

Hyper Interdisciplinary Conference Singapore 2025

Abstracts List

Poster No.	Theme	Presenter	Affiliation
P-01	Liquid scanner performing rapid inspection of hazardous liquids within sealed containers via infrared and ultrasound.	Daisuke Chanohara	Kumahira
Abstract The liquid scanner developed by our company is a groundbreaking system capable of rapidly inspecting hazardous liquids such as flammable liquids, explosive liquids, strong acids, and strong bases, all without opening their sealed containers. Technically, the device uses infrared absorption analysis and ultrasound to collect the unique characteristics of the liquid, and then matches them against a proprietary database we have developed to determine whether the substance is hazardous. These technologies are not limited to hazardous liquids; they can also be applied to a wide range of other liquids, and are expected to be useful for applications such as distinguishing types of oil and detecting food fraud.			
P-02	KAMBIO Program ~Kampo And MicroBiome Initiative with OMICs Integration~	Tatsuhiro Nomaguchi	Metagen
Abstract Metagen is maximising the potential of the gut environment by seamlessly integrating the scientific knowledge that is being updated on a daily basis into businesses. By effectively utilizing the gut environment information, we promote the “gut environment based-stratified healthcare”. This approach involves proper classification of individual gut environments to tailor treatments based on scientific evidence. By establishing and implementing Gut Design, we believe that we can contribute to the realization of each individual's desired state of well-being via the gut environment. This includes achieving the expected effects of products and services uniformly across individuals, enabling self-regulation towards their ideal health state, maintaining their favorable conditions, and alleviating discomforts, among other outcomes.			
P-03	AI-based radiation treatment planning support service ~ Cancer treatment × AI ~	Noriyuki Kadoya	AiRato
Abstract AiRato is advancing AI-driven radiotherapy planning to make high-precision treatments more efficient and accessible. Their flagship product, RatoGuide (AIVOT), uses a deep learning model (HD U-Net) to predict 3D dose distributions for intensity-modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT). In collaboration with academic institutions including Yamanashi University and Kumamoto University, they are developing AI tools for automated plan generation in head-and-neck, prostate, esophageal cancer, and stereotactic radiotherapy for brain metastases. Their published research shows dose-prediction accuracy of ~2% and clinically acceptable deliverable plans, significantly reducing planning times (from ~6 hours to ~20 minutes).			

P-04	Plasma surface treatment technology modifying scaffold surfaces to support cultivated meat and alternative protein development.	Yozo Maruyama	Izumi Industry Co., Ltd.
Abstract Cultivated meat and alternative protein research requires efficient cell attachment to scaffolds that provide a 3D structure for cell proliferation and tissue formation. However, many scaffold materials, including biodegradable polymers and food-safe biomaterials, have hydrophobic surfaces, resulting in low cell adhesion and poor attachment efficiency. This leads to inconsistent growth and increased reliance on coating agents or biological additives. Izumi Kogyo has developed a plasma surface treatment technology that directly modifies the scaffold surface, improving hydrophilicity and introducing surface functional groups beneficial for cell adhesion. This enables efficient cell attachment and proliferation without additional coating processes. This study aims to demonstrate how plasma-treated scaffolds enhance cell adhesion efficiency and support cost-effective and scalable development of cultivated meat and alternative protein solutions.			
P-05	SintoKogio Group ~Manufacturing Technology for Society~	Ken Nagai	SINTOKOGIO
Abstract SINTO has evolved from its roots in foundry equipment into a comprehensive materials-processing technology company. It delivers modular solutions across domains such as surface treatment, powder handling, mechatronics and material handling by combining proprietary casting technologies, precision sensors and IoT-driven data systems. For foundries, SINTO's net-shaping, thinning/weight-reduction and "zero-defect" casting systems streamline production while reducing labour and environmental load. Its surface-treatment offering integrates blasting media, equipment and evaluation tools to deliver enhanced strength, refined micro-processing and functional surfaces. Across these fields, SINTO emphasises human-friendly, eco-efficient manufacturing that builds on nearly a century of technological leadership.			
P-07	Refer to Poster	Norichika Katsura	INOMER
Abstract INOMER Inc. develops wearable robotic assistive devices designed to extend physical capability and support rehabilitation. Their flagship product, the wear-robot "inoGear HE-1", targets gait recovery by actively assisting hip-extension and stabilising pelvic motion through motor-and-wire actuation, replicating the manual techniques of physiotherapists. By integrating lightweight, easy-to-don mechanics with therapist-inspired movement patterns, the device enables consistent, high-volume training unimpeded by human fatigue or skill variation. Ultimately, INOMER's platform facilitates scalable, high-quality rehabilitation and empowers users to reclaim mobility with greater autonomy.			
P-09	AI-driven blueprint platform converting complex datasets into adaptive urban design blueprints for sustainable urban transformation.	Nurhan Raihan	CCSEA/RIFFAI
Abstract AI-driven blueprint platform that operationalizes urban climate intelligence for mitigating the Urban Heat Island (UHI) effect in rapidly developing cities. By converting complex datasets into adaptive urban design blueprints, the study demonstrates how digital infrastructures can inform climate-resilient planning and policy. The research advances a systems-based, data-to-design framework, bridging the gap between environmental science, artificial intelligence, and urban governance. Applied within the context of Southeast Asian megacities, the project exemplifies a			

startup–research hybrid model where academic rigor supports scalable innovation. This work contributes to emerging discourse on AI-enabled climate adaptation, positioning the blueprint platform as both a scientific tool and a market-ready instrument for sustainable urban transformation.

