



9TH INTERNATIONAL
BIOTECHNOLOGY
SYMPOSIUM 2026



UMS
UNIVERSITI MALAYSIA SABAH

**BIOTECHNOLOGY
RESEARCH INSTITUTE**
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ABSTRACT BOOK

STRENGTHENING A
SUSTAINABLE FUTURE WITH
EMERGING FRONTIERS IN
BIOTECHNOLOGY



26 – 27 AUGUST 2026

LE MERIDIEN KOTA KINABALU, MALAYSIA

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FOREWORD BY THE VICE CHANCELLOR

Universiti Malaysia Sabah, Malaysia

Bismillahirrahmanirrahim.

Assalamualaikum Warahmatullahi Wabarakatuh, Salam Sejahtera, Salam Sabah Maju Jaya, and Salam UMS Bertekad Cemerlang - *UMS The BRAIN of BORNEO*.

It is my great pleasure to extend a warm welcome to all participants, researchers, academicians, students, industry representatives, and distinguished guests attending the 9th Biotechnology Symposium 2026 (SB9). I am delighted to note that this symposium continues to serve as an important platform for the exchange of scientific knowledge, innovative ideas, and collaborative opportunities among biotechnology stakeholders from Malaysia and abroad.

The theme of this year's symposium, "Strengthening a Sustainable Future with Emerging Frontiers in Biotechnology," aptly reflects the pivotal role of biotechnology in addressing contemporary global challenges. Advances in biotechnology have transformed the way we approach healthcare, agriculture, environmental conservation, food security, and industrial development. As we move towards a more sustainable future, interdisciplinary collaboration and scientific innovation will be essential in generating impactful solutions for society.

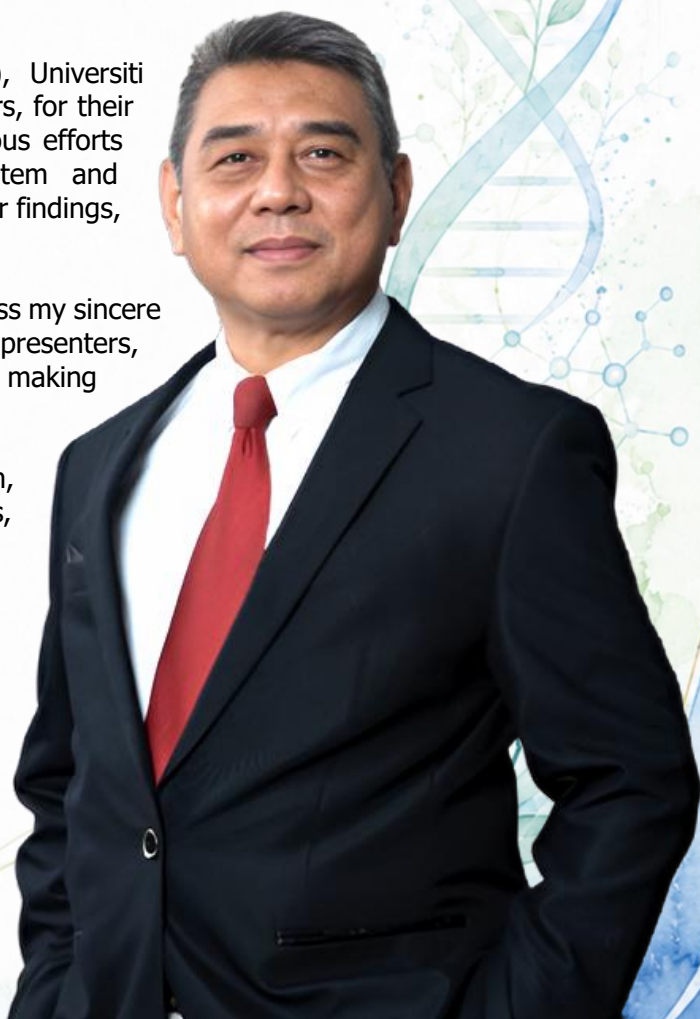
I commend the Biotechnology Research Institute (BRI), Universiti Malaysia Sabah, together with its co-organizers and partners, for their commitment to organizing this symposium. Their continuous efforts have strengthened the biotechnology research ecosystem and provided valuable opportunities for researchers to share their findings, establish networks, and foster strategic collaborations.

On behalf of Universiti Malaysia Sabah, I would like to express my sincere appreciation to all sponsors, collaborators, speakers, presenters, reviewers, and participants for their invaluable support in making this symposium a success.

I wish all participants a fruitful and rewarding symposium, filled with engaging discussions, meaningful collaborations, and new scientific insights.

Thank you.

Professor Datuk Dr. Kasim Haji Mansor, JP
Vice Chancellor
Universiti Malaysia Sabah



MESSAGE BY THE DIRECTOR

Biotechnology Research Institute, UMS

Bismillahirrahmanirrahim.

Assalamualaikum Warahmatullahi Wabarakatuh, Salam Sejahtera, Salam Sabah Maju Jaya, and warm greetings.

