respiratory health and wellbeing in polluted environments.

TH-18 **NAME(S): Pavapol Seetisarn**
ORGANIZATION: Ruamrudee International School
TITLE **PURE SAFE**
Remote communities often struggle with limited access to safe drinking water, relying on untreated natural sources that pose critical health risks. PURE SAFE addresses this by introducing a universal, modular mounting system that transforms any container from jars to industrial drums into a safe water source without the need for complex, fixed plumbing. Designed for high-potential practicality and ease of maintenance, our tool-free solution empowers schools, off-grid villages, and relief teams to achieve self-sufficiency. By integrating cutting-edge filtration technology with an adaptable design, PURE SAFE enables users to take full control of their water safety, ensuring access to clean, drinkable water anywhere, anytime.

TH-19 **NAME(S): Sarisa Melody Lowe**
ORGANIZATION: Ruamrudee International School
TITLE **LaanRak**
LaanRakis an AI-powered companion application that supports older adults by promoting healthy aging and monitoring cognitive and physical well-being. Its key innovation is AI speech and language analysis, using vocabulary, word repetition, hesitations, and language complexity to detect early signs of dementia and Alzheimer's during natural conversations with Chang Noi, an AI companion. Combined with cognitive games, health monitoring, medication tracking, secure health records, and caregiver alerts, LaanRak builds personalized cognitive baselines to identify potential risks early, supporting timely medical evaluation, greater independence, stronger family connections, and improved quality of life.

TH-20 **NAME(S): Kavin Atichartakarn**
ORGANIZATION: NIST International School
TITLE **OkraTrap: Bio-based food-contact wrap designed to capture microplastic particles from the food**
OkraTrap is a novel bio-based food-contact wrap engineered to capture microplastic particles from the surface of food before consumption. The material combines okra (Abelmoschus esculentus) mucilage, a naturally occurring anionic polysaccharide, with 70% recycled paper pulp to create a fully compostable composite sheet. Microplastics are trapped through a combination of mechanical filtration, particle impaction within the fiber matrix, and electrostatic adsorption provided by the negatively charged mucilage. Unlike conventional food wraps, which act only as passive barriers, OkraTrap actively captures contaminants while remaining affordable, sustainable, and compatible with existing paper-manufacturing infrastructure.

TH-21 **NAME(S): Torpong Atichartakarn**
ORGANIZATION: NIST International School
TITLE **ReefRelief - A Stronger Reef, A Better Future**
ReefRelief™ targets the biochemical trigger of coral bleaching. Rising sea temperatures damage zooxanthellae, the algae inside corals that supply up to 90% of their energy, causing them to overproduce reactive oxygen species. These toxic radicals injure coral tissue and force the algae out, leaving corals white and starving. ReefRelief™ is a biodegradable bead of seaweed-derived sodium alginate that slowly releases astaxanthin, a natural marine antioxidant, onto heat-stressed corals. In DPPH assays it reduced oxidative stress by 90% more than the negative control, keeping zooxanthellae inside the coral. It degrades fully in seawater and costs far less than reef restoration.

TH-22 **NAME(S): Proudpalin Suriyabhivadh / Akiranan Suriyabhivadh / Napa-ai Suriyabhivadh**
ORGANIZATION: Bangkok Patana School
TITLE **Amino Insecto Care: Cricket Protein Jelly for Sarcopenia Prevention in Aging Populations**
Sarcopenia — progressive muscle loss — affects nearly one in three elderly individuals worldwide, yet many older adults cannot consume adequate protein due to chewing and swallowing difficulties. Amino Insecto Care is an innovative hydrolyzed cricket protein jelly developed to support sarcopenia prevention in aging populations. The formulation combines high-leucine cricket protein with an IDDSI Level 4 soft-gel texture, making it easy to swallow and accessible for elderly nutrition. Compared with conventional whey protein products, it offers lower environmental impact and reduced production costs. Integrating clinical nutrition, food science, and sustainability, Amino Insecto Care supports UN SDGs 2, 3, and 12 simultaneously.

TH-23 **NAME(S): Theerutch Phayungthanakorn**
ORGANIZATION: Shrewsbury International School Bangkok, Thailand
TITLE **BodhiMobility**
BodhiMobility is a culturally adaptive assistive mobility system designed to help older adults safely transition from kneeling or floor-seated positions to standing. Inspired by daily practices common across many Asian cultures, the system addresses mobility challenges associated with aging, including knee strain, balance loss, fall risk, and dependence on caregivers. The project features two devices: BodhiStep, a compact motor-assisted kneeling platform for residential use, and LotusLift, a reinforced dual-stage assistive lift system for users requiring greater support. Both devices use controlled lifting mechanisms to improve stability, independence, and dignity while remaining suitable for culturally floor-based lifestyles.

TH-24 **NAME(S): Thipok Tungsiripat / Thiraphat Srichit / Jiratchaya Hemrungrojn / Tin Tuchinda / Pantach Tuchinda / Setthapong Mahattanakul / Pataraphol Vannichvatana / Thavinn Uttamoat**
ORGANIZATION: Chulalongkorn University Secondary School
TITLE **BOLD FIT ECOSYSTEM: An AI-Powered Active School Infrastructure Transforming Ordinary Schools into Preventive Healthcare Ecosystem**
Physical inactivity is a major global health challenge and a leading risk factor for non-communicable diseases (NCDs) such as cardiovascular disease, diabetes, and obesity. Schools represent a critical environment for promoting lifelong healthy behaviors; however, traditional physical education programs often lack continuity and opportunities for daily engagement. The BOLD FIT ECOSYSTEM is a school-based sport science innovation that transforms ordinary school environments into active fitness ecosystems. The system integrates functional exercise stations—including pull-ups, push-ups, squats, and stair climbing—with AI-based motion analysis and a digital fitness dashboard to enable real-time monitoring of student activity and performance. By combining accessible exercise infrastructure, data-driven monitoring, and behavioral motivation, BOLD FIT ECOSYSTEM provides a scalable model for increasing youth physical activity, improving physical fitness, and contributing to the long-term prevention of non-communicable diseases.

TH-25 **NAME(S): Tin Tuchinda / Pantach Tuchinda / Bhumiphat Ongkosit**
ORGANIZATION: Chulalongkorn University Demonstration Secondary School
TITLE **C U THAILAND: Your Smart AI Travel Guide for a Personalized Thailand Adventure.**
This mobile application is designed to enhance Thai tourism by providing innovative travel insights, acting as a versatile itinerary assistant, and efficiently developing creative routes from major cities to secondary destinations. It utilizes various types of information such as audio, images, and maps, and suggests lesser-known travel routes. A travel guide application "CU THAILAND" is not just a map; it's a "Personal AI Tour Guide" that uses artificial intelligence technology (use open sources AI and search engines which all students and most people can access) to search and create fresh, vibrant content. This is combined with realistic Text-to-Speech technology (TTS) for voice over audio file as your private tour guide to provide a distinctive, intelligent travel experience that caters to individual needs like never before. We use TTS to convert text to voice in multiple languages such as English, Chinese, Japanese etc. The application facilitates easy travel planning, allowing users to select places of interest themselves, suggests new attractions, and provides historical information through audio, images, and travel maps. This fosters an appreciation for history and culture, allows learning about local community ways of life, helps distribute income to communities, and leads to the stimulation of sustainable tourism economy.

TH-26 **NAME(S): Krittawat Boonserm / Prewfon Tainsri / Sirirat Wataradee**
ORGANIZATION: Chulalongkorn University Demonstration Secondary School
TITLE **Dairy Herd Pulse — An Interactive Dashboard for Smallholder Dairy Farm Health Management**
Thai smallholder dairy farmers are trapped in a cycle of high production costs and suboptimal farm productivity. The root cause is operating "blindly" without actionable data, leading to hidden economic losses and diminished herd performance. Dairy Herd Pulse solves this by transforming scattered farm records into clear, instant insights via a simple 3-color scorecard. By replacing guesswork with data-driven decision-making, it bridges the gap between complex veterinary science and practical farming. Farmers can instantly visualize their farm's true status at a glance, enabling precise, proactive management that reduces losses, increases productivity, and maximizes long-term profitability.

TH-27 **NAME(S): Jayata Tieanworn**
ORGANIZATION: International School Bangkok
TITLE **Dynamic PCB-Based Tactile Tablet for Visually Impaired Learning and Accessibility**
This project aims to develop a new generation of tactile display technology that allows visually impaired individuals to perceive not only Braille text but also maps, diagrams, mathematical graphs, geometric figures, scientific illustrations, and other complex visual information through touch.

TH-28 **NAME(S): Titapa Simapichaicheth / Celine Boonyanusasna**
ORGANIZATION: NIST International School / Shrewsbury International School
TITLE **Goldfitt: Exercise Gamify for Elderly**
As the world rapidly ages, with over 16.2% of the global population projected to be 65 or older by 2050, sarcopenia, the progressive loss of muscle mass and strength, increasingly threatens elderly independence, yet seniors often abandon boring, repetitive physical therapy. Goldfitt addresses this through four low-impact devices— hand compression, string resistance, finger dexterity trainer, and arm/leg bicycle, each targeting specific muscle groups while seated. A wireless Control Box converts movements into Bluetooth game commands, supporting both existing games and custom Goldfitt-designed games, while a cloud-connected application tracks real-time progress for families and caregivers. By transforming exercise into play, Goldfitt helps elderly individuals stay active and independent.

TH-29 **NAME(S): Gaweewat Thanasitnaphitkul**
ORGANIZATION: The Newton Sixth Form
TITLE **Guitar-Based Interactive Music and Cognitive Wellness Platform for Elderly Care**
This project develops an innovative interactive device designed to resemble a guitar while simplifying the playing experience for elderly users. The platform combines a custom-designed hardware controller and software ecosystem that enables users to enjoy music, participate in games, exercise cognitive functions, and engage socially without requiring prior musical training.

TH-30 **NAME(S): Intutch Vikman Kamollertvara**
ORGANIZATION: Brentwood College School
TITLE **Imagi - Creativity for Everyone**
This project develops a creative stationery ecosystem built around innovative rubber stamps, interchangeable handles, a futuristic storage box, and a digital content-sharing platform. The platform enables teachers, parents, students, elderly people, and individuals with disabilities to create educational and artistic content without requiring advanced drawing skills.

TH-31 **NAME(S): Kongkiat Srisuwatanasagul / Sayamon Srisuwatanasagul / Saritvich Panyaboriban / Supapit Kanthawat / Ornjira Khampila**
ORGANIZATION: Chulalongkorn University, Faculty of Veterinary Science
TITLE **Interactive 3D Ruminant Digestive System Simulator**
The "Interactive 3D Ruminant Digestive System" is an advanced web-based educational platform designed to revolutionize veterinary anatomy training. It features an intuitive anatomy mode encompassing the rumen, reticulum, omasum, abomasum, spleen, and celiac arteries. Users can engage with a dynamic cross-section mode to explore internal structures via multi-axis slicing and follow the physiological digestion process step-by-step. By translating complex multi-chambered bovine anatomy into a highly accessible, manipulatable 3D digital space, this innovation significantly enhances spatial learning, retention, and comprehension for modern veterinary students.

TH-32 **NAME(S): Jitwarin Waruttamapornsu / Nisha Luangvaranunt**
ORGANIZATION: Chulalongkorn University Demonstration Secondary School
TITLE **LingUp: Unlock the World Through Social Gaming and AI—Level Up Your English with Friends Worldwide**
LingUp is an innovative English learning platform that integrates Artificial Intelligence (AI), Voice Recognition, Gamification, and Social Networking to create an engaging, interactive, and practical language-learning experience. The platform encourages learners to develop real-world communication skills through AI-powered voice interaction and collaborative gameplay. LingUp has the potential to evolve into a global language-learning platform that connects learners worldwide, supports education in schools, universities, and organizations, and fosters an international learning community for cross-cultural communication and global citizenship.

TH-33 **NAME(S): Sean Terdprisant / Akka Asavanund**
ORGANIZATION: International School Bangkok, Concordian International School
TITLE **MotoSaaS: Motorcycle Safety as a Service**
MotoSaaS is a Safety-as-a-Service AI application that makes motorcycle safety simpler, smarter, and cheaper. Motorcycle-related fatalities are the leading road killer in developing countries (e.g., ~80% of traffic deaths in Thailand), often involving low-income riders who are the family breadwinners. Existing $300-3,000+ hardware-based safety sensors for bikes are unaffordable and require invasive installations that can void vehicle warranties. MotoSaaS repurposes smartphones already mounted on motorcycles into an AI-driven safety-solution. Its first application detects blind-spot risks using the phone's front camera, with a modular design that supports future integration of external sensors (e.g., EEG wearables to detect fatigue).

