



Industry, Innovation and Infrastructure



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Zaman Beralih, Musim Bertukar

SDG 9, which focuses on building resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation, is reflected in the Malay expression “*Zaman beralih, musim bertukar*” (times change, seasons shift). This phrase highlights the need for continuous adaptation and progress in an ever-evolving world.

At UM, this spirit is embraced through initiatives that support innovation, research, and technological advancement. By fostering a culture of creativity, knowledge exchange, and practical solutions, UM contributes to sustainable development while preparing students and researchers to meet the challenges of a changing world—embodying the vision of SDG 9.

UM Spin-Offs and Ventures: Driving Innovation for Society and Industry

In 2024, Universiti Malaya (UM) continued to solidify its role as a catalyst for innovation, industry, and infrastructure development, transforming academic research into practical solutions that address societal challenges and promote sustainable growth. Through the UM Centre of Innovation and Enterprise (UMCIE), the university nurtures a dynamic ecosystem of spin-offs, start-ups, and deep-tech ventures spanning healthcare, green energy, digital transformation, biotechnology, and advanced materials.

These enterprises, including pioneering ventures such as Musculoskeletal BioHeal, CARE Passport App, NeoGuard, Xcess Pressure, UMTechVis, Zephyron, Qubios, eProfiler, Essentinutrien, Biofusion+, and Malphene, exemplify UM's commitment to equity, sustainability, and socially impactful innovation. In 2024, these ventures advanced cutting-edge therapies, renewable energy solutions, AI-driven healthcare, microbiome-based wellness products, and frontier materials technologies—demonstrating how UM-driven innovation not only strengthens Malaysia's industrial and technological capacity but also improves quality of life, empowers communities, and contributes to a low-carbon, resilient future. The following sections highlight UM's achievements across key thematic areas, illustrating the university's distinctive role in fostering transformative, inclusive, and sustainable enterprise.

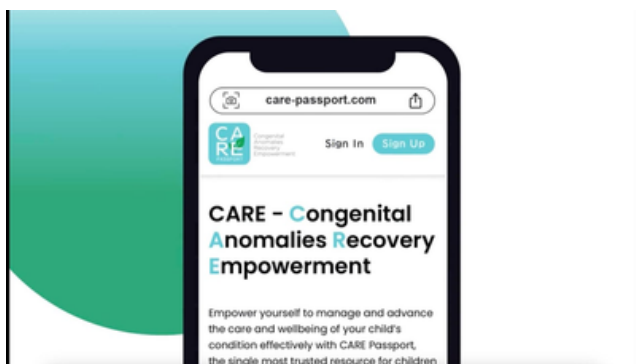


Healthcare and Biomedical Innovation

UM's healthcare spin-offs are translating cutting-edge research into therapies and tools that significantly improve patient outcomes. Musculoskeletal BioHeal, a minimally invasive regenerative treatment for osteoarthritis, providing long-term relief and enhanced joint function while reducing dependence on surgery or steroids. CARE Passport App addresses the challenges of managing complex congenital anomalies by offering patients and caregivers a secure, centralised digital platform to store, update, and share medical records, ensuring continuity of care and empowering patients to actively participate in their treatment. NeoGuard delivers AI-powered fetal monitoring tools customised for Southeast Asian populations, enabling early detection of high-risk conditions and supporting timely interventions to improve maternal and neonatal health outcomes. Together, these ventures exemplify how UM is bridging clinical research, digital health, and patient-centred innovation.