It is with great pleasure that I welcome you to the 9th Biotechnology Symposium 2026 (SB9) and present this collection of abstracts, which showcases the diverse and innovative research contributions of scientists, academicians, students, and industry professionals.

This year's theme, "Strengthening a Sustainable Future with Emerging Frontiers in Biotechnology," reflects our collective commitment to harnessing biotechnology as a driving force for sustainable development. As the world continues to face unprecedented challenges in healthcare, food security, environmental sustainability, and industrial innovation, biotechnology has become increasingly vital in delivering science-based solutions that enhance the quality of life while preserving our natural resources.

Over the years, the Biotechnology Symposium has grown into an important scientific platform that promotes knowledge exchange, interdisciplinary collaboration, and meaningful partnerships among researchers from academia, government agencies, research institutions, and industry. Beyond the presentation of research findings, the symposium provides an avenue for sharing ideas, fostering new collaborations, and translating scientific discoveries into real-world applications that benefit society. I would also like to extend my heartfelt gratitude to our co-organisers, sponsors, journal partners, and collaborating institutions for their continued support, which has contributed significantly to the success of this symposium. Your partnership reflects our shared commitment to advancing biotechnology research and innovation for the benefit of society and the sustainable development of our nation.

It is my sincere hope that this symposium will continue to strengthen scientific networks, inspire future innovations, and foster lasting collaborations that extend beyond this event. May the discussions and research presented here stimulate new ideas and contribute to the advancement of biotechnology at both national and international levels.

I wish all participants a successful, productive, and inspiring symposium.

Thank you.

Prof. Dr. Jualang @ Azlan Gansau

*Director
Biotechnology Research Institute*



MESSAGE BY THE CHAIRPERSON

9th International Biotechnology Symposium 2026

Salam Sejahtera, Salam Sabah Maju Jaya, and Warm Greetings.

It is my great pleasure to welcome all participants, speakers, researchers, students, and guests to the 9th Biotechnology Symposium 2026 (SB9). On behalf of the organizing committee, I would like to thank everyone for your participation and support in making this symposium possible.

The theme of this year's symposium, Strengthening a Sustainable Future with Emerging Frontiers in Biotechnology, highlights the important role of biotechnology in addressing global challenges and improving the well-being of our communities. We hope this symposium provides an excellent platform for researchers, students, and industry partners to share their latest findings, exchange ideas, and build meaningful collaborations.

I would like to express my sincere appreciation to our keynote and invited speakers, presenters, reviewers, sponsors, co-organizers, collaborators, and every member of the organizing committee for their commitment and support. Without your contributions, this symposium would not have been possible.

I also hope that all participants will take this opportunity to network, exchange knowledge, and establish new collaborations that will continue beyond this symposium.

Finally, I wish everyone a successful and enjoyable symposium. May SB9 inspire new ideas, strengthen scientific partnerships, and contribute to the advancement of biotechnology for a more sustainable future.

Thank you and I wish you all a fruitful symposium.

Assoc. Prof. Ts. Dr. Wilson Yong Thau Lym

Chairperson

9th International Biotechnology Symposium



KEYNOTE SPEAKER

Professor Dr. Syarul Nataqain Baharum

Director, Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia

26th August 2026 | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

Speaker Biography



Professor Dr. Syarul Nataqain Baharum is the Director of the Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia (UKM), and a leading researcher in functional metabolomics, systems biology, natural products and biotechnology. She is President of the Malaysian Systems and Synthetic Biology Society, Vice President of the Malaysian Natural Product Society, and Malaysian Focal Point for the Asia Oceania Metabolomics Association. With over 150 Scopus-indexed publications, more than 2,800 citations and over RM5.5 million research funding, her work spans drug discovery, diabetes, antimicrobial research, cancer biology and sustainable biotechnology. She has also held visiting professorships at universities in Korea and Thailand. List of Biodata

Speakers. Professor Dr. Syarul Nataqain Baharum is the Director of the Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia (UKM), and a leading researcher in functional metabolomics, systems biology, natural products and biotechnology. She is President of the Malaysian Systems and Synthetic Biology Society, Vice President of the Malaysian Natural Product Society, and Malaysian Focal Point for the Asia Oceania Metabolomics Association. With over 150 Scopus-indexed publications, more than 2,800 citations and over RM5.5 million in research funding, her work spans drug discovery, diabetes, antimicrobial research, cancer biology and sustainable biotechnology. She has also held visiting professorships at universities in Korea and Thailand.