TH-34 **NAME(S): Krittawat Boonserm / Sujika Ngamsa-ard / Sirirat Wataradee / Somboon Tanasupawat / Saranporn Poothong**
ORGANIZATION: Chulalongkorn University Demonstration Secondary School / Faculty of Pharmaceutical Sciences, Chulalongkorn University / Faculty of Veterinary Science, Chulalongkorn University
TITLE **PetProFit**
Obesity in dogs is a growing veterinary concern linked to diabetes, cardiovascular disease, and hyperlipidemia. This study screened lactic acid bacteria (LAB) isolated from Thai fermented foods for cholesterol-assimilating probiotic properties. Four strains (NP1-1, NP5-5, BK2-1, BK2-2) showed superior cholesterol assimilation (72.1–79.1%) compared to the reference strain L. rhamnosus GG (42.3%). All strains were non-hemolytic. L. argentoratensis NP1-1 demonstrated exceptional acid tolerance (95.5%), bile tolerance (98.1%), and hydrophobicity (28.2%), making it a highly promising probiotic candidate for managing canine obesity and related metabolic disorders.

TH-35 **NAME(S): Kornsiripachara Damrongrat**
ORGANIZATION: International School Bangkok
TITLE **PulmoPlay: Interactive Lung Rehabilitation System**
PulmoPlay is an innovative medical rehabilitation platform that upgrades a conventional incentive spirometer into a smart, connected healthcare device. The project combines airflow sensing technology, embedded electronics, wireless communication, gamification, cloud computing, and patient monitoring systems. The goal is to improve patient engagement during lung rehabilitation while providing measurable clinical data for healthcare professionals.

TH-36 **NAME(S): Parnpavit Nilgianskul**
ORGANIZATION: Shrewsbury International School Bangkok
TITLE **PulseIQ**
PulseIQ is a real-time biometric stress monitoring and personalised profiling system for competitive squash athletes. Using the RMSSD algorithm validated by Kubios HRV - the gold standard used in over 1,800 universities worldwide - PulseIQ connects to a Polar H10 chest strap via Bluetooth and displays live stress levels to coaches through a traffic light system during training. Coaches log stress spikes alongside match score context point by point, then conduct post-session interviews to identify psychological triggers behind each physiological response. Over multiple sessions, the system builds a personalised stress trigger profile per athlete - revealing hidden patterns invisible to the human eye. PulseIQ makes the invisible visible.

TH-37 **NAME(S): Poon Punjarungroj**
ORGANIZATION: International School Bangkok
TITLE **SafeGreen**
As a response to crop-eating pests, pesticide use impairs plant photosynthesis, degrades soil health, and leaves toxic residues that significantly reduce the nutritional value of food. Existing solutions are present, yet are often ineffective at neutralizing these chemicals. SafeGreen addresses these limitations, being a faucet-mounted device that removes pesticide residues from produce while preserving its nutritional and economic value. It integrates with standard water-dispensing appliances and combines ozone-microbubble injection with peroxide dispersion in order to maximize neutralization of these chemical residues. Paired with direct unit sales, SafeGreen gives farmers and households an affordable path to safer, more marketable food.

TH-38 **NAME(S): Narida Charanachitta**
ORGANIZATION: Bangkok Patana School
TITLE **Seagrass Seednest**
Seagrass Seednest is an innovative biodegradable anchoring system designed to accelerate large-scale seagrass restoration. Current restoration methods require divers to manually plant individual seedlings, making deployment time-consuming and labour-intensive. The Seednest enables multiple seagrass seedlings to be secured within a single biodegradable structure made from natural materials and deployed directly from a boat. Once placed on the seabed, the system stabilizes seedlings during establishment while gradually decomposing without leaving harmful waste. By reducing the need for extensive diving operations, Seagrass Seednest increases restoration efficiency and enables scalable recovery of degraded seagrass ecosystems.

TH-39 **NAME(S): Woratat Kosolpisitkul / Thanapat Wongprach / Kitpatwut Tanchutchawal / Chanyakart Pattarasait / Popnapat Saruayjirawat**
ORGANIZATION: Chulalongkorn University Demonstration Secondary School
TITLE **Sensecare mirror**
SenseCare Mirror for Elder is an easy-to-use smart mirror app for daily health checks in nursing homes, especially in remote areas where one caregiver may look after up to 15 residents. Each morning, older adults answer simple questions and use a body map to show pain or discomfort. AI checks the information against a clinical database to find possible health risks early. Each user can also view their full health history. This Thailand-first idea supports early care, reduces unnecessary hospital visits, and eases pressure on the healthcare system.

TH-40 **NAME(S): Ranrachata Yutthasarnsiri**
ORGANIZATION: Ruamrudee International School
TITLE **SmartWear Athlete**
SmartWear Athlete is a wearable performance testing and training system that automatically evaluates exercise posture, counts valid repetitions, and tracks athletic development over time. Wearable inertial measurement sensors (IMUs) integrated with a microcontroller capture real-time movement data during exercises such as sit-ups, squats, and push-ups. Machine learning algorithms analyze body motion patterns to determine whether each repetition is performed with correct technique, so only correctly executed repetitions are counted, providing an objective assessment of athletic performance. The device connects wirelessly to mobile applications, giving athletes immediate feedback and increasing engagement during training.

TH-41 **NAME(S): Purichaya Wacharapornin / Puripat Thangsurbkul / Putana Thangsurbkul**
ORGANIZATION: Chulalongkorn University Demonstration Secondary school
TITLE **StrikePoint Master - Precision Emergency Breach Simulator that convert panic into precision thru practice**
StrikePoint Master – Master the Break The StrikePoint Master is a zero-waste, non-destructive training system engineered to teach the life-saving corner-strike method for breaching tempered vehicle glass during emergencies. The kit combines a full-scale, multi-zone reflective impact panel with a high-density kinetic rubber mallet, allowing users to apply realistic force without shattering glass or creating hazardous debris. Embedded pressure and location sensors analyze impacts in real time, delivering instant tri-color LED and audio feedback to guide accuracy. With an instantaneous, zero-reset training cycle, it enables continuous physical repetitions that rapidly encode critical muscle memory, ensuring rapid, reliable escape execution when every second counts.

TH-42 **NAME(S): Woranun Atikarnbodee**
ORGANIZATION: Shrewsbury International School Bangkok
TITLE **The Embrace Gloves**
Embrace Gloves target the itch-scratch cycle driving skin damage and infection in eczema and chronic pruritic conditions. Silver nanoparticles synthesized from banana pseudostem extract, an agricultural by-product, provide proven antimicrobial protection against bacteria. Ventilation channels manage heat and moisture for extended wear, while low-friction construction minimizes mechanical trauma during sleep. A gyro sensor connected to a mobile application tracks nightly scratching events, giving patients and clinicians measurable data to monitor severity and treatment progress.

TH-43 **NAME(S): Mr.Tanapon Tungkahotara / Mr.Phongphol Moolpong / Mr.Prach Malai / Mr.Thanwa Bualavong / Mr.Ryuhei Goko**
ORGANIZATION: Wichai Wittaya School
TITLE **Development of a Stroke Risk Detection System Based on Behind-the-Ear Carotid Artery Monitoring (GEN 2)**
CarotidSync GEN 2 is a wearable bilateral carotid hemodynamic monitoring system designed for early stroke risk assessment. The device is attached behind both ears using medical adhesive patches and integrates acoustic sensors, multi-wavelength photoplethysmography (PPG), pulse wave analysis, and artificial intelligence. It continuously measures carotid blood flow velocity, estimated blood pressure, heart rate, oxygen saturation, and bilateral vascular synchronization in real time. AI algorithms analyze hemodynamic patterns and generate a stroke/stenosis risk score through a smartphone application. The system provides a non-invasive, portable, and cost-effective solution for community-based vascular screening and continuous home monitoring.

TH-44 **NAME(S): Chananya Sriwiwatkul / Rakaey Sukchai / Natpreeya Rerkpreedapong**
ORGANIZATION: Panyarat High School
TITLE **A Wearable System Using Micro:bit and Machine Learning to Monitor Upper-Limb Rehabilitation for Stroke Recovery**
This innovation introduces a low-cost, Micro:bit-powered wearable developed for stroke patients to perform home rehabilitation with clinical-grade precision. While standard trackers merely count repetitions, this system utilizes machine learning to analyze multi-axis acceleration signatures, specifically identifying compensatory movement patterns that can impede neurological recovery. Focusing on three key exercises: arm lifts, shoulder rotations, and elbow flexions, the device assesses movement quality and fatigue in real-time. Data is relayed via a Blynk dashboard with Telegram reports for caregivers, ensuring patients prioritize functional restoration over simple repetition, effectively bridging the gap between "doing the exercise" and "doing it correctly."

TH-45 **NAME(S): Chaiyapong Kluakaew / Trairut Wattanapornmongkol / Phudit Boonphen**
ORGANIZATION: Rajini School
TITLE **Flood Rescue Vest**
The Flood Rescue Vest is an innovative life-saving device designed for flood emergencies. It provides at least 100 Newtons of buoyancy, complying with International Organization for Standardization ISO 12402 standards. The vest integrates GPS-based real-time location tracking via Global System for Mobile Communications GSM or LoRa LoRa networks, combined with retroreflective materials, an emergency whistle, a waterproof QR code, and a rescue lifting loop. This innovation enhances victim detection and rescue efficiency, reduces response time and fatalities, and strengthens community resilience and disaster preparedness against increasingly severe climate-related flooding.

TH-46 **NAME(S): Thirada Chaiyosburana / Jira Chomthongdi / Pawarisa Leewiraphan / Supakarn Viriyasujcha**
ORGANIZATION: Amnuaysilpa School
TITLE **Phosfade**
Phosfade is a low-cost filtration that promotes decentralizing pollution from its source. By attaching the product to the washing machine drain hose, it captures phosphate from household wastewater before it is discharged into rivers, which will prevent eutrophication and harmful algal bloom that causes toxic waters, oxygen depletion, and aquatic biodiversity loss. The filter uses upcycled oyster shells waste from hotel buffets, which are processed into a safe, mineral-based adsorption material. Once saturated, the phosphate precipitates can then be reused as the plant's fertilizer, ultimately creating a circular economy that valorizes food waste into high-value, practical solution.

TH-47 **NAME(S): Miss Kawissara Pholdee / Mr.Prant Inkam / Mr.Kittitat Bunwong**
ORGANIZATION: Montfort College Chiang Mai
TITLE **Development of protein bar from fermented Wolffia globosa as a soy protein substitute for individuals with soy allergy**
As the global food industry faces a dual crisis of food security and a rising incidence of dietary allergies, the search for a New Protein Frontier is urgent. Wolffia globosa was selected as the model organism due to its complete essential amino acid profile, comparable to hen eggs. However, raw consumption is hindered by its grassy aroma and low digestibility. This project applies Bioconversion through Fermentation to shatter these barriers. Our research delves into microbial growth kinetics and its impact on nutritional enhancement, resulting in a probiotic protein bar that is gentle on the digestive system and 100% safe from common dietary allergens. By overcoming the physical and chemical obstacles of aquatic plants, we provide a blueprint for a safer, more sustainable protein future.

TH-48 **NAME(S): Naravid Tejavanija**
ORGANIZATION: Shrewsbury International School Bangkok
TITLE **GOcacao: Low-Cost Cacao Fermentation Intelligence**
GOcacao is a low-cost cacao fermentation intelligence system for smallholder farmers. A portable device (USD 80-130) tracks fermentation temperature as a biological signal, and a proprietary algorithm detects the natural peak and decline of microbial activity, telling the farmer exactly when to turn and stop the beans instead of guessing or counting days. Cloud software gives real-time alerts and batch-level, verifiable records. In controlled trials it raised fully-fermented beans to 84.5% (vs 68%) and cut variation to 3.5% (vs 26.8%), nearly doubling farmer income with a 1-2 month payback.