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Below: The CARE Passport App



Above: The inventor of Musculoskeletal BioHeal (top), Dr. Chong Pan Pan (Department of Orthopaedic Surgery, Faculty of Medicine, UM); the inventor of CARE Passport App (middle), Dr. Tan Yew Mei (Department of Surgery, Faculty of Medicine, UM); and the inventor of NeoGuard (bottom), Dr. Saw Shier Nee (Department of Artificial Intelligence, Faculty of Computer Science and Information Technology, UM)

Green Energy and Environmental Sustainability

UM-linked enterprises are developing renewable energy and environmental technologies that combine practicality with sustainability. Xcess Pressure Sdn. Bhd. harnesses excess pressure in urban water pipelines to generate electricity through in-pipe hydropower systems, offering a scalable and low-impact energy solution without major infrastructure changes. UMTechVis designs automated solar panel cleaning systems equipped with advanced sensors and robotic mechanisms, improving energy efficiency, reducing maintenance costs, and extending the lifespan of solar installations in tropical climates. Zephyron addresses the automotive sector's carbon footprint with a hydrogen-based engine cleaning system that removes carbon deposits efficiently and safely, reducing fuel consumption and environmental pollutants. These initiatives demonstrate UM's commitment to advancing low-carbon technologies that are both innovative and applicable in real-world settings.

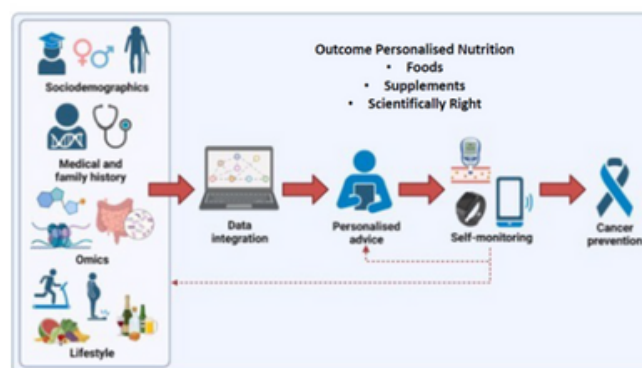
Right: In-pipe hydropower technology by Xcess Pressure Sdn. Bhd. (top); testing, witnessed by representatives from the Ministry of Energy Transition and Water Transformation (PETRA), SPAN, PAAB, and Air Selangor (middle); and pilot project prototype testing (bottom)



Above: UMTechVis (left) led by Prof. Tan Chou Yong; and Zephyron (right) led by Dr. Muhammad Shakeel Ahmad

Digital Transformation and Artificial Intelligence

UM's ventures in digital and AI technologies are redefining healthcare, diagnostics, and industrial processes. Qubios, led by Prof. Dr. Vannajan Sanghiran Lee from the Department of Chemistry, leverages AI and quantum computing to deliver personalised cancer care, supporting early detection, genome-based treatment planning, and predictive analytics to optimise patient outcomes. eProfiler Solution Ltd., founded by Prof. Dr. Vengadesh Periasamy, offers a portable, chemistry-free platform for rapid diagnostics and material characterisation, enhanced with blockchain-enabled data traceability, enabling accurate and reproducible testing for clinical, industrial, and environmental applications. These start-ups exemplify how UM's innovation ecosystem integrates frontier computational technologies with practical solutions that are scalable, inclusive, and data-driven.



Above: Diagram explaining Qubios

Below: The portable eProfiler device



Above: Photos during the product launch and demo workshop of eProfiler Solution

Biotechnology and Natural Products

UM spin-offs are turning Malaysia's rich biodiversity into innovative biotech solutions with societal and health benefits. Essentinutrien Sdn. Bhd. develops health supplements from Tiger Milk Mushroom, combining traditional knowledge with scientific research to enhance immunity, improve respiratory health, and offer natural alternatives to synthetic interventions. The company also supports rural cultivators through training, sustainable farming, and inclusive supply chains that empower local communities. Biofusion+, founded by Dr. Lee Hai Yen, applies microbiome science to create consumer-focused wellness products such as LactiShield+, a probiotic designed to strengthen gut health and immunity, especially for travellers. By translating advanced research into accessible formulations, Biofusion+ addresses practical health needs while advancing evidence-based wellness and ongoing innovation in microbiome applications.