Pioneering a Sustainable Future: Biosafety and Biosecurity via Metabolomics and Systems Biology

Abstract

As global biotechnology and bio-based economies rapidly expand, robust biosafety and biosecurity frameworks are essential to safeguard ecological integrity, food security, and human health. Aligning with these global imperatives, Malaysia's National Biotechnology Policy 2.0 (NBP 2.0) establishes a strategic roadmap focused on healthcare, agriculture, and the circular bioeconomy to transform the nation into a high-technology bio-innovation hub by 2030. However, traditional bio-surveillance systems often struggle to track emerging biological threats, elucidate host-pathogen dynamics, and accelerate the safe, standardized translation of natural products. This keynote address demonstrates how untargeted metabolomics and systems biology provide a transformative paradigm for molecular bio-surveillance, therapeutic discovery, and regulatory compliance across terrestrial and aquatic ecosystems. By leveraging mass spectrometry platforms (UHPLC-QTOF-MS/MS and GC-MS) and NMR integrated with Global Natural Product Social Molecular Networking (GNPS), complex biological matrices can be systematically mapped and dereplicated. In healthcare and wellness, our research applies these systems-level frameworks to safely translate native botanical assets into standardized therapeutics, uncovering triterpenoids and flavonoids with neuroprotective effects against Alzheimer's disease (AD), anti-diabetic efficacy via enzyme inhibition, and anti-cancer bioactivities. In aquatic biosecurity, our studies on grouper disease (vibriosis) reveal metabolic survival phenotypes, driving the design of targeted immunostimulant diets via oleic acid formulation to fortify food security. Beyond discovery, high-throughput AI-chemometric and machine learning serve as biosecurity standards. By bridging analytical omics with NBP 2.0 directives, this integrated framework converts complex metabolic data into actionable bio-policy safeguarding indigenous biodiversity, driving disease-resilient innovation, and underpinning a secure, sustainable bioeconomy.

MEET OUR PLENARY SPEAKERS

PLENARY SESSION 1



Prof. Ts. Dr. Chong Khim Phin

Professor, Universiti Malaysia Sabah, Malaysia



Prof. Dr. Elfahmi, S.Si., M.Si

Professor, Institut Teknologi Bandung, Indonesia

PLENARY SESSION 2



Prof. Emerita Datuk Dr. Asma Ismail

Vice-Chancellor, IMU University, Malaysia



Prof. Dr. Ni Nyoman Tri Puspaningsih, M.Si

Professor, University of Airlangga, Indonesia

26th AUGUST 2026

Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

MEET OUR PLENARY SPEAKERS

PLENARY SESSION 3



**Ts. Hj. Mohammad Hazani
Haji Hassan**

CEO, Malaysian Technology Development Corporation (MTDC)



Prof. Dr. Te-Sheng Chang

Professor, National University of Tainan, Taiwan



Dr. Karthik Chandran

Celler Therapeutics, Malaysia



Dato' Sri Mike Chan

Chairman, European Wellness Biomedical Group

27th AUGUST 2026

Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

MEET OUR PLENARY SPEAKERS

PLENARY SESSION 4



Dr. Iling Ma

Research Officer, Office of the Chief Research Officer
Institute for Development Studies (IDS) Sabah, Malaysia



**Mdm. Ken Kartina
Binti Khamis**

Director, Sabah Biodiversity Centre, Malaysia



Dr. Faizal Hamid

Vice President, Bioeconomy Corporation, Malaysia

27th AUGUST 2026

Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

PLENARY 1

Rethinking Plant Disease Management: Biopesticides, Microbiome Dynamics and Lessons Learned from Basal Stem Rot in Oil Palm

26th August 2026 | 11:15 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

Speaker Biography



Professor Chong Khim Phin is a Professor of Plant Pathology at Universiti Malaysia Sabah (UMS), specialising in sustainable agriculture, soil and plant health, and crop disease management, particularly in oil palm. Over two decades, he has led approximately RM4 million in research and community projects, including a RM2 million FGV Holdings endowment for sustainable oil palm management. With more than 150 publications, he contributes to agricultural policy and sustainability through the MSPO National Steering Committee, Sabah

Ganoderma Task Force and national biofertilizer initiatives. He is a Fellow of the Academy of Sciences Malaysia, Professional Technologist and UMS Senate Member, and was recognised among Malaysia's Top Research Scientists in 2020.

Abstract

Basal stem rot (BSR), caused predominantly by *Ganoderma boninense*, remains one of the most serious and persistent diseases limiting sustainable oil palm production in Southeast Asia. Despite extensive research, effective management remains challenging because infection is difficult to detect at an early stage, while visible symptoms generally appear only after substantial internal tissue damage has occurred. Consequently, there is still no consistently reliable, rapid and practical field based method for early detection or an absolute control strategy. This plenary presents our research journey from pathogen suppression toward a broader ecological approach to BSR management. We investigated beneficial microorganisms, including *Trichoderma*, *Bacillus*, *Streptomyces*, *Pseudomonas* and *Penicillium*, as biological control agents against *G. boninense*. Selected antagonists demonstrated strong pathogen inhibition through complementary mechanisms including mycoparasitism, antibiosis and production of bioactive metabolites. Microscopic and metabolomic analyses provided insights into pathogen disruption and the potential compounds involved in suppression, while field applications demonstrated reductions in *Ganoderma* colonisation, highlighting the potential for translating microbial antagonism into practical disease management. However, our findings also indicate that successful BSR management cannot depend solely on identifying and applying individual antagonistic microorganisms. Soil microbiome studies revealed substantial differences in microbial diversity and community structure between fields with different BSR disease pressures, influenced by pathogen presence, field management and soil physicochemical properties. These observations suggest that disease development is shaped by interactions among the pathogen, beneficial and competing microorganisms, the soil environment and the host plant. We therefore propose a shift from a conventional "kill the pathogen" approach toward microbiome-informed disease management, integrating beneficial microbial consortia, soil health, plant resilience, early detection and improved agronomic practices. Ultimately, regenerative agriculture that strengthens the biological health and resilience of the soil-plant system may provide a more sustainable pathway for managing BSR and improving the long-term productivity and resilience of oil palm plantations.