TH-49 **NAME(S): Mr. Jiranut Nutwattanasirikul / Mr. Nathakit Chaiwongsai**
ORGANIZATION: Montfort College (Secondary Section)
TITLE **DustDose: A Wearable Personal PM2.5 Exposure Tracker and School Air-Safety Alert System for Children in Haze-Affected Regions**
DustDose is a low-cost wearable device that protects children's respiratory health in regions affected by seasonal haze and air pollution. Unlike conventional apps that only show city-wide air quality, DustDose measures each child's personal PM2.5 exposure and accumulates it into a daily inhaled dose using a laser sensor. A built-in traffic-light indicator lets children respond instantly, while a connected dashboard combines class data so teachers can objectively decide whether outdoor activities are safe. By turning invisible pollution into personalized, actionable information, DustDose reduces exposure, supports school decisions, and offers a scalable solution for polluted cities and wildfire-prone areas worldwide.

TH-50 **NAME(S): Mr. Thee Nophaket / Miss Natchaya Sirisutham / Mr. Teepope Chankong / Mr. Tankhun Charoenloetthanakit**
ORGANIZATION: Chiang Mai University Demonstration School
TITLE **Non-Invasive Sleep Hypoglycemia Detection System**
G-SENSE is a non-invasive, multi-modal medical device designed to detect nocturnal hypoglycemia during sleep. While commercial smartwatches lack reliable differential logic, G-SENSE utilizes a unique decision algorithm integrating Skin Conductance (GSR), Heart Rate (PPG), and Skin Temperature. By using temperature as a key differentiator, the system can distinctively identify "cold sweat"—a physiological response triggered by epinephrine release during glucose drops below 3.9 mmol/L—from nightmares or night terrors. Built on an ESP32 MCU, this low-cost ($90) prototype achieves high sensitivity (≥85%) and safely transmits wireless alerts to caregivers, preventing dangerous asymptomatic sleep-induced hypoglycemia.

TH-51 **NAME(S): Pimchanok Pornsuwankun**
ORGANIZATION: Shrewsbury International School Bangkok (Riverside)
TITLE **Re:vibe — The Smart Wearable Motion Coach**
Office syndrome affects millions of people who spend long hours at desks, yet many struggle to perform rehabilitation exercises correctly without professional supervision. This innovation transforms a micro:bit into an intelligent wearable rehabilitation watch that combines motion sensing, machine learning, and interactive feedback. The device recognizes resistance-band exercises in real time, evaluates movement quality, and instantly guides users through LED indicators and motivating sound effects. By making corrective exercise simple, engaging, and accessible, the system helps improve posture, reduce muscle strain, and encourage long-term adherence to rehabilitation, offering an affordable and scalable solution for workplace health worldwide.

TH-52 **NAME(S): Sopanarin Mongkolcharoensri / Paleerat Wongchampa / Lerson Kirasamuthranon**
ORGANIZATION: Regent's International School Bangkok
TITLE **A Compact Triple-Band Implantable Antenna for Real-Time Biomedical Telemetry**
This invention presents a miniaturized triple band implantable antenna designed for biomedical telemetry and Wireless Body Area Network (WBAN) applications. The antenna operates at 401-406 MHz, 1.396-1.432 GHz, and 2.4-2.5 GHz, enabling reliable communication between implanted medical devices and external monitoring. This antennas enable real time, remote monitoring of vital signs such as ECG, heart rate, blood pressure, oxygen saturation, EMG, temperature sensor which reduce healthcare workers manual workload and human errors.

TH-53 **NAME(S): Tyn Skulyong**
ORGANIZATION: NIST international school
TITLE **Calm Log**
CalmLog is an Apple Watch-based assistive app designed to help individuals with Tourette's syndrome recognize and manage tic episodes in real time. Using the watch's accelerometer, gyroscope, CalmLog detects sudden motion patterns or stress-related signals and responds with gentle haptic feedback, breathing reminders, and local episode logging. The app helps users build self-awareness, identify triggers, and review patterns over time. By combining wearable technology, behavioral support, and personalized tracking, CalmLog aims to make tic management more accessible, private, and immediate.

TH-54 **NAME(S): Danita Sakulvera**
ORGANIZATION: Harrow International School Bangkok, Thailand
TITLE **An Educational Board Game to Promote Oral Health Awareness Among Secondary School Students**
Traditional school curricula often emphasize tooth anatomy over practical oral care, leaving a gap in dental education. To address this, this study introduces an educational board game rooted in game-based learning. Simulating the human oral cavity, the game tasks players as dental health guardians aiming to collect 32 permanent teeth. Through card mechanics and five targeted mini-games, students navigate real-world hygiene habits, risk factors, and treatments. The game's effectiveness will be evaluated with 30 secondary students via pre- and post-tests and perception questionnaires, analyzed using paired t-tests. Expected outcomes include improved dental knowledge, positive attitudes, and an engaging classroom tool.

TH-55 **NAME(S): Mr.Titapat Ratanarat / Mr.Tristan Kanjanapas / Mr.Pakakorn Thienthong**
ORGANIZATION: The Youth Fund & Tracklab Youth Organization
TITLE **Earth Rangers: A Cooperative Board Game for Environmental Sustainability**
Earth Rangers is a cooperative environmental education board game that makes sustainability learning interactive and accessible. Players work together to reduce pollution, restore ecosystems, protect marine life, and build sustainable infrastructure while responding to challenges such as plastic pollution, ghost nets, PM2.5, wildfires, and coral bleaching. Through teamwork and strategic decision-making, the game promotes environmental awareness, biodiversity conservation, and understanding of the United Nations Sustainable Development Goals (SDGs).

TH-56 **NAME(S): Mr. Nutatcha Yowcharoensuk / Mr. Kueaangkul Chanpo / Mr. Namo Tippayawong**
ORGANIZATION: Chiang Mai University Demonstration School
TITLE **DecayScan: A Hierarchical AI-Powered Dental Caries Screening Platform**
DecayScan is an AI-powered dental caries screening platform designed to support early detection of tooth decay using smartphone images through a LINE Official Account. The system applies a hierarchical deep learning framework to classify teeth into seven clinically relevant categories: sound tooth, initial, moderate, extensive caries, existing restoration, tooth fracture and discoloration. Trained on publicly available and expert-validated intraoral datasets, DecayScan provides instant assessments and practical oral health advice. It can also connect with intraoral cameras for remote outreach screening. With clinical relevance, scalability, and commercialization potential, DecayScan offers an accessible solution to improve preventive oral healthcare worldwide.

TH-57 **NAME(S): Miss Passa-on Jesdpiyawong / Miss Punlawin Chotirattanaphithak / Mr. Wongsapat Satitjindawong**
ORGANIZATION: Ruamrudee International School / Wellington College International School Bangkok
TITLE **VoiceFocus : AI-Based Thai Speech Analysis for Preliminary ADHD Screening**
VoiceFocus is an AI-based Thai speech analysis program designed to support preliminary ADHD-risk screening in school-aged children. The system records or uploads Thai speech, extracts acoustic features such as speech patterns, RMS energy, signal variance, zero-crossing rate, and pitch variability, and uses machine learning-based classification to generate a preliminary risk output. Prototype testing demonstrates that VoiceFocus can produce measurable acoustic features, probability distribution, confidence score, risk score, and screening reports. The system is not intended for medical diagnosis, but aims to support early observation, ADHD awareness, and appropriate referral to specialists in Thai school settings.

TH-58 **NAME(S): Mrs. Woranuch Bhirom Bhakdi / Miss Puttachat Pongsuchat**
ORGANIZATION: Purevera Company Limited
TITLE **PP NAT NAD SERUM**
PP NAT NAD SERUM Expertly formulated by Thai researchers, PP NAT NAD SERUM is a next-generation skincare innovation targeting the NAD^+ pathway to combat cellular aging. Utilizing advanced plant-derived actives like RejuveNAD™, it boosts NAD^+ biosynthesis via the NAMPT pathway, significantly enhancing cellular regeneration and mitochondrial function. The carefully bio-engineered formula also comprehensively addresses oxidative stress, glycation, and skin detoxification. Delivering measurable wrinkle reduction, improved elasticity, and refined texture, the serum is validated by strong market demand, achieving over 500,000 units sold in its first five months.

TH-59 **NAME(S): Varinthon Chairojrat / Srung Smanmoo**
ORGANIZATION: Tobacco Authority of Thailand and Quantum Biotech
TITLE **Green-to-Gold: A Net-Zero Emission Process for High-Yield CoQ10 Synthesis from Tobacco Waste**
Transforming agricultural waste into high-value life science solutions, this breakthrough technology introduces an eco-friendly, high-yield process to extract Solanesol from tobacco leaves, enabling the cost-effective industrial synthesis of Coenzyme Q10 (CoQ10). By integrating a novel Net Zero Bio-Hybrid Ultrasonication Extraction and Sequential Flow Chemistry, the innovation achieves maximum purity while completely eliminating carbon emissions. This dual-impact solution creates a highly profitable green business model for the global multi-billion-dollar wellness market while driving the agricultural sector toward a sustainable, Net-Zero Carbon future

TH-60 **NAME(S): Napisa Srimongkolpathum / Teepop Thongborisute / Jirapinya Booncherdchu / Matthew Knox**
ORGANIZATION: Triam Udom Suksa School / Rayong Wittayakom School / Bangkok Patana School
TITLE **Social Sync Step Box**
This innovation is a 60 × 35 × 10 cm acrylic box designed for Chair Aerobics in older adults. It features 8 LED lights that indicate left and right foot placement to guide movement, improve rhythm, and reduce confusion during exercise. A built-in keypad allows users to set exercise repetitions and patterns. An EVA shock-absorbing pad provides impact protection and enhances safety during stepping movements. The system aims to improve coordination, balance, and timing while reducing reliance on instructors. It supports safe, low-impact exercise to promote physical health, prevent falls, and enhance overall well-being in elderly users.

TH-61 **NAME(S): Thananrat Rattanasirivilai / Natthawat Rattanasirivilai**
ORGANIZATION: Shrewsbury International School Bangkok
TITLE **Chitosan-Biochar Hydrogel to Enhance Soil Water Retention**
Drought severely limits agricultural productivity, particularly for smallholder farmers in rain-dependent regions. Although synthetic superabsorbent polymers (SAPs) have been used to mitigate this, high costs and environmental persistence make them unsuitable for widespread adoption. This study developed a low-cost, biodegradable hydrogel composite from chitosan and biochar as an alternative. Hydrogel beads containing 0%, 1%, 2%, and 3% biochar were synthesized and evaluated through swelling tests and a 14-day drought simulation in loamy soil. The 2% biochar formulation achieved the highest swelling ratio (605.2%), significantly outperforming pure chitosan (378.6%). After 14 days without irrigation, hydrogel-amended soil retained 26.0% moisture compared with 2.0% in untreated soil. These results demonstrate the potential of chitosan-biochar hydrogels for sustainable drought-resilient agriculture and a viable alternative to synthetic hydrogels.

TH-62 **NAME(S): Miss Panisara wachirawitthayakorn / Mr. Jiranut Nutwattanasirikul / Mr. Kitsana Intadet / Mr. Tanapach Somsak**
ORGANIZATION: Montfort College Secondary Section, Chiang Mai / Chiang Mai University Demonstration School / Nawaminthrachinuthit Horwang Nonthaburi School
TITLE **Thermal Guardian: Smart Non-Contact Fever Monitoring & IoT Alert System**
Thermal Guardian is an innovative non-contact infant fever monitoring and IoT-based alert system developed to enhance early health surveillance for vulnerable infants. Utilizing a thermal imaging sensor and intelligent embedded processing, the system continuously monitors body temperature without disturbing the infant's sleep or requiring physical contact. Advanced thermal data analysis identifies abnormal temperature trends while minimizing environmental interference. When a potential fever is detected, real-time alerts are instantly delivered to caregivers through wireless IoT communication. This innovation promotes safer infant care, reduces monitoring burden, and supports timely intervention. Thermal Guardian demonstrates the integration of healthcare innovation, thermal sensing technology, embedded systems, and smart connectivity for practical real-world applications.