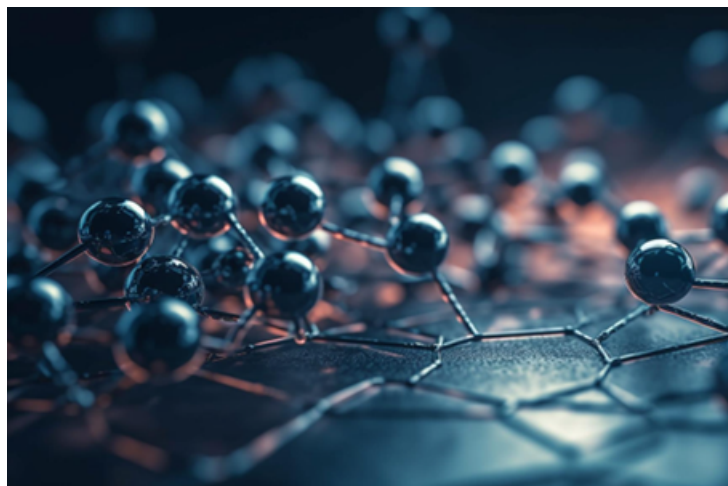
Right: Researchers from Essentinutrien Sdn. Bhd. with their health supplements (top), and researchers from Biofusion+ showcasing their LactiShield+ probiotic product



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Advanced Materials and High-Tech Solutions

UM's deep-tech ventures are advancing frontier materials for industrial and research applications. Malphene, led by Associate Prof. Dr. Hairul Anuar Tajuddin from the Department of Chemistry, specialises in the production and customisation of nanographene, a versatile material used in energy storage, electronics, and advanced manufacturing. With stable supply, competitive pricing, and tailored solutions, Malphene supports innovation across multiple industries while establishing Malaysia as a growing contributor to the global advanced materials market. This demonstrates how UM-driven deep-tech enterprises translate scientific expertise into tangible industrial and economic impact.



Advancing Innovation and Technology at Universiti Malaya

In 2024, Universiti Malaya (UM) solidified its role as a national hub for research, innovation, and technological advancement, demonstrating a multi-faceted approach to fostering creativity and problem-solving. From hosting the inaugural RoboCup Malaysia Open, where UM emerged as Overall Major League Champion, to co-organising MakersFest 2024, the university provided platforms that showcase cutting-edge robotics, artificial intelligence, and hands-on innovation. These events not only positioned UM at the forefront of national and international innovation ecosystems but also highlighted its commitment to nurturing the next generation of innovators through mentorship, collaborative projects, and community engagement.

Complementing these high-profile initiatives, UM strengthened strategic partnerships with industry and government stakeholders, including the Malaysia Rubber Council and iTrademark Sdn. Bhd., while hosting pivotal events such as Innovathon Season 2 auditions, Konvensyen Kumpulan Inovatif & Kreatif (KIK) 2023/2024, and the 2nd Research Officers National Symposium (ReONS 2024). Through these collaborations, the university actively promoted the commercialisation of research, intellectual property management, and translational solutions that address societal challenges. Collectively, these efforts reflect UM's holistic approach to advancing science, technology, and innovation, reinforcing its contribution to sustainable industrial development and Malaysia's broader research and innovation agenda.

UM Hosted the First RoboCup Malaysia Open 2024

In September 2024, Universiti Malaya (UM) made history as the host of the first RoboCup Malaysia Open 2024, held from 5 to 9 September at the UM Exam Hall. The event represented a national milestone, positioning Malaysia within the global robotics and artificial intelligence (AI) research community.

The competition provided a dynamic platform for local talents to demonstrate their skills in AI robotics innovation and to benchmark their capabilities at the international level. The RoboCup Malaysia Open 2024 featured two leagues — the Major League and Junior League — bringing together university and school teams from across Malaysia and abroad.