PLENARY 2

Development of herbal medicines using biotechnological approaches: Standardization and genetic engineering of plant secondary metabolites

26th August 2026 | 11:40 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Professor Elfahmi is a Professor of Medicinal Plants Biotechnology at the School of Pharmacy, Bandung Institute of Technology (ITB), Indonesia. His research focuses on natural products, phytochemistry, pharmacognosy and metabolic engineering for functional foods and herbal medicines. He has authored over 100 journal publications and holds patents related to antimalarial artemisinin production and bioflavonoid isolation. His achievements include the Timmerman Award, Innovator of ITB recognition and a 2024 Karya Anak Bangsa award from Indonesia's Ministry of Health. He currently serves as Vice Dean of Academic Affairs at ITB's School of Pharmacy and Head of the Excellence Center of Nutraceutical, while also leading the R&D company PT EBM SchiTech.

Abstract

Plants have served as tremendous sources for drug discovery for long time. Many drugs in the market have been derived from plants. Development of sciences and technology have contributed to continuously discovery plant derived drugs. Secondary metabolites which are responsible for the pharmacological activities of medicinal plants, are normally produced in low level. While many of them have been used for treatment the diseases. The availability of secondary metabolites as the sources of medicines is urgently needed. So that the low secondary metabolites contents have become a bottleneck for the development of plant-derived drugs as well herbal medicines. Biotechnological approaches, especially plant tissue cultures and genetic engineering have been used as an alternative to produce useful secondary metabolites as medicines from plants. The development of DNA recombinant technology has given a big challenge in the engineering of secondary metabolites from plants. These techniques have been applied for several plants in our laboratories, some of them are presented here. To enhance the antimalarial artemisinin production from *Artemisia annua*, the key enzymes of artemisinin biosynthetic pathway such as farnesyl phosphate synthase (fps) and amorphaadiene synthase (ads) have been engineered. The fps and ads, native and or synthetic genes have been transformed to *A. annua*, *Eschericia coli*, and *Sacharomyces cereviceae*. Transformation of genes in *A. annua* was mediated by *Agrobacterium tumefaciens*. This transformation stimulated the protection mechanism of plant, therefore the expression level of the genes was still low. Antisilencing p19 gene which has been transformed together with the genes could break the protection mechanism then enhance the expression level of genes. At the same time could enhance the artemisinin production up to 2,57 folds. These two genes have been also successfully transformed in *E. coli* and the analysis of protein expressed showed that that these two genes could be expressed in *E. coli*. Transformation of genes in *S. cereviceae* has been done using pBEVY vector. The analysis of recombinant yeast seems to alter the metabolite profiles of their recombinants. The literature review of similar engineering methods of secondary metabolites in biological system will be included in briefly. The development of the medicinal plants is a crucial to explore their prospective. Isolation of compounds which are assumed to be responsible for the pharmacological activities is an important. Our groups have isolated more than 500 pure compounds that have been used as markers compounds for standardization and quality control of herbal medicines, these compounds belong to a wide range of secondary metabolites such as alkaloid, terpenoid, steroid, flavonoid, lignan, coumarin, tannin, and other phenolic compounds.

PLENARY 3

Post-Pandemic Challenges of Biotechnology in the Region: An Academia Perspective

26th August 2026 | 3:00 PM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Professor Emerita Datuk Dr. Asma Ismail, FASc is a distinguished Malaysian scientist and academic leader currently serving as Vice-Chancellor and Chief Executive Officer of IMU University. Originally from Malaysia, she has made pioneering contributions to medical microbiology, diagnostic technologies, higher education and science, technology and innovation policy. She developed three rapid typhoid diagnostic tests—TYPHIDOT, Typhidot-M and TyphiRapid—with TYPHIDOT receiving advocacy from the World Health Organization. She was Malaysia's first female Vice-Chancellor of two public universities, first female Director-General of Higher Education and first female President of the Academy of Sciences Malaysia. She has over 150 publications and is a Fellow of ASM, TWAS and the Islamic World Academy of Sciences

Abstract

The COVID-19 pandemic was an unprecedented stress test of regional biotechnology and university research systems, revealing both the power of science and critical weaknesses in preparedness, translational capacity, infrastructure, talent and sustainable funding. While universities rapidly expanded diagnostics, genomic surveillance and research collaborations during the crisis, the post-pandemic challenge is to sustain these capabilities when emergency funding declines and competing priorities emerge. Preparedness must therefore move beyond owning infrastructure towards building accessible capability, adaptable talent, shared platforms and resilient networks.

At the same time, the Fifth Industrial Revolution (5IR) is transforming biotechnology through the convergence of artificial intelligence, bioinformatics, engineering, robotics, advanced manufacturing and data science. Universities must prepare a new generation of hybrid scientists capable of working across biological and digital domains while strengthening regulatory science, biosafety, biosecurity, ethics and research translation. The persistent gap between discovery and societal impact further requires academia to move beyond publication towards translation, adoption and impact.