TH-63 **NAME(S): Miss Jhintramon Thaveamayteachord / Miss Kunjiranuth Boonsoong / Miss Wachiraya Worakal / Mr. Krit Chaisawat / Mr. Weeraphat Upasan**
ORGANIZATION: The Prince Royal's College / Montfort College Secondary Section, Chiang Mai / Vachiralai School / Sarasas Witaed Chiang Mai School
TITLE **Infant Vision AI Analytics: Smart Infant Behavior Monitoring & Analytics**
InfantVision AI Analytics is an AI-based infant behavior monitoring and analytics system for babies aged 0–12 months. The prototype integrates an IP camera, Mini PC, image processing, artificial intelligence, and IoT technologies to automatically detect and analyze sleep-wake status, facial position, and movement activity in real time. Behavioral data are stored and visualized through an interactive dashboard, while Telegram notifications provide instant alerts for attention-required events. Experimental testing demonstrated continuous monitoring and automated behavioral logging capabilities. This innovation supports data-driven infant care and future digital health technology development.

TH-64 **NAME(S): Chinnavich Watcharachin**
ORGANIZATION: EBOX Co., Ltd.
TITLE **Eco-Concrete Block: Non-Load Bearing Concrete Block from Rubber Tree Biomass Ash and Water Hyacinth Fiber**
This invention develops non-load bearing concrete blocks using rubber tree biomass ash (a power plant byproduct) and water hyacinth fiber (an invasive weed) as eco-friendly substitutes for Portland cement and stone aggregates respectively. Nine mix formulas were tested against Thai Industrial Standard TIS 58-2533. Formula M1-2 (15% rubber tree ash + 0.5% water hyacinth fiber) achieved 10.27 MPa compressive strength at 28 days, exceeding the 2.5 MPa minimum by over 300%, and costs approximately 12% less to produce than conventional blocks. Multiple Bangkok installations have been completed, with all units sustaining no damage in a recent high-magnitude earthquake.

TH-65 **NAME(S): Pannawich Kongwuttipanya / Papichmon Kongwuttipanya**
ORGANIZATION: Triam Udom Suksa School
TITLE **SOMM: Asia's First Practical IoT and OpenAI-Powered Intelligent System for Snoring Analysis and Sleep Management**
SOMM is the first practical AI-powered IoT sleep monitoring and snoring management innovation specifically designed for Asian users. The system combines embedded sensors, advanced signal processing, cloud computing, and AI integrated with the OpenAI platform to analyze sleep quality, distinguish normal and abnormal snoring, and detect potential sleep-related health risks in real time, even in noisy environments. Unlike conventional recording applications, SOMM provides instant vibration-based feedback and personalized AI insights through a mobile application. The platform supports long-term sleep analytics, preventive healthcare, telemedicine integration, and digital health services, improving early detection and management of sleep disorders.

TH-66 **NAME(S): Miss Pimpichcha Uttarapong / Miss Pimpichchaya Uttarapong / Miss Pinnarate Muangman / Mr. Nopparat Thananchana / Mr. Nopnapas Thananchana**
ORGANIZATION: Varee Chiangmai International School / The Prince Royal's College / Chiang Mai University Demonstration School
TITLE **NeuroRhythm Rehab: An Interactive Music-Based Rehabilitation System with Measurable Outcomes**
NeuroRhythm Rehab is an interactive music-based rehabilitation system developed to support stroke survivors with hemiparesis. The project introduces Smart Rhythm Rehab, integrating music therapy, motor training, cognitive exercises, and digital monitoring into a single platform. The system features three rehabilitation modes to improve motor function, hand–eye coordination, reaction speed, memory, and attention. Preliminary testing demonstrated 90.09% response accuracy and 72.85% task correctness. Usability evaluation revealed high user acceptance, with interest and overall satisfaction scores of 4.8 and 4.7 out of 5, respectively, while 90% of users successfully operated the device independently.

TH-67 **NAME(S): Jasica Thiangthangthum / Ananya Kiatcharoenwat / Nunnapat Thongyoolert / Punchita Khajonjarukun / Siraya Asavametha**
ORGANIZATION: Bodindecha (Sing Singhaseni) School / Sarasas Witaed Saimai School / Learn Satit Pattana / Mater Dei School
TITLE **Smart sign language recognition and Thai-English translation system**
This project presents a real-time sign language recognition and translation system designed to bridge communication between hearing-impaired individuals and the general public. Using computer vision technology, the system captures live webcam video at 12 frames per second and detects 21 hand landmarks to identify gestures. An AI model classifies each gesture with confidence scoring and converts recognized words into on-screen text and spoken audio. Running on a local web server via an Arduino UNO Q board, the system achieved 100% accuracy across 50 participants performing 5 gestures, demonstrating strong potential to improve accessibility and reduce communication barriers.

TH-68 **NAME(S): Kornkrit Teanpakdeeprasat / Nabhat Sethaudom / Nathas Tangtipongkul / Pimnara Roongsetthavitr / Suchanan Kittikraisak**
ORGANIZATION: International Community School / The Newton Sixth Form
TITLE **SmartLung: An Intelligent Respiratory Muscle Training and Remote Monitoring Platform for the elderly**
Traditional respiratory tools lack data tracking, while clinical devices remain prohibitively expensive for elderly tele-rehabilitation. To bridge this gap, we developed SmartLung, a low-cost, data-driven device for primary healthcare providers. The system synchronizes heart rate, blood oxygen, and inspiratory pressure data via Wi-Fi to the LungCare platform for longitudinal tracking.

TH-69 **NAME(S): Petechapat Areewong**
ORGANIZATION: Choate Rosemary Hall
TITLE **Calci-Go Drink**
Inspired by personal experiences with sports injury and calcium deficiency due to lactose intolerance, Calci-Go is a calcium-infused sports drink that makes supplementing your calcium needs extremely easy and efficient. Made with real mango and pineapple juice, Calci-Go takes the form of a highly functional sports drink and delivers 300 mg of calcium, 75 mg of potassium, and 75 mg of sodium without any funky taste. With over half the Thai population suffering from calcium deficiency and lactose intolerance, Calci-Go aims to combat that problem.

TH-70 **NAME(S): Rasa Bunditkitsada / Preyahathai Aroonvanichporn**
ORGANIZATION: NIST International School of Thailand
TITLE **Grounded**
Global coffee consumption results in over 6 million tonnes of waste annually. Simultaneously, the traditional leather industry drives deforestation, greenhouse gas emissions, and toxic chemical waste from tanning processes. Grounded addresses both problems by transforming coffee grounds into resilient bio-composite leather while reducing environmental footprint. Our product produces 25x less carbon emissions and achieves a tensile strength of 13.25 MPa, comparable to animal leather (8–17 MPa). This material powers a "waste-to-value" program that incentivizes hospitality and F&B businesses to redirect grounds, enhancing circular economy opportunities while helping operators meet ESG goals.

TH-71 **NAME(S): Miss Hidayat Bensulong / Miss Hanna Bensulong**
ORGANIZATION: Thamavitya Mulniti School
TITLE **Stroke Motion: Prototype Webcam-Based Upper Limb and Trunk Motion Analysis System for Monitoring Movement Abnormalities Associated with Stroke and Rehabilitation Tracking.**
Stroke Motion is a webcam-based motion analysis system developed to support monitoring of movement abnormalities associated with stroke and rehabilitation tracking. The system uses Artificial Intelligence, Computer Vision, and MediaPipe Pose technology to analyze upper limb and trunk movements in real time. It calculates arm symmetry, range of motion, movement speed, and a rehabilitation score. Testing involved 5 healthy participants, 5 at-risk individuals, and 1 stroke patient. Results showed clear differentiation between movement patterns and improvement in rehabilitation scores after therapy. The innovation offers a low-cost, accessible solution for clinical and home-based rehabilitation monitoring.

TH-72 **NAME(S): Miss Nattanya Kliaosri / Miss Muthita Komonthiti / Miss Athita Srimala / Mr. Sapon Yingmi / Mrs. Sureerat Juykrayang**
ORGANIZATION: Weerawatyothin School
TITLE **High-quality pickled mangoes machine**
The High-quality Pickled Mangoes Machine was developed to evaluate its efficiency, examine pickled mango characteristics, and compare them with market alternatives. The findings indicate: 1. An internal pressure of 1.5 bar accelerates pickling to 6 days, with a 4.1 average brine pH. 2. The mango flesh exhibits a 4.2 average pH, 12% average brine concentration, 15% average starch content, and a 20-day shelf life. 3. Compared to market alternatives, machine-pickled mangoes retain 5% higher starch content and 3% lower brine concentration.

TH-73 **NAME(S): Kundol Tangruthaiwanich / Burich Benjarattananon**
ORGANIZATION: Ruamrudee International School & Bangkok Christian College
TITLE **Pulma**
Pulma is an affordable, non-invasive device for early lung cancer risk screening. Its core innovation is reading the volatile organic compounds (VOCs) in a person's breath, the chemical byproducts that lung tumors release and that differ in people with cancer. Using a low-cost metal-oxide gas sensor, Pulma detects this breath signature and combines it with the user's lung function and background risk factors to produce one clear risk score. Unlike costly hospital imaging, it works remotely, flagging high-risk individuals for confirmatory screening and bringing early detection to people who live in areas with no access to hospitals.

TH-74 **NAME(S): Mr. Tanakorn Pornpratansombut / Mr. Manaschon Bunlengjai / Mr. Supakid Sripuatkead / Mr. Nuttawut Rujiphut / Miss Jiratchaya Khorueang**
ORGANIZATION: Wat Khemapirataram School
TITLE **Smart Shrimp Freshness Assessment System Using Spectral Technology and Artificial Intelligence**
We developed a smart shrimp freshness assessment system that combines spectral sensing and machine learning for rapid, non-destructive quality evaluation. Using over 1,400 spectral reflectance samples collected across a 96-hour post-harvest period, we trained a Random Forest classifier to distinguish freshness levels. The model reached 73–75% classification accuracy — comparable to the consistency of trained human inspectors relying on visual assessment alone, but without the fatigue, subjectivity, or time constraints. The system supports aquaculture quality management, strengthens food safety, and improves post-harvest handling across seafood supply chains, contributing to more reliable and sustainable food production.

TH-75 **NAME(S): Rosarin Suphasasin**
ORGANIZATION: Faculty of Economics, Srinakharinwirot University, Thailand
TITLE **AuraMind – Adaptive Neurodiversity Browser Assistant with AI Sensory Load Management**
AuraMind is an AI-powered browser assistant designed to reduce sensory overload and improve digital accessibility for neurodivergent users, including individuals with Autism, ADHD, Dyslexia, and Sensory Processing Sensitivity. The system analyzes webpages in real time, calculates a Sensory Load Score, and applies personalized optimizations based on individual sensory profiles. AuraMind aims to create a calmer, safer, and more inclusive internet experience for everyone.

TH-76 **NAME(S): Siseerot Ketkaew**
ORGANIZATION: Ramkhamhaeng University
TITLE **Research and Construction of Innovation to Reduce Air Humidity By Appling Electric Field Intensity Energy**
This invention presents research and construction of innovation to reduce air humidity by appling electric field intensity energy consists of 2 parts: Part 1, a set of high-intensity non-uniform electric field cells with the corona discharge process to cause ionization to break the bonds of water molecules for use in reducing the relative humidity in the air using the technique of adjusting the high voltage voltage in the high voltage circuit to control the intensity of the electric field, and Part 2 is a set to reduce the amount of ozone gas using an ultraviolet light with a wavelength of 253.7 nm. Part 1 has designed and construction a set of electric field cells consisting of a corona wire placed between two aluminum plates and High voltage flyback converter circuit consists of a high frequency pulse generator using IC number 555 for adjusting the electric field intensity from 5 kV/cm to 25 kV/cm under the adjustment of a high voltage of 1 kilovolt to 5 kilovolts, respectively, by using a pulse signal to stimulate the work of the IGBT to control the operation of high-frequency high-voltage transformers to produce high voltage electricity for supplying electrical energy to a set of electric field cells. The test results were that when measuring the relative humidity in the air, it was found that the electric field intensity was 25 kV/cm at a wind speed of 1 m/s able to reduce the amount of relative humidity in the air by 50%RH and produce 1 ppm of ozone gas in the computer laboratory, area size 20 square meters, in 60 minutes, and in the set to reduce the amount of ozone gas, it will be found the amount of ozone gas produced by the electric field set will be reduced to 0.01 ppm (OSHA or the Occupational Safety and Health Administration Set a requirement that you should not work in areas with an ozone concentration of more than 0.10 ppm. for more than 8 hours.) This research has passed the overall power consumption analysis test. and analyze safety standards regarding electrical leakage for the safety of users It is already completed at the testing room of the Electrical and Electronic Product Testing Center (PTEC), NSTDA, and in the future, it can be further developed into an innovation that can be used for real use.