RoboCup, first established in 1996, is one of the world's leading annual robotics competitions, founded by a group of academics to advance AI and robotics research. The event's long-term vision — to develop a robot team capable of defeating the FIFA World Cup champions by 2050 — continues to inspire innovation, education, and collaboration in intelligent robotics.



Above: Recording of the RoboCup Malaysia Open 2024 Opening Ceremony, held on 5 September 2024. The full video is available on [Universiti Malaya's official YouTube channel](#)

Below: Scenes from the opening ceremony



UM Emerged as Overall Major League Champion at RoboCup Malaysia Open 2024

UM concluded the inaugural RoboCup Malaysia Open 2024 as the Overall Major League Champion, marking a significant achievement in AI robotics excellence. Team UM competed in the @Home and @Home Education Major Leagues, focusing on intelligent service robotics for domestic applications.

In the @Home Education category, UM teams Homies and Enigma placed second and fourth, respectively, in a highly competitive field that included participants from universities such as UTM, USM, UNIMY, UNIMAP, UPM, UTP, UTHM, and international institutions from Thailand and Japan. In the elite @Home category, UM teams Terminator and TwiggiesAid showcased remarkable skill and resilience, maintaining top positions throughout the four-day challenge and outperforming seasoned teams with international RoboCup experience.

Beyond the competitions, UM students mentored school teams participating in the Junior Leagues @OnStage, where their mentees won first prize — a success that reinforced the university's commitment to STEM education, knowledge transfer, and community mentorship.

The success of Team UM reflected strong institutional support from the Vice-Chancellor, Professor Dato' Seri Ir. Dr. Noor Azuan Abu Osman, and Deputy Vice-Chancellor (HEP), Professor Dr. Zamri Radzi, alongside dedicated mentoring from the Faculty of Computer Science and Information Technology (FCSIT) and the Faculty of Engineering. Over 40 student volunteers and 100 staff members from across UM faculties and departments contributed to the event's success, embodying the spirit of collaboration that defines UM as One.

With more than 1,500 visitors and 100 participants at the closing symposium, the RoboCup Malaysia Open 2024 positioned UM as a national leader in AI robotics research, innovation, and education, setting a new benchmark for Malaysia's advancement in intelligent technology.

Below: Photos from the competition, featuring Team UM with their winning trophies and robots



Fostering Innovation Through MakersFest 2024

In 2024, Universiti Malaya co-hosted MakersFest 2024 on 10–11 December at the Kompleks Perdanasiswa UM, a strategic platform designed to nurture a culture of innovation and creativity in Malaysia. The event was organised by STEM4ALL Makerspace Malaysia, in collaboration with Makerspace @ Universiti Malaya, with MRANTI Makerslab as Strategic Partner and Digital News Asia (DNA) as Ecosystem Partner. MakersFest brought together the makers community and celebrated creativity through hands-on workshops, exhibits, engaging forums, and ideathons. It showcased innovators, start-ups, and researchers while promoting living labs and interactive experiences, connecting educational institutions, industry partners, and the community to develop high-impact solutions addressing future challenges.

As a centre of excellence in education and innovation, Universiti Malaya continues to play a key role in cultivating the next generation of globally competitive innovators. MakersFest 2024 demonstrated the university's commitment to inclusive innovation, knowledge exchange, and collaborative problem-solving for sustainable development.



Above: Event poster for MakersFest 2024

Below: Photos from the event launch and selected exhibits during MakersFest 2024



UM Strengthens Partnership with Malaysia Rubber Council

Universiti Malaya has formalised a memorandum of understanding (MOU) with the Malaysia Rubber Council, reinforcing the university's commitment to the commercialisation of advanced rubber technologies. This strategic collaboration seeks to enhance the competitiveness of local industries, stimulate innovation, and support sustainable growth within the rubber sector.