In an era of constrained resources, doing more with less should not mean lowering ambitions, but using existing resources more intelligently. Universities must specialise rather than duplicate, share rather than own, collaborate rather than compete unnecessarily, digitise rather than simply expand, and translate rather than merely publish. This requires stronger university–industry–government–healthcare partnerships, shared regional infrastructure and new funding models supporting platforms and translational research. Ultimately, post-pandemic preparedness will depend not on how much infrastructure universities possess, but on how effectively knowledge, talent, technology and networks can be mobilised when society needs them most.

PLENARY 4

Enzyme Engineering: Therapeutic promising agent against pathogenic bacteria

26th August 2026 | 3:25 PM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Professor Dr. Ni Nyoman Tri Puspaningsih, M.Si is a Professor of Biochemistry at Universitas Airlangga, Indonesia, where she has served since 1987 and currently holds the position of Vice Rector for Research, Innovation and Community Development. She also leads the Research Center for Bio-Molecule Engineering and serves internationally as Chairperson and Executive Secretary of the World University Association for Community Development. Her research focuses on lignocellulase enzymes and their application to the Bio-Circular and Green Economy. She has produced 73 Scopus-indexed publications and 18 national patents and has collaborated internationally, including with Osaka University. Her achievements include the 2023 Sustainability Pioneers Award and Indonesia's Satya Lencana 30-year medal.

Abstract

Enzyme engineering, encompassing molecular, genetic, and bioinformatic approaches, protein fusion, and other methods is aimed to obtain enzymes with more stable on its biochemical properties and also promising to many industrial applications, including as therapeutic agents. The diversity of carbohydrate components making up the organism cell wall exhibit unique to each cluster of organisms. We interest the carbohydrates component of pathogenic organism cell wall, such as Mycobacterial cell wall by hemicelluloses, microcystis cell wall by pectin, and fusarium by glucan. CAZy's group of cell wall degrading enzyme demonstrated potential agent to be used as therapeutic agent or enzybiotic. One of the compiler of mycobacterial cell wall is arabinogalactan which is compiled by arabinose with unusual stereochemical. CAZy's of GH51 of α -L-arabinofuranosidase can hydrolized the arabinofuranosidic bond. However, its ability to breakdown the arabinofuranosidic from D-arabinose as monomer is still unknown. Here we present enzyme engineering through computational design to improve the specificity of α -L-arabinofuranosidase by replacing discriminate amino acid residue. Whole Genome sequencing analysis also strengthening the potential other CAZy's group of LAMGH92 as the second Mycobacterial degrading cell wall enzyme.

PLENARY 5

Capital Innovation: Early-Stage Funding to Drive Tomorrow's Technology Breakthroughs

27th August 2026 | 10:15 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Ts. Hj. Mohammad Hazani Hj. Hassan is the Chief Executive Officer of the Malaysian Technology Development Corporation (MTDC), a wholly owned subsidiary of Khazanah. He brings around 30 years of experience in fund management, venture capital, technology transfer and engineering, including leadership of MTDC's Technology Ventures Division and a secondment to a Silicon Valley venture capital fund.

Previously, he was a Principal at Kumpulan Modal Perdana, managing venture capital funds across Malaysia, the United States and China. He contributes to national technology and entrepreneurship development through roles with MPKK, TeAM, MOSTI and MITI, and previously chaired the Malaysian Venture Capital Association.

Abstract

Emerging technologies are creating new opportunities to solve global challenges while supporting a more sustainable future. From biotechnology and artificial intelligence to clean technology and advanced manufacturing, innovative ideas have the potential to improve lives, strengthen industries, and drive economic growth. However, many promising startups struggle to move beyond the prototype or proof-of-concept stage because they lack the funding and support needed to commercialise their innovations. Early-stage funding plays a crucial role in helping startups bridge this gap. More than just financial assistance, it provides entrepreneurs with the resources to validate their technologies, develop market-ready products, attract customers, and build investor confidence. Funding programmes offered by governments, venture capital firms, angel investors, and corporate partners can significantly reduce the risks associated with commercialising new technologies. At the same time, access to experienced mentors, industry networks, intellectual property support, and market opportunities is equally important in helping startups grow into successful businesses. Building a strong innovation ecosystem requires close collaboration between government, academia, industry, investors, and entrepreneurs. When these stakeholders work together, they create an environment where innovative ideas can be developed, tested, and successfully brought to market. Such collaboration also encourages greater private investment and accelerates the adoption of technologies that address real-world challenges. As countries continue to invest in innovation-driven economies, early-stage funding should be viewed as a strategic investment in the future rather than simply a source of capital. By empowering startups with the right funding, guidance, and partnerships, we can accelerate technology commercialisation, build globally competitive companies, and strengthen a sustainable future through emerging frontiers in technology.