TH-77 **NAME(S): Ms.Supaksatinee Rattanasut**
ORGANIZATION: Wichai Wittaya School
TITLE **Trauma Seal Pro (TSP): A Sustainable Manual Negative Pressure Wound Dressing for Advanced Emergency Wound Management During the Golden Hour**
Trauma Seal Pro (TSP) is a portable, electricity-free manual negative pressure wound dressing developed to improve emergency wound management during the Golden Hour. Inspired by the clinical principles of Negative Pressure Wound Therapy (NPWT), the system combines a multilayer bio-based dressing with a manual closed-loop negative pressure mechanism to manage the wound environment, remove exudate, reduce infection risk, promote tissue healing, and provide early visual infection monitoring using a natural pH-responsive indicator. Designed for emergency response, disaster relief, conflict zones, and remote communities, TSP expands access to advanced wound care through an affordable, sustainable, and field-deployable solution.

TH-78 **NAME(S): Miss Chayanis Kradangnga / Miss Monika Khuruwanit / Miss Paveeyada Sujithamvong**
ORGANIZATION: Sukhondheerawidh School
TITLE **THAI KITCHEN-INSPIRED SCRUB GEL**
Innovation from Tamarind and Mulberry Extraction The gel contains extract from tamarind juice, produced using an ultrasonic cleaner to assist in the extraction process, which helps release AHA compounds. Tamarind is acidic and supports skin exfoliation and brightening. Mulberry leaves are extracted using an ultrasonic device as well. After extraction, hexane is used for evaporation to remove chlorophyll. Mulberry leaf extract helps repair the skin after exfoliation. The DIY bead-making machine is adapted from a viscous-material pump connected to a tube and a needle nozzle, allowing the creation of very small beads.

TH-79 **NAME(S): Nathakorn Pongsak**
ORGANIZATION: Shrewsbury International School Bangkok Riverside
TITLE **Elephant food**
Domesticated elephants in Surin, Thailand, increasingly consume soil as local salt licks provide insufficient minerals, contributing to gastrointestinal problems. This project developed a low-cost supplement from nine locally sourced Thai plant ingredients. The herbal supplement provides sodium, calcium, magnesium, and phosphorus to reduce excessive soil consumption and can be prepared by elephant caretaker families without specialized equipment. It has been fed to more than 200 elephants across Surin, demonstrating its practicality for community use. The formula is now being introduced in other Thai provinces to improve elephant nutrition and welfare.

TH-80 **NAME(S): Kundol Tangruthaiwanich / Burich Benjarattananon / Pakawat Poldetch / Nuttapat Tangruthaiwanich**
ORGANIZATION: Ruamrudee International School & Bangkok Christian College
TITLE **TeleSync**
TeleSync is a portable, non-invasive telehealth system that brings objective physical examination to remote care. Standard video consultations capture symptoms and appearance but miss vital signs and heart and lung sounds. TeleSync pairs a handheld device with a guided mobile app and a doctor dashboard, letting patients or non-expert caregivers record digital auscultation, SpO_2, heart rate, temperature, and blood pressure. Data is captured offline-first and synced for remote clinical review, with critical-threshold alerts triggering rapid referral. Designed for rural, elderly, and homebound populations, TeleSync turns subjective verbal reports into structured clinical data, supporting earlier detection and stronger continuity of care.

TH-81 **NAME(S): Namfah Pibulsonggram**
ORGANIZATION: Bangkok Patana School
TITLE **Save Ourselves (SOS) Boardgame**
Save Ourselves (SOS) is an interactive educational board game that aims to empower children starting from the ages of 5 to feel more secure and confident in protecting themselves. It contains a wide range of interactive scenarios, allowing kids to develop practical decision-making skills. Specifically, the game includes situation cards, feeling cards, and power cards that teach children to identify safe or unsafe scenarios and understand personal boundaries. The outcome of the game is that children learn to say “no” confidently and comprehend that in dangerous scenarios, they should immediately tell a trusted adult.

TH-82 **NAME(S): Boonyawee Piriyalertsak (Aireen)**
ORGANIZATION: Shrewsbury International School Bangkok
TITLE **ArtSense: A Reusable Tactile Embossing Press for Thai Traditional Patterns**
ArtSense is a reusable, 3D-printed tactile embossing press that lets visually impaired students feel five traditional Thai art patterns through touch on ordinary paper. Interchangeable slot-and-tab plates create dual-depth embossed lines (1.8mm primary, 1.5mm secondary) with dot spacing calibrated to finger sensitivity, at under ฿2 per sheet versus ฿80+ for existing tactile materials. Developed and tested across three rounds with students at the Bangkok School for the Blind, guided by Dr.Issavara Sirirungruang of Ratchasuda College, Mahidol University, ArtSense is Thailand's first tactile tool built specifically for Thai traditional patterns, opening cultural art education to blind and visually impaired learners.

TH-83 **NAME(S): Asst. Prof. Dr. Chutima Kongjaroon / Asst. Prof. Dr. Anakhaorn Srisaipet / Asst. Prof. Dr. Siriporn Samutwachirawong / Asst. Prof. Surachai Srinorajan / Thidarat Srivichai**
ORGANIZATION: Maejo University
TITLE **Functional Food Potential of Cinnamon Honey Enhanced by Gastronomic Sciences Infusion**
This project introduces an innovative extraction method grounded in gastronomic science to enhance the bioactivity of cinnamon-infused honey. Traditional maceration over two months yielded only modest increases in phenolic content (3.08-4.75 mg GAE/mL) and antioxidant activity (35.15-40.87%). In contrast, the novel technique achieved significantly higher values (5.32 mg GAE/mL and 51.17% inhibition) in less time. The process also enriched key volatiles such as cinnamaldehyde and eugenol, reinforcing the honey's therapeutic potential. Efficient, scalable, and eco-friendly, this innovation bridges food chemistry and biochemistry, transforming a traditional ingredient into a modern functional food and nutraceutical with strong health and commercial value.

TH-84 **NAME(S): Buncha Chaovarin / Thawilwadee Bureekul / Thanyawee Puthanakit / Surakameth Mahasirimongol / Srung Smanmoo**
ORGANIZATION: Academic Group 4, The 12th Class, Diploma Programme in Medical Governance for Senior Executives (PTP.12), Thailand
TITLE **Music for Resilience: An AI-Generated, Preference-Based Music Platform for Proactive Mental-Health Screening and Reintegration of Prisoners Nearing Release**
Music for Resilience turns AI-generated music into a proactive mental-health screening system for prisons. The musical tastes of 300 Thai prisoners nearing release (150 women, 150 men) were surveyed and synthesized into 12 original AI-generated songs matched to each listener's gender, genre preference, and three emotional themes. A four-week listening programme (~20 minutes/day) was paired with repeated standardized screening (ST-5, PHQ-9, GAD-7). The platform detected 26 individuals with self-harm risk signals — nine newly emerging — and referred 100% to care, and now anchors a national policy proposal covering all 143 Thai prisons.

TUNISIA

TN-01 **NAME(S): Faycel Khlifi**
ORGANIZATION: Retired Primary School Teacher
TITLE **Eternal calendar**
To find the name of the day corresponding to any date from 01/01/01 to infinity, I did some research that led to some rules. First, we find the number x. x = a - a0. a: the desired year. a0: zero year. Always 0 ≤ x ≤ 27. Before the year 2000, the zero years are written on the prototype. x = a - a0. After the year 2000, we apply the 400-year periodicity rule. We find a1 then a2. a2 < 2000. x = a2 - a0. Finally, we put x in front of January 1st and apply the instructions.

TÜRKIYE

TR-01 **NAME(S): Maryam Raei dehaghi / Samira Raei dehaghi**
ORGANIZATION: N/A
TITLE **ThyroProRes System: A Dual AI-Guided Bio-Immune Platform for Thyroid Protection and Hormonal Restoration (Part 1: ThyraGeniQ Capsule / Part 2: ThyroShiQ Capsule)**
The ThyroProRes System is a dual AI-guided bio-immune platform for thyroid protection and hormonal restoration. It follows a Protect → Restore strategy and has two complementary parts. The ThyraGeniQ Capsule is designed for lost or severely reduced thyroid hormonal function. Using encapsulated thyroid organoids and intelligent control, it aims to restore personalized T4 and T3 production and regulation. The ThyroShiQ Capsule is designed for autoimmune diseases that threaten thyroid tissue or function. By monitoring immune activity and helping restore immune balance and tolerance, it aims to reduce autoimmune damage and protect thyroid tissue and function.

TR-02 **NAME(S): VAHID ESTIRI / EMAD AHMADI / ALIREZA ARABI / AMIR KIAN DELAVAR / ALBORZ MATAJI / ILIYA SAGHAFI**
ORGANIZATION: N/A
TITLE **Smart Adaptive Power Cut-off System (SAPCS)**
The Smart Adaptive Power Cut-off System (SAPCS) is a compact, fully automatic plug-and-play device designed to eliminate standby power consumption and prevent battery degradation. Unlike conventional smart plugs that only offer remote control, the SAPCS operates autonomously. It features a dual-action cut-off mechanism: (1) it completely disconnects the power supply when the connected device is turned off, and (2) it intelligently detects when a rechargeable device (e.g., smartphone, laptop) reaches 100% charge and cuts off the current to prevent overcharging. Certified as fire-retardant (withstanding up to 700°C) and made from recyclable materials, the device targets the global issue of "vampire energy" (which accounts for 15-20% of household electricity use) . By addressing the 50% reduction in lithium-ion battery lifespan caused by continuous trickle charging and the 12% of home fires caused by electrical faults, the SAPCS offers a safety and sustainability solution that is currently absent in standard market competitors.

TR-03 **NAME(S): Hassanali Moeini**
ORGANIZATION: N/A
TITLE **Dynamic Ergonomic Foot Support System with Adaptive Spring Suspension and Memory Foam Technology**
The invention presents a Dynamic Ergonomic Foot Support System designed to improve comfort and reduce pressure concentration during prolonged sitting or standing. The system integrates an adaptive spring suspension mechanism, an ergonomic support plate, and a memory foam layer within a multilayer structure. The spring system provides controlled mechanical flexibility, while the memory foam conforms to foot anatomy and enhances pressure distribution. Operating completely without electricity, sensors, or motors, this passive ergonomic solution offers improved adaptability, durability, and cost-effective manufacturing potential for office, industrial, healthcare, educational, and residential applications.

TR-04 **NAME(S): Amirhossein Mokhberian**
ORGANIZATION: N/A
TITLE **Ergonomic Oral Suction System for Pediatric Patients with Adjustable Suction Intensity and Secretion Collection Reservoir**
This invention relates to an ergonomic pediatric oral suction device with an adjustable suction intensity system and an oral secretion collection reservoir, designed for applications in medical devices, dentistry, and pediatric healthcare. The main objective of this device is to provide safe, rapid, and effective removal of oral secretions and, when required, secretions from the initial part of the upper respiratory tract in children, while reducing the risk of injury to delicate oral tissues and improving patient comfort during use. The device includes an ergonomic mouthpiece made of biocompatible medical-grade silicone, a main body equipped with an adjustable suction control system, a low-noise motor, control buttons, a detachable secretion collection reservoir, a replaceable antibacterial filter, and a flexible connector for connection to a suction source. The ergonomic design of the mouthpiece ensures proper placement inside the child's oral cavity and prevents excessive pressure and damage to sensitive tissues.

TR-05 **NAME(S): Mehran Bakhtiari / Pedram Radfar / Mahboubeh Hasheminezhad / Mohammadamin Neda / Mohammad Bahmani / Alisa heydari / Sadra heydari**
ORGANIZATION: N/A
TITLE **Smart box for transferring all sensitive laboratory, pharmaceutical and medical samples**
The box for transferring laboratory samples from minus 5 degrees Celsius to plus 60 degrees Celsius is used to transfer samples that must be moved from one city to another without being damaged along the way. In some cases, the samples must be kept at temperatures be placed in a dark environment with the desired temperature, for example, at a temperature of minus 5 degrees, with a constant temperature of several hours, or a temperature of 10 degrees plus, or for some samples, for example, a sperm sample, at a temperature of 37 degrees, or also a variety of primers and temperature-sensitive drugs and All laboratory samples or the transfer of human body organs such as heart, kidney, liver, etc. to be transplanted for a long time from one city to another need to maintain constant humidity and temperature with the desired temperature in the medical protocol. . Also, this box will be prevented from accessing laboratory samples and stolen members by using a multi-digit code lock that is built in and a metal body that is fully protected. Also, this box will be connected to a lighter. The car has the ability to be charged on longer routes from one city to another, and also by using the application that is installed for this box and connected to the mobile phone, the desired temperature and humidity can be controlled and adjusted.