Right: Photo from the MOU signing with the Malaysia Rubber Council



Strategic Alliance Between Universiti Malaya and iTrademark

Universiti Malaya has entered into a Strategic Alliance and Licensing Agreement with iTrademark Sdn. Bhd., establishing a collaborative framework to advance knowledge sharing in intellectual property (IP) management. This partnership aims to support the innovation and commercialisation of new ideas, strengthen market competitiveness, and advance research and development initiatives.

Under this collaboration, the UM Centre of Innovation and Enterprise (UMCIE) will co-organise IP-focused training, workshops, seminars, and programmes in partnership with iTrademark, covering topics such as the fundamentals of intellectual property, trademarks, copyrights, patents, and industrial design. This initiative underscores Universiti Malaya's commitment to equipping researchers, innovators, and industry stakeholders with the knowledge and skills necessary to protect, manage, and commercialise intellectual property effectively.

Right: Photos from the Strategic Alliance and Licensing Agreement with iTrademark Sdn. Bhd.



Strengthening Digital Talent through Partnership with Alibaba Cloud

In 2024, Universiti Malaya (UM) strengthened its commitment to digital innovation and talent development through a strategic partnership with Alibaba Cloud, the digital technology and intelligence backbone of Alibaba Group. Formalised under the Alibaba Cloud Academic Empowerment Program (AAEP), this collaboration aims to enhance cloud computing and artificial intelligence (AI) education for UM students and educators while building a sustainable pipeline of local digital talent.

The partnership marked the establishment of the Alibaba Cloud Academy Skills Centre at UM, which serves as a hub for workshops, boot camps, and training sessions. Each month, the centre will feature themed programmes covering areas such as AI, database management, and elastic computing—ensuring that both students and educators are exposed to a wide range of emerging digital technologies. Through the AAEP, participants gain access to over 300 certification courses, hands-on labs, and global learning resources that bridge the gap between academia and industry.

In conjunction with this initiative, Alibaba Cloud also launched the “Future Star” internship programme, with UM selected as the pioneer university in Malaysia. The programme offers students three to six months of structured, real-world training, blending technical learning with mentorship and career development opportunities.

This partnership reflects UM’s strategic vision to integrate frontier technologies into education and research. By equipping students and educators with advanced digital competencies, UM continues to play a pivotal role in nurturing Malaysia’s future-ready workforce. The collaboration also underscores a shared commitment between academia and industry to drive sustainable digital transformation—strengthening national innovation capacity and supporting inclusive industrial growth in alignment with SDG 9.

Below: Photos taken during the establishment of the Alibaba Cloud Academy Skills Centre at UM



Universiti Malaya Hosts Innovathon Season 2 Auditions

Universiti Malaya (UM) was selected to host the auditions for the second season of the prestigious Innovathon, an event that brings together the brightest minds from diverse fields to showcase innovative ideas and projects. The auditions were held on 22–24 June at the Research Management and Innovation Complex, UM, highlighting the university's status as a leading institution in research and innovation.

UM's state-of-the-art facilities and its strong commitment to fostering a culture of creativity and enterprise provided an ideal setting for the auditions, which attracted hundreds of participants from various institutions and professional backgrounds. Contestants presented their innovative solutions and prototypes to a panel of judges comprising industry experts, academics, and UM specialists.

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The event was graced by YB Tuan Chang Lih Kang, Minister of Science, Technology and Innovation, underscoring government support for innovation and technological advancement in Malaysia. Professor Ir. Dr. Kaharudin Dimyati, Deputy Vice-Chancellor (Research & Innovation), was also present, further emphasizing UM's commitment to advancing research, innovation, and entrepreneurial excellence.