PLENARY 6

Mining Nature's Toolbox: Enzymatic Synthesis of New Bioactive Compounds

27th August 2026 | 10:40 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Professor Te-sheng Chang is an academic from Tainan, Taiwan, specialising in the enzymatic biotransformation of natural products. He built his academic career at the National University of Tainan, where he became Professor and served as Chairman of the Department of Biological Sciences and Technology. His research achievements have earned multiple Excellent and Outstanding Researcher awards from Taiwan's Ministry of Science and Technology, Ministry of Education and Science and Technology Council. He has been recognised on Stanford University's World's Top 2% of Scientists list for lifelong and annual scientific impact from 2021 to 2026. His international research collaborations include Kyushu University, Japan, and Universiti Malaysia Sabah.

Abstract

Nature provides a vast, underused synthetic toolbox: over 10,000 characterized enzymatic pathways and more than 122 million compounds that could serve as biotransformation precursors. The bottleneck is predicting which enzyme–substrate pairings will yield genuinely new and bioactive molecules. This talk presents two complementary strategies addressing that problem. The Predicted Data Mining Approach (PDMA) screens commercial natural-product libraries *in silico* against an enzyme's substrate and reaction specificity, then validates candidates experimentally. Three cases are shown: hydroxylation by *Bacillus megaterium* tyrosinase (BmTYR), converting loureirin A and B into two new ortho-dihydroxy flavonoids with potent anti- α -glucosidase activity; glycosylation by *Bacillus subtilis* glycosyltransferase, yielding a new corylin glucoside with improved solubility and anti-inflammatory and anti-melanoma activity; and methylation, producing a methoxy protosapogenin B with enhanced anti-inflammatory activity. PDMA was then applied to melanogenesis inhibitors. Hydroxyphenethyl anisate (HP) was selected as a scaffold and confirmed to suppress melanin synthesis and tyrosinase gene expression. Enzymatic derivatization generated HP glycosides, hydroxylated HP (HP-OH), and hydroxytyrosol esters (HT-X), all with potent anti-inflammatory and anti-melanogenic activity in cell and zebrafish models. Biotransformation-Guided Purification (BGP) reverses the conventional workflow, using biotransformability to guide fractionation of crude herbal extracts. Applied to licorice, BGP delivered butin, with over 100-fold greater antioxidant activity than its precursor. Together, PDMA for compound libraries and BGP for crude extracts offer a general framework for enzymatically generating new bioactive chemical space, now being extended with AI- and molecular-dynamics-driven prediction.

PLENARY 7

Strengthening a Sustainable Future Through Emerging Biotechnology

27th August 2026 | 11:15 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Dr. Karthik Chandran, PhD is the Chief Revenue Officer of Celler Therapeutics Sdn Bhd and a biotechnology professional with more than 20 years of experience in cellular and gene therapeutics and sustainable bio-economy development. His expertise centres on translating scientific and laboratory innovations into scalable industrial applications, with an emphasis on sustainable

biotechnology. Through his industry experience, he contributes to developing innovative approaches that strengthen biotechnology commercialisation and the growth of a sustainable bio-economy.

Abstract

The planet has entered the Anthropocene, an era where human actions heavily engineering nature now rival major natural forces. To combat systemic climate destabilisation and biodiversity loss, we must urgently shift from a destructive linear fossil economy to a regenerative, circular bio-economy. This plenary address introduces the Bio-Digital Blueprint—a revolutionary framework designed to decouple global economic progress from environmental degradation by replacing polluting industrial processes with clean biological alternatives. The presentation explores four critical sectors of biological intervention: Synthetic Biology, which transforms waste into high-value biomaterials through microbial cell factories; Agricultural Biotech, which replacing brute-force farming with biofertilisers, climate-resilient crops, and alternative proteins.; Marine Biotech, which Actively protecting marine ecosystems through targeted bioremediation and sustainable aquaculture.; and Medical Biotech, which treats biology as programmable medicine to radically extend human healthspan. Finally, the session highlights Sabah's unique positioning to emerge as a premier Global Bio-Hub, leveraging its vast agricultural biomass and unmatched Bornean genetic biodiversity. Attendees will discover how aligning policy harmonisation, patient capital investment, and public trust can safely translate laboratory breakthroughs into world-changing industrial reality.

PLENARY 8

BioHacking Longevity Through Healthspan Extension via Cellular Regeneration with Precision Medicine

27th August 2026 | 11:40 AM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Dato' Sri Mike Chan is an internationally recognised leader in regenerative medicine, stem cell research and anti-aging therapies. With advanced academic training at Utrecht University, MIT and Oxford, he has pioneered cellular therapy and biomolecular medicine in Asia since the early 1990s. He currently serves as Chairman of the European Wellness Biomedical Group, which operates more than 40 international clinics, and holds leadership positions in international preventive and regenerative medicine organisations. He has contributed numerous patents in stem cell technologies and immunotherapy, authored over 60 books and 170 scientific articles, and delivered more than 1,000 lectures worldwide.