UNITED KINGDOM

UK-01 **NAME(S): Thanita Sedtinwong**
ORGANIZATION: Concord College, UK
TITLE **Turning Sugarcane Waste into Structural Reinforcement for Sustainable Cement Mortars**
Sugarcane filter cake (FC), a by-product of the sugar industry, suffers management challenges but offers value-added potential. This work converts FC into biochar (FCB) and applies as a cement additive. Mortars containing 0-10 %wt FCB were evaluated, with 7.5 wt% giving optimal performance, achieving 45.3 MPa compressive strength, 58% higher than the control after 28 days. The improvement is due to the micro-filler effect, pore refinement and enhanced hydration. The enhancement of pozzolanic activity in concrete upon incorporation of filter cake biochar was confirmed by increased calcium silicate hydrate (C–S–H) formation, resulting in improved compressive strength. Thus, FCB shows strong potential as a sustainable additive for low-carbon cement-based materials.

UNITED STATES OF AMERICA

US-01 **NAME(S): Sara Sheikhlary**
ORGANIZATION: The University of Arizona
TITLE **AstroGuard™ Surface Technology: Geometry-Driven Dust Mitigation for Space Systems**
AstroGuard™ Surface Technology is a passive, geometry-driven dust mitigation solution for lunar, Martian, and orbital space systems. It utilizes multi-scale anisotropic surface structures to reduce particle adhesion, direct dust movement, and harness natural thermal cycling for self-cleaning performance, without power, electronics, or moving parts. By destabilizing van der Waals and electrostatic interactions through engineered surface geometry, AstroGuard™ preserves solar panel efficiency, optical clarity, and thermal functionality. The system integrates seamlessly into existing hardware, introduces no new failure modes, and extends mission lifetime while reducing maintenance and operational risk.

US-02 **NAME(S): Sara Sheikhlary**
ORGANIZATION: The University of Arizona
TITLE **MACSS™: Adaptive Closed-Loop Cognitive Stability System**
MACSS™ (Memory Augmentation and Cognitive Stability System) is a non-invasive, AI-driven cognitive support platform designed to stabilize memory and reduce cognitive fatigue through real-time neural monitoring and adaptive assistance. Using EEG-based brain-state detection, machine learning personalization, and optional mild neuromodulation, MACSS™ forms a closed-loop system that synchronizes biological memory with an intelligent external memory companion. Unlike invasive brain-computer interfaces or generic cognitive apps, MACSS™ adapts dynamically to the user's neural signature and intervenes only when instability is detected. The system provides scalable, ethically aligned cognitive resilience for aging populations, high-performance professionals, and early-stage cognitive decline.

US-03 **NAME(S): Sara Sheikhlary**
ORGANIZATION: The University of Arizona
TITLE **AgriPlasma Mobile™: AI-Assisted Portable Cold Plasma System for Sustainable Soil Regeneration**
AgriPlasma Mobile™ is a portable, AI-enabled atmospheric plasma system designed for chemical-free soil disinfection and fertilization. Using dielectric barrier discharge (DBD) technology, the device generates reactive oxygen and nitrogen species (RONS) to neutralize pathogens, decompose pesticide residues, and enhance nitrogen bioavailability. Integrated smart control, ozone monitoring, and optional nitrogen enrichment ensure safe and precise field operation. Solar-assisted charging and cloud-based AI analytics enable adaptive treatment optimization and off-grid deployment. AgriPlasma Mobile™ transforms advanced plasma engineering into a scalable, sustainable smart agriculture platform.

US-04 **NAME(S): Woosung Choi / Wang Kai Y**
ORGANIZATION: University High School, Northwood High School
TITLE **DiaBreath: AI-Powered Breath Analyzer for Noninvasive Diabetes Screening**
Because current diabetes diagnosis methods such as the A1C blood test are invasive and expensive, more than 175 million cases remain undiagnosed around the world, mostly in low- and middle-income countries. This research proposes DiaBreath, a portable device that diagnoses diabetes from exhaled breath. The device measures volatile organic compounds in breath using an MQ gas sensor array, and a connected smartphone application collects health information from the user. The two data are combined in a multimodal machine learning model, which showed 98% accuracy and 98.03% ROC-AUC in the test. The device is built with Arduino and a 3D-printed shell.

US-05 **NAME(S): Ralph Allen Beach**
ORGANIZATION: N/A
TITLE **Donnie All Jump**
A new type of battery terminals that require no tools whatsoever to install them, there is however, an adapter tool that installs the adapters onto the cables, which connect to the terminals

US-06 **NAME(S): Aidan Lee**
ORGANIZATION: Glen Rock High School
TITLE **Stage-Controlled Muscle Recovery Patch Based on PAX7–IGF1–MSTN Muscle Healing Biological Pathways**
Muscle injuries require stage-specific care, but most patches offer only cooling or heating. This project proposes a stage-controlled muscle recovery patch that translates PAX7, IGF1, and MSTN pathways into adaptive treatment modes. The flexible hydrogel patch integrates a gel pad, temperature-control layer, mild compression structure, and micro-vibration motor. In the early stage, cooling and stabilization support PAX7-related satellite cell activation. In the middle stage, warming and vibration promote blood flow, cellular activity, and IGF1-mediated regeneration. In the late stage, regulated compression and stimulation help prevent prolonged MSTN-associated suppression of muscle growth.

US-07 **NAME(S): Ellie Nahyun Kim**
ORGANIZATION: Lake Forest Academy
TITLE **AI-Assisted Discovery of Natural Quorum-Sensing Inhibitors to Reduce Foodborne Bacterial Biofilm Formation and Delay Food Spoilage**
This invention is an AI-assisted food safety research platform designed to identify natural compounds that may delay food spoilage by disrupting bacterial quorum sensing rather than directly killing bacteria. The project targets the LasR receptor of Pseudomonas aeruginosa, a quorum-sensing protein involved in biofilm formation and bacterial communication. Natural food-derived compounds such as cinnamaldehyde, eugenol, thymol, carvacrol, curcumin, vanillin, quercetin, catechin, linalool, and geraniol were screened using molecular docking tools. By ranking candidates based on predicted binding scores and food-safety potential, this invention proposes a safer, natural, and resistance-conscious approach to future food preservation.

US-08 **NAME(S): Eunseo Kwon**
ORGANIZATION: The Frederick Gunn School
TITLE **Development of a Smart pH-Responsive Chitosan Nanoparticle Wound Dressing**
This invention introduces a smart pH-responsive chitosan nanoparticle wound dressing designed to support healing and detect infection-related changes. Chitosan nanoparticles promoted human fibroblast proliferation and migration, with 50 μg/mL identified as an effective concentration. These nanoparticles were incorporated into an anthocyanin-based hydrogel that changes color according to wound pH. Under alkaline infection-like conditions, the hydrogel turns yellow, swells more, and releases more chitosan nanoparticles, producing stronger antibacterial activity against E. coli. This integrated system combines tissue-regeneration support, real-time visual monitoring, and adaptive antimicrobial delivery, offering a promising low-cost solution for advanced wound care.

US-09 **NAME(S): Heeseong Yang**
ORGANIZATION: Portsmouth Abbey School
TITLE **CortiShield: A Cell-Based Screening Kit for PTSD-Related Neuroprotective Compounds**
CortiShield NeuroRescue Screening Kit is a cell-based research platform designed to identify compounds that protect human glial cells from cortisol-enhanced oxidative stress. Based on experimental evidence that cortisol pretreatment increases ROS accumulation, reduces antioxidant defense genes, and lowers glial cell viability under H_2O_2 challenge, this kit provides a standardized workflow for neuroprotective compound screening. Candidate antioxidants, natural extracts, postbiotics, or drug candidates can be tested using cell viability, ROS imaging, and optional RT-qPCR analysis. Results are converted into a simple NeuroRescue Score, allowing researchers to compare protective potential and support early-stage neuroprotection discovery.

US-10 **NAME(S): Minhyo Tae**
ORGANIZATION: Canterbury School, New Milford, United States
TITLE **AquaRoot Bio-Island: A Floating Plant-Based System for Heavy Metal and Nutrient Removal from Polluted Water**
AquaRoot Bio-Island is a floating plant-based water purification system designed to remove heavy metals and nutrients from polluted water. The prototype uses aquatic macrophytes, including water coin, water hyacinth, and water wisteria, grown on a floating platform with submerged root systems. In cadmium-contaminated water, all plants reduced metal levels over time, with water coin showing the strongest removal efficiency. Tissue analysis showed that most cadmium accumulated in roots, allowing safer harvesting and disposal of contaminated biomass. This invention offers a low-cost, scalable, and eco-friendly solution for restoring agricultural, urban, and freshwater ecosystems affected by pollution.

US-11 **NAME(S): Seoyeon Bae**
ORGANIZATION: Wilbraham & Monson Academy
TITLE **NeuroSpine DualShield Hydrogel: A Hyaluronic Acid–Alpha-Lipoic Acid Biomimetic Platform for Supporting Spinal Neuronal Recovery**
NeuroSpine DualShield Hydrogel is a proposed biomedical invention designed to support spinal neuronal recovery after injury. The system combines hyaluronic acid (HA), an extracellular matrix–supporting biomaterial, with alpha-lipoic acid (ALA), an antioxidant compound that helps reduce oxidative stress. Based on experimental cell-viability results, the optimized combination of HA 100 μM and ALA 50 μM produced greater neuronal-like cell survival than either treatment alone. This invention translates the laboratory finding into a dual-action hydrogel platform that may be developed for hospital-based spinal injury research, surgical recovery support, and future regenerative medicine applications after further safety validation.

US-12 **NAME(S): Seoyul Lee**
ORGANIZATION: The Hun School of Princeton
TITLE **MOB3B-PrognoDx: An Integrative Genomic and Functional Platform for Prognostic Biomarker Discovery in Diffuse Large B-Cell Lymphoma**
Diffuse large B-cell lymphoma is an aggressive blood cancer with variable survival outcomes and frequent relapse. This project proposes MOB3B-PrognoDx, an integrative biomarker discovery platform that combines public cancer-genomic data analysis with laboratory-based functional validation. Using cBioPortal survival-stratified copy-number analysis, MOB3B deletion was identified as significantly enriched in deceased DLBCL patients. Functional experiments in SU-DHL-4 lymphoma cells showed that MOB3B overexpression increased MOB3B mRNA levels, reduced viable cancer cell numbers, and induced G0/G1 cell-cycle arrest. These findings suggest that MOB3B may serve as a prognostic biomarker and future therapeutic target for aggressive DLBCL.

US-13 **NAME(S): Yeo Eun Park / Jason Jung**
ORGANIZATION: American School Foundation of Guadalajara, Cypress High School
TITLE **TAL1-PrognoScan: A Gene-Amplification-Based Prognostic Screening System for Breast Cancer Risk Assessment**
TAL1-PrognoScan is a breast cancer prognostic screening system designed to identify patients with potentially aggressive cancer behavior through TAL1 gene-amplification and expression analysis. The invention was developed from genomic database analysis showing that TAL1 amplification appeared in deceased breast cancer patients but not in living patients. Experimental validation in MDA-MB-231 breast cancer cells further showed that TAL1 overexpression increased cell viability and colony formation, while TAL1 knockdown reduced cancer-cell growth. This system combines TAL1 genomic screening, mRNA expression testing, and risk-score interpretation to support personalized prognosis prediction and future treatment planning.

UZBEKISTAN

UZ-01 **NAME(S): Matýakubova Parkhat Maylievna / Ruslan Kuluev / Khulkar Usmanova Turgunbaev Asadulla**
ORGANIZATION: Tashkent State Technical University
TITLE **Devices for monitoring the moisture content of liquid materials**
This device contains a pipe for transporting liquid material, which has holes for placing two thermistors installed sequentially in the horizontal section of the pipe, perpendicular to the flow. For the transportation of liquid material at a constant speed, a tank with a uniform level was used. The second thermistor is equipped with a heater. Both thermistors are connected to the arms of the bridge measuring circuit. The heater is connected to the voltage source via the thyristor key, the thyristor key is connected to the output of the bridge circuit via the electronic amplifier and trigger, and the trigger is also connected to the valve. The valve input is connected to the pulse generator, and the output is connected to the pulse counter connected to the input of the indicator element.