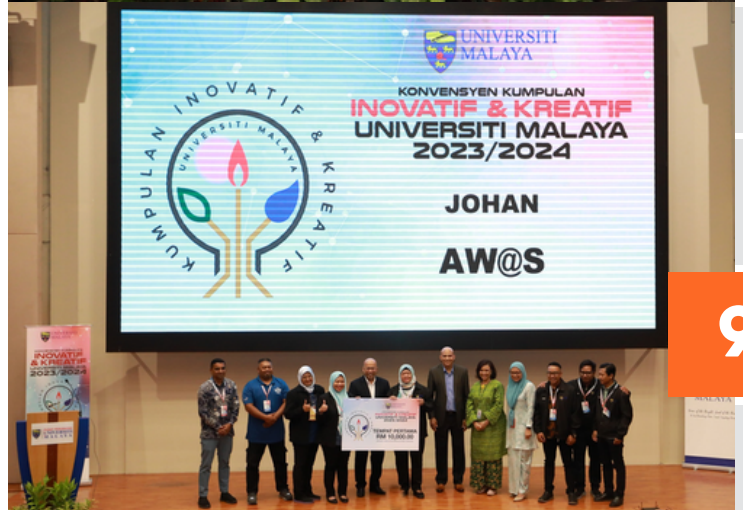
Right: Photos from the Innovathon Season 2 auditions, showing the judging sessions

Konvensyen Kumpulan Inovatif & Kreatif (KIK) 2023/2024

Universiti Malaya successfully held the Konvensyen Kumpulan Inovatif & Kreatif (KIK) 2023/2024 at the Auditorium, 13th Floor, Menara Selatan, Pusat Perubatan Universiti Malaya (PPUM). The convention aligns with Pillar 4: Talent – Reviving Innovative Circle (KIK) of the Universiti Malaya Strategic Plan 2021–2025, which in 2023 saw the successful implementation of multiple projects, equipment improvements, and service enhancements driven by creative and innovative ideas from the UM community.

The Johan (first-place) award was presented to Kumpulan Agronomics Waste System (AW@S), formed by staff from the Institute of Biological Sciences, Faculty of Science, for their proposal to implement an Integrated Agricultural Waste Management System. Two projects from PPUM achieved recognition: Green Angels (Department of Nursing) secured third place, while Happy Pills (Departments of Pharmacy and Dietetics) received the Anugerah Inovasi Harapan.

The event highlights Universiti Malaya's ongoing commitment to fostering creativity, innovation, and practical solutions that enhance institutional services and advance its vision as a model sustainable campus.



Right: Photo from the Konvensyen Kumpulan Inovatif & Kreatif (KIK) 2023/2024, showing the award ceremony and exhibitions

2nd Research Officers National Symposium (ReONS 2024) at Universiti Malaya

YBhg. Dato' Ts. Dr. Hj. Aminuddin bin Hassim, Chief Secretary of MOSTI, officiated the 2nd Research Officers National Symposium (ReONS 2024), themed “From Research to Community: Translational Research and Commercialization”, at the Auditorium, High-Impact Research Building, Universiti Malaya, Kuala Lumpur. The two-day symposium aims to empower and inspire research officers from universities and research institutions across Malaysia to become leading scientists of the future.

The symposium featured 80 participants, including eight plenary speakers, 25 oral presenters, and 22 poster presenters. Also present at the opening ceremony were Professor Ir. Dr. Kaharudin Dimiyati, Deputy Vice-Chancellor (Research & Innovation), Universiti Malaya, Dr. Chen Chee Dhang, Chairman of ReONS 2024, and Dr. Norfaryanti Kamaruddin, President of MROS.

In his keynote address, YBhg. Dato' Ts. Dr. Hj. Aminuddin highlighted the availability of research grants for competent researchers in translational research, emphasising the importance of connecting research outcomes to community solutions. He also stressed effective science communication among researchers to industry stakeholders and funding agencies. Strong, long-term collaboration between universities, policy-making agencies, and industry players was underscored as essential for driving high-impact research that delivers measurable benefits to the economy and society.



Right: Photos from the 2nd Research Officers National Symposium (ReONS 2024) at Universiti Malaya. Photo credits: Ministry of Science, Technology and Innovation (MOSTI) and Malaysian Research Officers Society (MROS)