Abstract

Extending lifespan without preserving health risks prolonging age-related decline. Meaningful longevity therefore requires healthspan extension across four interconnected dimensions: cellspan, organspan, healthspan, and lifespan. Cellular resilience supports organ function, while sustained organ function promotes healthy longevity. Brainspan illustrates this relationship, as functional and structural changes may emerge from approximately 40 years of age, although their onset and progression may be delayed through targeted preventive and regenerative strategies. This plenary presentation explores how precision medicine can guide cellular regeneration by integrating biological-age profiling, organ-function biomarkers, and individualized therapeutic selection. Within the DDRR framework—Diagnose, Detoxify, Repair, and Rejuvenate—diagnosis identifies vulnerable organs and ageing-related dysfunction, while detoxification targets metabolic, inflammatory, and environmental stressors that accelerate cellular damage. Repair and rejuvenation address key hallmarks of ageing, including stem-cell exhaustion, mitochondrial dysfunction, cellular senescence, chronic inflammation, impaired intercellular communication, and reduced repair capacity. Three complementary regenerative modalities are examined: organ-specific stem cells to enhance homing, paracrine signaling, immunomodulation, and tissue repair; therapeutic peptides to support mitochondrial function and regulate senescence pathways; and exosomes to restore intercellular communication and deliver regenerative signals. Their precision-guided integration aims to activate endogenous repair mechanisms rather than rely solely on direct cell replacement. By preserving cellular stamina and targeting organ-specific vulnerabilities, cellular regeneration provides a foundation for extending healthspan. Ultimately, longevity depends on healthspan and brainspan which relies on cellspan. We are as young or old as our cells and their mitochondria!

PLENARY 9

Making Biotechnology Work for Sabah

27th August 2026 | 3:00 PM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Dr. Iling Ma is a Research Officer at the Institute for Development Studies (Sabah), where she supports policy research, programme facilitation and cross-sector collaboration. A Malaysian researcher with academic training from Universiti Malaya, including a PhD in Material Science, her research covers anticorrosion coatings, polymer nanocomposites and bio-based materials such as chitosan, cellulose and natural-oil polyols. Her current work focuses on translating scientific research into practical solutions that generate measurable value for Sabah. She works closely with government, academia, industry and communities to align research activities with state development priorities and convert technical knowledge into actionable policy and programme insights.

Abstract

Sabah possesses considerable biological wealth and diverse production landscapes, yet local value is often lost through disease, inconsistent quality, limited processing and fragmented delivery. Biotechnology can address these constraints when appropriate applications are matched to the needs, resources and capabilities of specific localities. Guided by the Sabah Biotechnology Action Blueprint 2024–2034 and National Biotechnology Policy 2.0, a locality-based approach connects national capabilities with Sabah's institutions, industries and communities. Targeted interventions in agriculture, marine resources, industrial processing and health can support the highlands, interior forests, eastern lowlands, coastal communities and statewide service nodes. Their value should be assessed through improved production, stronger local participation, higher income retention and responsible environmental management. Effective implementation requires coordinated governance, industry partnerships, skilled talent, accessible services and locality-level measurement. By applying the right biotechnology in the right place, Sabah can transform its bioresources into practical solutions that strengthen livelihoods, resilience and sustainable economic development.

PLENARY 10

From Blueprint to Impact Strengthening Biotechnology Governance for a Sustainable Future in Sabah

27th August 2026 | 3:25 PM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah



Speaker Biography

Madam Ken Kartina Khamis is the Director of the Sabah Biodiversity Centre (SaBC) under the Chief Minister's Department, a position she has held since 2024. With a background in policy, data and project management, she oversees implementation of the Sabah Biodiversity Enactment (2000), biotechnology development initiatives and access and benefit-sharing of biological resources.

Her contributions include the Sabah Biotechnology Action Blueprint 2024–2034, biodiversity information systems, Prior Informed Consent guidelines and the Sabah Biodiversity Strategy. Before joining SaBC, she served in the Chief Minister's Department's Science and Technology Unit, contributing to biodiversity conservation and development programmes. She holds a BSc in Mathematics and Computer Science from the University of Tasmania.

Abstract

Sabah's rich biological assets demand robust governance structures and proactive strategic frameworks to translate potential into sustainable socio-economic impact. Established in 2008 under the Sabah Biodiversity Enactment 2000 (SBE 2000), the Sabah Biodiversity Centre (SaBC), operating alongside the Sabah Biodiversity Council (SBC), serves as the cornerstone for managing, conserving, and regulating the state's biological resources in compliance with international standards such as the Convention on Biological Diversity (CBD) and the Nagoya Protocol. To overcome existing landscape challenges including regulatory gaps, talent brain drains, insufficient financial incentives, marketing shortfalls, and inadequate R&D infrastructure—Sabah has introduced the Sabah Biotechnology Action Blueprint (2024–2034). Designed as a comprehensive hardware and software upgrade for Sabah's bioeconomy, Blueprint 2.0 aims to transform Sabah from a raw resource provider into a leading, competitive centre for biotechnology development across Malaysia and the ASEAN region.