VIETNAM

VN-01 **NAME(S): NGUYEN Ha Linh / NGUYEN Le Dan Linh / LE Hoang Phuc / DO Phuong Chi / TRAN Minh Ngoc**
ORGANIZATION: Foreign Language Specialised School / Vinschool Times City / Vinschool Smartcity
TITLE **VEssence - herbal anti-inflammatory cream with extracts of green tea leaves, guava leaves, and Centella asiatica.**
The developed product optimized anti-inflammatory topical cream integrating green tea (Camellia sinenis), guava (Psidium guajava), and Centella asiatica extracts. Using the emulsification method, 33 formulations were screened against five quality criteria. The optimized formula (S10), utilizing 5% Sepineo P600 and 10% oil phase, successfully met all physical stability and microbial specifications under Vietnamese Pharmacopoeia V standards. Furthermore, an in-vitro BSA denaturation assay demonstrated that the cream exhibited strong, concentration-dependent anti-inflammatory efficacy (IC_{50} = 698.02 µg/mL). At 1,000 µg/mL, it achieved 71.29% inhibition, proving to be a safe, cost-effective, and promising cosmeceutical candidate for acne-associated inflammation.

VN-02 **NAME(S): Thai Hong Quynh Chi / Le Pham Khanh Chi / Hoang Le Hai Dang / Ton Duc Minh / Nguyen Hoang Mai**
ORGANIZATION: Hanoi - Amsterdam High School For The Gifted
TITLE **Polyaniline hydroxyapatite materials for environmental treatment**
Polyaniline (PANI) was synthesized chemically. The morphology and structure of polyaniline were studied using SEM imaging and spectroscopic methods. The thermal stability of polyaniline was determined by TGA. Hydroxyapatite (HAP) was isolated from freshwater fish scales. PANI/HAP materials were fabricated in different ratios by dispersing HAP into PANI. The PANI/HAP materials were used to test the absorption of methylene blue (MB), Reactive Blue 19 (RB19), and Reactive Orange 122 (RO122) dyes. The dye absorption process was evaluated using UV-Vis spectroscopy. The research results showed that the PANI/HAP material absorbed the dyes studied very well.

VN-03 **NAME(S): Dinh Nguyen Van Khanh / Nguyen Ha Chi / Mai Ngan Ha / Truong Thi Tuyet / Nguyen Ngoc Minh / Assoc Prof. PhD. Nguyen Thi Van Anh (Mentor)**
ORGANIZATION: Diplomatic Academy of Vietnam / Archimedes Dong Anh High school / Hanoi International School / National Economics University, Vietnam / Vinschool Ocean Park 1 High School / University of Labour and Social Affairs, Vietnam
TITLE **The Impact of Circular Economy Communication on Green Consumption Behavior among Generation Z in Vietnam: An Integrated SOR–TPB Approach**
This study investigates the role of circular economy communication in promoting green consumption behavior among Generation Z in Vietnam. The findings show that circular economy communication positively influences attitude, subjective norms, and perceived behavioral control, while attitude is the strongest predictor of green consumption behavior. Notably, subjective norms do not directly affect behavior but influence it indirectly through attitude and perceived behavioral control. The study extends the application of the integrated SOR–TPB framework in the context of circular economy and green consumption, providing practical implications for businesses, policymakers, and communication organizations to foster sustainable consumption among young consumers.

VN-04 **NAME(S): Pham Minh Duong / Vuong Minh Tuan / Nguyen Tra My / Nguyen Dang Tung / Bui Khau Quang Hung**
ORGANIZATION: Vinschool Times City
TITLE **RESEARCH AND DESIGN OF A FLUORESCENCE SENSOR FOR DETECTING URIC ACID BASED ON THE RARE-EARTH LUMINESCENT Eu(III) COMPOUND**
Monitoring uric acid is important for the early diagnosis of hyperuricemia, gout, and kidney disorders. This study developed a fluorescence sensor using the luminescent complex Na[Eu(TFNB)4], immobilized on an anion-exchange resin for improved stability. Structural and photoluminescence analyses confirmed successful synthesis and strong red emission at 612 nm. The immobilized sensor exhibited stable fluorescence and a concentration-dependent turn-off response to uric acid, with complete quenching at 350 μM and a visible red-to-blue color change at 420 μM. These clinically relevant thresholds demonstrate the sensor's potential as a sensitive, low-cost diagnostic tool for uric acid detection.

VN-05 **NAME(S): Vũ Phương Linh / Ngô Hồng Cẩm Linh / Nguyễn Bùi Tuệ Lâm / Đặng Trâm Anh / Nguyễn Nhật Mai**
ORGANIZATION: Foreign Language Specialized School / Nguyen Sieu High School / Hoang Mai Star School / Hanoi-Amsterdam High School for the Gifted
TITLE **The Grannycore Hypothesis**
Popular media describe a resurgence of traditional, craft-related hobbies among younger consumers, a trend nicknamed “grannycore,” and claim such pursuits are displacing nightlife and screen time. This study examines whether this cultural narrative leaves a measurable footprint in U.S. consumer spending behavior. Using monthly Federal Reserve Economic Data (FRED) from 2010 to 2026, we apply trend tests, STL decomposition, and cross-correlation to evaluate hobby-related retail sales. While absolute hobby spending rose significantly (Kendall’s $\tau = 0.57$) and exhibited a one-time structural increase during the 2020 lockdown, it was the slowest-growing spending category examined. Notably, its share of total retail declined steadily from 2.01% in 2010 to 1.29% in 2025. Furthermore, the substitution hypothesis is contradicted: spending on food services and drinking places grew fastest and co-moved positively with hobby spending ($r = 0.83$, contemporaneous). We conclude that aggregate population data do not corroborate a relative hobby resurgence or the displacement of nightlife. Because aggregate spending cannot isolate Generation Z, these findings bound the phenomenon and motivate future cohort-resolved time-use analyses.

VN-06 **NAME(S): Ngô Bảo Châu / Trần Cẩm Linh / Võ Phan Thục Nguyen / Trần Hà Linh / Lê Vũ Hoàng**
ORGANIZATION: Foreign Language Specialized School / Hanoi-Amsterdam High School for the Gifted, Miss Hall’s School / Nguyen Sieu School
TITLE **Watts Behind the Compute: Quantifying the electricity cost and carbon footprint embedded in AI compute — and whether it can be hedged**
Compute, the processing power behind artificial intelligence, is rapidly becoming a financial commodity, yet regulated compute-futures track only chip-rental prices, ignoring its largest operating cost and environmental footprint: electricity. To address this blind spot, we establish a public, reproducible framework. By standardizing an H100 thermal design power of 0.70 kW and a data-centre Power Usage Effectiveness (PUE) of 1.20, we calculate a baseline draw of 0.84 kWh per GPU-hour. Using this metric, the methodology tracks the structural cost floor over time, runs ordinary least squares (OLS) regressions to analyze macroeconomic drivers, maps grid carbon intensities across 18 economies, and estimates minimum-variance hedge ratios. The results demonstrate that electricity costs $0.165 per hour at US retail prices-a slow, structural cost barely related to natural-gas spot volatility. Furthermore, grid carbon intensity varies 24-fold by location. Finally, while AI-exposed merchant power generator Vistra offers the best listed hedge by removing 23.1% of a compute-equity basket's variance, our findings underscore the urgent need for carbon-adjusted compute derivatives and climate-aware data-centre siting.

VN-07 **NAME(S): Lê Sỹ Bảo Nam / Nguyễn Minh Hiếu / Nguyễn Lê Diệu Thư / Nguyễn Hoàng Bách / Nguyễn Huy Hoàng**
ORGANIZATION: Hanoi-Amsterdam High School for the Gifted / Archimedes Dong Anh school / Chu Van An High School for the Gifted
TITLE **A Non-Invasive Biosensing and Environmental Smart Pillow for Real-time Sleep Diagnostics and Cardiovascular Monitoring.**
Realize the problem of stress and environmental pollution lowering sleep quality and harming health. Our team invented an IoT-based smart sleep-tracking system to measure body conditions and bedroom environments using a modular add-on design for regular pillows. This device includes biometric, force, and environmental sensors as hardware, transmits data to a cloud server, and illustrates it through interactive charts on a visualized webpage. The device shows high veracity, achieving excellent accuracy in sleep phase analysis during testing. We look forward to optimizing AI models for long-term health predictions. In addition, we hope it can be commercialized to support more users.

VN-08 **NAME(S): Nguyễn Bích Vân / Nguyễn An Huy / Phạm Gia Khánh / Đoàn Đình Phong / Phạm Minh Tuệ**
ORGANIZATION: Foreign Language Specialized School, Vinschool Smart City, Hanoi National University of Education High School for Gifted Students, True North School, Nguyen Hue High School for Gifted Student
TITLE **Turning compute into a financial asset**
A liquid market for compute derivatives is widely expected to be years away. This study quantifies how much of a firm's compute-cost risk can be hedged today using publicly traded assets.We construct a Synthetic Compute Cost Index (SCCI) from listed proxies across the GPU cost stack and evaluate hedging effectiveness using minimum-variance regressions, principal component analysis, a GARCH/VaR model, and scenario analyses. We find that roughly 56% of compute-cost variance can be replicated with a liquid ETF basket, driven predominantly by semiconductor exposure, cutting annualized volatility from 43.3% to 28.8%. In economic terms, this hedging strategy mitigates approximately $24 million of downside risk annually on a $100 million compute budget. However, the remaining 44% of variance is largely idiosyncratic and unhedgeable with existing instruments, underscoring the urgent economic need for a dedicated compute-derivatives market.

VN-09 **NAME(S): Nguyen Vinh Phuc**
ORGANIZATION: International Schools of North America
TITLE **Artificial Intelligence-Based Deepfake Video Detection and Media Authentication System**
As synthetic media grows more realistic and accessible, verifying the authenticity of digital content has become a critical challenge, threatening digital trust, misinformation spread, and information integrity. This project presents an end-to-end automated deepfake detection system that integrates facial extraction, data preprocessing, and a custom AI model into a unified workflow for practical, real-world deployment. The system automatically detects faces in videos/images, prepares the data for analysis, and classifies content as real or fake. Evaluated on facial media extracted from the DFDC dataset, the model achieved approximately 93% accuracy in distinguishing authentic from manipulated content.

VN-10 **NAME(S): Nguyen Khanh Hung**
ORGANIZATION: Vinschool
TITLE **Application of bioinformatics in determining the roles of miRNA-21 in lung cancer**
Using bioinformatic tools online, I was able to analyze the roles and functions of hsa-miR-21-3p in lung cancer. 4 target genes were selected from miRNet which are CDK6, PIK3CD, CCND1, PIK3R3, PIK3CA, CDK4 and PIK3CB. But only 4 of them were found in targetscan so those were chosen to be analyzed and studied Kaplan-Meier survival analysis, thereby coming up with detailed functions of miRNA-21 on those target genes.

VN-11 **NAME(S): Ly Ha Phuong Chi / Nguyen Khoa Dien**
ORGANIZATION: Ha Noi - Amsterdam High School for the Gifted / Ha Noi - Brighton College Vietnam
TITLE **FROM WASTE TO WELLNESS: FERMENTED POMELO PEEL EXTRACTS FOR SUSTAINABLE HEAVY METAL REMOVAL IN MEDICINAL HERBS**
This project addresses heavy metal contamination in pharmaceutical and herbal materials, which may harm human health even at low concentrations. Pomelo and orange peel extracts were used as an eco-friendly method to remove Pb^{2+}, Cd^{2+}, and As ions. Different extraction methods were tested, with fermentation showing the highest efficiency. The treatment removed about 94–98% of Cd^{2+} and 90–94% of Pb^{2+}, while As removal increased with soaking time. Importantly, the process did not affect the properties of the materials. This low-cost green technology reuses fruit waste and offers a simple, sustainable approach for improving pharmaceutical safety.

VN-12 **NAME(S): Vu Ha Bich Diep / Tran Hoang Dung**
ORGANIZATION: Foreign Language Specialized School / Hanoi National University of Education High School for Gifted Students
TITLE **Development of a Retail Analytics Dashboard to Improve Customer Retention and Boost Revenue for Vietnamese Convenience Stores**
With the advent of technology, small retail owners currently fail to retain customers and identify valuable customer segments. The simple Retail Analytics Dashboard emerges as a catalyst for change: to categorize customers into different groups, to propose solutions to retain loyal and at-risk groups, and more remarkably to automatically send out special deals to designated groups. The dashboard is constructed upon synthetic data generated from the open-source KiotViet retail data schema in Vietnam and classic business analytics models, namely RFM (Recency-Frequency-Monetary) and Apriori. These can help small retailers in Vietnam improve competitiveness and boost revenue.

VN-13 **NAME(S): Bui Ngoc An Khue**
ORGANIZATION: Vinschool Imperia
TITLE **Development of acne patches containing α-mangostin from the mangoteen peel**
The project addresses acne treatment issues, where current chemical therapies cause skin irritation and antibiotic resistance, while existing patches lack active antibacterial properties and use non-biodegradable polymers. As a solution, alpha -mangostin from mangosteen peel is utilized for its potent antibacterial and anti-inflammatory benefits. Methodology involves using reflux extraction to obtain α-mangostin extract from mangosteen peel, which is then blended into a mixture of Chitosan and Alginate solutions to form the biodegradable acne patch matrix. This yields fast pimple drying, effective antibacterial action, and high safety, while upcycling agricultural waste to increase economic value and protect the environment.

VN-14 **NAME(S): Nguyen Duong Ngoc Mai / Trinh Hien Tri / Pham Thanh Tung / Nguyen Hong Vinh / Nguyen Ha My / Phung Chi Binh / Assoc Prof. PhD. Nguyen Thi Van Anh (Mentor)**
ORGANIZATION: University High School (Irvine, CA) / Vinschool Smart City / Vinschool Times City High School, Hanoi, Vietnam / Foreign Language Specialized School / Amsterdam Highschool for the Gifted / University of Labour and Social Affairs, Hanoi, Vietnam
TITLE **The Circular Agriculture Model of Tam Dao Mushroom Cooperative, Phu Tho, Vietnam: A Multidimensional Value Perspective**
Research findings indicate that the circular agriculture model at the Tam Dao Mushroom Cooperative is built upon the integration of circular production, deep processing, health product development, and experiential tourism. The interconnectedness of these components generates five distinct categories of value: economic, environmental, social, educational, and tourism, thereby enhancing resource efficiency, elevating product value, and promoting sustainable development. Based on this case study, the research proposes a six-step replication framework designed to assist Vietnamese agricultural cooperatives in transitioning toward multi-value creation and a circular economy.

VN-15 NAME(S): QUACH NGOC KY ANH / NGUYEN DINH VIET BACH / CAO DUC ANH / LA KIEN MINH / NGUYEN MANH TUAN
ORGANIZATION: Vinschool / Hanoi-Amsterdam High school for the Gifted
TITLE From Fermented Rice Bran to a Computational miRNA Regulatory Atlas: A Bioinformatics Framework for Decoding miR-132/miR-134 Spatiotemporal Dynamics in GABAergic Memory Enhancement
Our previous research established a dual-stage fermentation process using Aspergillus oryzae and Lactobacillus brevis to convert rice bran into a GABA-rich extract containing 3.1 ± 0.3 g/100 g GABA with 87% conversion efficiency. The extract also increased exosomal miR-132 and miR-134 expression by at least 2.5-fold in vitro, suggesting potential for supporting cognitive function during aging. This study proposes a computational systems biology framework to clarify how miR-132 and miR-134 cooperatively regulate synaptic plasticity in the aging hippocampus. Publicly available RNA-seq, miRNA-seq, and AGO2/FMRP CLIP-seq datasets are integrated to construct a spatially resolved miRNA–mRNA regulatory network. Kinetic ODE modeling predicts that miR-132 acts early after stimulation, peaking at approximately 6 hours and promoting plasticity through repression of targets such as p250GAP and MeCP2. In contrast, miR-134 is predicted to act later, peaking around 14 hours and supporting structural stabilization through FMRP-dependent regulation of Limk1 and actin remodeling. Molecular modeling further suggests that GABA-induced BDNF signaling may reduce FMRP binding to miR-134. Overall, the framework links fermented GABA production with predictive bioinformatics, generating testable hypotheses for GABA timing, dosage, and miRNA-based strategies for age-related cognitive decline.

VN-16 NAME(S): NGUYEN CANH MINH / TRAN THU MINH / NGUYEN HONG TRANG / NGUYEN DINH GIA BAO / MAI KHANH CHI
ORGANIZATION: Cambridge Rindge & Latin School / Archimedes Dong Anh School / Vinschool The Harmony / Nguyen Hue High School for the Gifted
TITLE Evaluate Preferences and Design Comprehensive Support Packages for SMEs by Mixed Logit and Latent Class Models
This study examines how small and medium-sized enterprises (SMEs) trade off alternative forms and delivery conditions of government support. A sequential mixed-methods design is proposed. First, policy review and semi-structured interviews with SMEs, public agencies, financial institutions and business-support providers will refine the attributes and levels of the support packages. Second, a discrete choice experiment will ask a stratified sample of Vietnamese SMEs to choose between hypothetical packages combining finance, tax relief, technology assistance, business development services, co-financing requirements and administrative procedures. Multinomial Logit will provide a baseline, while Mixed Logit will estimate preference heterogeneity and Latent Class analysis will identify policy-relevant SME segments. The study will calculate marginal utilities, willingness to accept co-financing, predicted programme uptake and distributional effects across firm size, sector, ownership, location and capability. The expected outcome is an evidence-based portfolio of inclusive, administratively feasible and cost-conscious support packages rather than a uniform policy instrument.

VN-17 NAME(S): BUI NGUYEN PHUC HUNG / NGUYEN NGUYEN HUY / NGYEN AN GIA HUY / LAM TRI KHANG
ORGANIZATION: Lê Quý Đôn High School for the Gifted, Da Nang / Hanoi-Amsterdam High school for the Gifted / Trường Quốc tế Nam Sài Gòn (SSIS)
TITLE Research and Development of a Smart Weather Monitoring Station Based on the Internet of Things (IoT)
The project, "Research and Development of a Smart Weather Monitoring Station Based on the Internet of Things (IoT)," aims to apply embedded systems, microcontroller technology, and the Internet of Things (IoT) to environmental monitoring applications. The proposed system employs an ESP32 as the central controller and integrates multiple sensors to measure wind speed, wind direction, temperature, humidity, and carbon dioxide (CO_2) concentration in real time. The collected data are transmitted via Wi-Fi to a cloud database and displayed on a web-based monitoring platform, allowing users to access environmental information anytime and anywhere. Through this project, students will learn the complete IoT development process, including hardware design, embedded programming, cloud communication, and web application development. The final outcomes include a fully functional prototype, a research report, and a project presentation.

VN-18 NAME(S): NGUYEN TAN DAT / TRAN THANH LAM / NGUYEN BACH / NGUYEN NGOC MAI / LE DUC HIEU
ORGANIZATION: High School for the Gifted - Vinh University / Kim Lien High School / Wichita Collegiate School / Quang Trung High School
TITLE Research, Design of a Robotic Pick-and-Place Model for Color-Based Product Sorting
The project, “Research, Design of a Robotic Pick-and-Place Model for Color-Based Product Sorting,” focuses on developing an automated system capable of identifying, picking, and sorting objects according to their color characteristics. The system consists of a robotic picking mechanism, a conveyor belt, an object-detection sensor, a camera or color sensor, an Arduino controller, and an end-effector using either a vacuum suction mechanism or a mechanical gripper. During operation, products are transported by the conveyor belt to the inspection position. When an object is detected, the conveyor belt stops so that the system can acquire and process its color information. Based on the recognition result, the controller commands the robot to move to the pickup position, grasp the product, and place it in the corresponding sorting tray. The development process includes mechanical design, electrical circuit assembly, control-program development, subsystem integration, testing, and calibration to improve the model’s accuracy and operational stability.

ZAMBIA

ZM-01 NAME(S): Reu Ngonga Ndumba
ORGANIZATION: N/A
TITLE Road Accident Reducer
My driving safety system is used to help with driving and travelling, particularly when the accident is about to occur. My invention fits any vehicle; it is easy to install and greatly reduces the number of road accidents. It is made of infrared remote control and a receiver. No prior art advice provides the novel features and results listed above. Head on collision will be reduced because it will create a limited space from 2m-100m. The averter will be connected to another averter installed near the road pothole. We will install portable potholes infrared remote control to be connected to remote receiver on vehicle.

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As a studio marketing executive of Disney and then DreamWorks, over the years I have had the pleasure of working with HOW Creative of highly creative, innovative professionals of a variety of projects.

HOW Creative breathe new life into the StarPower program by re-branding the conference in a way that didn't compromise its long established brand equity. HOW Creative came up with the entirely new look for StarPower that had fun with the "idea" of entertainment marketing professionals. The campaign carried a unified, consistent message through all the program elements, from a series of teaser mailers to an ad campaign that ran in Brandweek and Adweek to the final conference brochure.

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Holly Beverly, Vice President Marketing

Howard and his team showed us how to articulate our company brand vision, philosophy, values, position and brand promise into a solid core brand essence, including our brand identity, website, trade show display, printed collateral and other critical touchpoints. The result was ATI won #41 on the "Inc. 500" list of fastest growing privately held companies the following year.

The branding made a huge difference!

ATI had no branding whatsoever when we engaged HOW Creative; not even logo/brand icon. He guided us how to use branding to establish our Identity and vision in the telecommunications industry. The result was over 2000% growth in less than 4 years!

Thanks, Howard.

Nancy Ridge, Vice President

FREE (Value $250.) Consultation with Howard A. Lim
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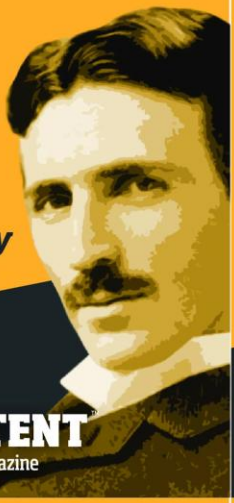
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The goal of an inventor essentially is to save human lives: it adds certainty to the essentiality

Nikola Tesla



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Genius is 1% inspiration and 99% sweat

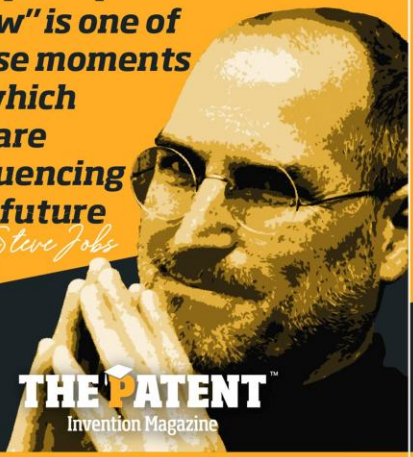
Thomas Edison



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The perception is that "now" is one of those moments in which we are influencing the future

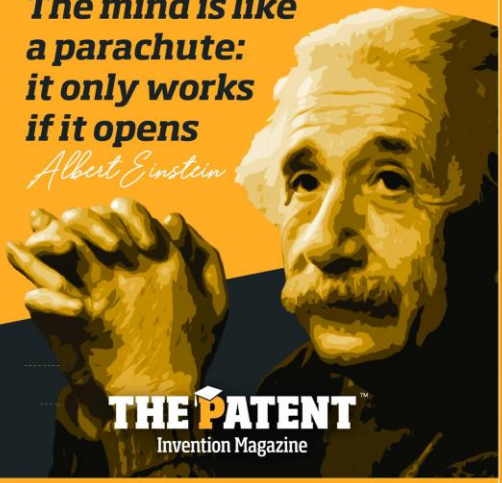
Steve Jobs



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The mind is like a parachute: it only works if it opens

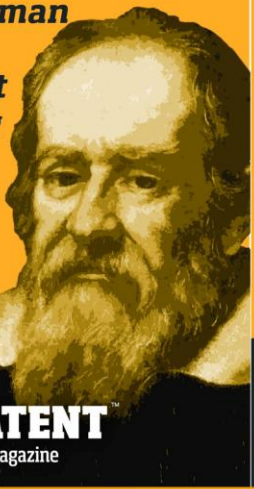
Albert Einstein



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I never met a man so ignorant that i couldn't learn nothing from him

Galileo Galilei



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Keep up with the latest news and learn new thing, possibily from the best. That's the recipe for success

Mark Zuckerberg



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