PLENARY 11

Feeding the Future: Next-Gen Proteins and Regenerative Propagation as Emerging Frontiers in the Bioeconomy

27th August 2026 | 3:50 PM | Grand Ballroom, Le Meridien Kota Kinabalu, Sabah

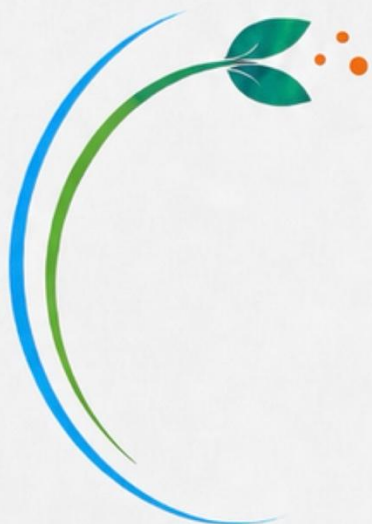


Speaker Biography

Dr. Faizal Hamid is Vice President of the Industry Development Division at Bioeconomy Corporation and Founder and CEO of Plantgenics Sdn Bhd. With more than 12 years of experience across government, private-sector, entrepreneurship, agrifood and bioeconomy development, he leads initiatives supporting Malaysia's biotechnology enterprises, bio-based industries and SMEs. His work has helped secure RM6.7 million in government programme funding, facilitate market access for 60 companies and support 250 MSMEs through a national accelerator programme. He has also facilitated international technology-transfer and commercial partnerships, including a major agricultural project with the Mozambique government. He holds a PhD in Biotechnology from Monash University and is an experienced international speaker and advisor.

Abstract

As global food systems face mounting pressure from population growth, climate change, and resource constraints, biotechnology is emerging as a critical lever for sustainable food security. We will examine two converging frontiers reshaping the bioeconomy: next-generation proteins — including precision fermentation, cultivated and alternative protein platforms — and regenerative propagation technologies that accelerate the sustainable production of high-value crops and biomaterials. Drawing on Malaysia's national bioeconomy agenda, we will explore how these technologies can strengthen food resilience, reduce environmental footprint, and unlock new economic value chains. As the lead agency driving Malaysia's biotechnology and bioeconomy development, Bioeconomy Corporation continues to catalyse this transition through its BioNexus and Bio-based Accelerator (BBA) ecosystem, which includes companies actively working across next-generation protein and regenerative propagation technologies. This session will offer insights into the scientific advances, industry pathways, and policy considerations needed to position biotechnology as a cornerstone of a sustainable future.



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LEP-SENTINEL: A Dual-Signal CRISPR[®] Host
Transcriptomic Platform for Early Paucibacillary
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Hydroxychavicol suppresses early TNF- α -driven cytokines in activated endothelial cells via canonical NF- κ B-independent pathways

Siti Marlina Jasni¹, Yiizamy Suffian², Nor Hisam Zamakshshari², and Erna-Zulaikha Dayang^{*}

¹ Department of Paraclinical Sciences, Faculty of Medicine and Health Sciences,

² Department of Chemistry, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

*Correspondence: ahdezulaikha@unimas.my

Abstract:

Atherosclerosis is a chronic inflammatory vascular disease, partly driven by tumor necrosis factor- α (TNF- α)-mediated endothelial activation, leading to increased proinflammatory cytokine release and subsequently leukocyte recruitment. Hydroxychavicol, a phenolic compound derived from *Piper betle*, has been reported to exert anti-inflammatory effects, but its precise mechanisms in endothelial inflammatory response remain underexplored. This study investigated whether hydroxychavicol modulates early TNF- α -induced inflammatory responses in activated human endothelial cells, with a focus on canonical NF- κ B signaling independence. Human umbilical vein endothelial cells (HUVECs) were pre-treated with hydroxychavicol prior to TNF- α exposure. After 4 hours, pro-inflammatory cytokine production, including interleukin-6 (IL-6), interleukin-8 (IL-8), and monocyte chemoattractant protein-1 (MCP-1), was quantified using ELISA. NF- κ B pathway involvement was assessed by evaluating I κ B degradation via Western blot analysis. TNF- α significantly upregulated IL-6, IL-8, and MCP-1 secretion, consistent with endothelial activation relevant to atherosclerotic inflammation. Hydroxychavicol treatment markedly suppressed TNF- α -induced cytokine release in a dose-dependent manner. Notably, Western blot analysis revealed preservation of I κ B levels following hydroxychavicol exposure, indicating inhibition of early inflammatory signaling without canonical I κ B degradation and NF- κ B activation. These findings suggest that hydroxychavicol attenuates endothelial inflammatory responses through NF- κ B-independent mechanisms. In conclusion, hydroxychavicol effectively suppresses early TNF- α -driven cytokine production in endothelial cells implicated in atherosclerosis, potentially via alternative signaling pathways independent of canonical NF- κ B activation. This supports its therapeutic potential as a vascular-protective anti-inflammatory agent targeting early endothelial dysfunction in atherosclerotic disease.

Keywords: Atherosclerosis, natural compound, endothelial dysfunction, cytokines

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Contact us :



Biotechnology Research Institute,
Universiti Malaysia Sabah,
Jalan UMS,
88400 Kota Kinabalu, Sabah, Malaysia



(+6088) 320009 Ext: 213900



adminipb@ums.edu.my