P-10	Smart aroma activation platform enabling controlled release to establish new paradigms in food innovation.	Jenjira Leelapatarapun	Vidyasirimedhi Institute of Science and Technology (VISTEC)
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Abstract

Nowadays, dynamic foods are increasingly in demand , especially among younger generations who seek experiences beyond taste. Aroma plays a central role in this demand, as it is strongly linked to emotions, memories, and flavor. However, conventional methods like sauces or encapsulation provide only short-lived effects, since volatile compounds often evaporate or degrade during storage.

To address these challenges, we developed SCENTORY, a smart aroma activation platform enabling controlled, sequential release through molecular bonding. Aroma compounds are linked to edible carriers (proteins, carbohydrates, or lipids), forming stable bonds that break under stimuli such as heat, pH, or enzymes. This technology can be use in many applications such as ready-to-heat meals, functional foods, beverages, luxury dining, and medical food. SCENTORY establishes a new paradigm in food innovation, delivering flavor stability, healthier formulations, and emotionally rich dining experiences.

P-11	Acclimatized microbial consortia to transform food waste into valuable resources, promoting an environmentally-responsible future.	THAMONWAN WORARUTHAI	GreenGen Biotechnology Co., Ltd.
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Abstract

Food waste is a critical global issue, driving environmental, economic, and social challenges, particularly greenhouse gas emissions. Over 60% of total waste is food waste, increasing landfill use and the financial burden of waste management. Urgent and sustainable solutions are needed to address this problem. GreenGen Biotechnology has developed the GreenGen Biodigester, a biotechnology-based system that uses acclimatized microbial consortia to convert food waste into biogas and BioVis—a bio-nutrient rich in essential macronutrients, micronutrients, amino acids, and plant hormones. These outputs support sustainable agriculture while reducing environmental impact. Through this innovation, we are transforming food waste into valuable resources and promoting a circular, environmentally responsible future.

P-12	Upcycling end-of-life solar panel waste into advanced functional materials, contributing to a low-carbon, fossil-free future.	Anittha Prasertsab	VISTEC
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Abstract

VCAT develops sustainable technology to upcycle end-of-life solar panel waste into high-value green nano-silica and other functional materials that drive circularity in chemical and biorefinery processes. Our core technology transforms the main chemical components of the waste under mild conditions into precursor materials via hydrothermal synthesis. These advanced materials are highly effective for applications in the automotive, coating, and construction industries and catalyst. VCAT's process supports the circular economy, reduces landfill waste and greenhouse gas emissions, and contributes to a low-carbon, fossil-free future.

P-13	Data-driven machine learning (ML) models to identify optimal process conditions for biorefinery deployment at scale.	Ian Watson	University of Glasgow
Abstract Biorefineries offer potential to produce high value product, heat and power but complications arise with scaling and deployment at industrial scale. By using data-driven machine learning (ML) models, optimal process conditions are being identified to create more cost-effective pathways for profitability, deployment, scaling and operation. This style of modelling is useful for dealing with feedstock variability and fluctuations in product demand. Alternative modelling techniques are criticized for their comparative lack of flexibility and expensive computational load. ML modelling also benefits from the potential to be tailored to specific processes whilst identifying broader opportunities.			
P-14	Voltage optimizers to deliver monthly savings, lower carbon footprints, and facilitates power consumption monitoring.	Damien Cheong	Co.Efficient Alpha Pte Ltd
Abstract Our Alpha Series Voltage Optimizers are proudly made-in-Singapore, built-to-order and tested for safety, compliance and performance by an accredited laboratory. Each Alpha Optimizer <ul style="list-style-type: none"> • delivers 6 - 12% nett savings to you monthly, perpetually • delivers ROI in 24 - 36 months • lowers your carbon footprint by 6 - 12% • occupies less than 0.72m² space • comes IIOT-enabled, with integrated smart sensors and cloud-based data communication • allows you to monitor, track and evaluate your power consumption, savings and carbon emissions metrics via a dedicated 24/7 on-demand platform 			
P-15	3D scaffolds enabled high-density fish fat cell production, validated at lab scale, and scaled up in packed-bed bioreactors.	Kevin Gunawan	SIFBI,A*Star
Abstract Cultivated seafood represents a sustainable and ethical alternative to traditional fishing and aquaculture. Our team have developed robust fish adipose-derived stem cells that exhibit fast growth rate and high adipogenesis efficiency. However, conventional methods of cell culture using T-flasks are limited by scalability and yield, which are not suitable for large scale production of cultivated seafood. To overcome these challenges, 3D scaffolds provide a promising solution that enable higher cell densities and improved fat cell yields. These scaffolds have been validated at small scale and adapted to bioreactor systems such as packed-bed bioreactor for scalable production. In this study, we employed 3D scaffolds to manufacture fish fat cells from multiple fish cell lines and successfully demonstrated the transition from laboratory scale to bioreactor-based biomanufacturing.			
P-16	Pure hydrogen. Zero logistics. HYDGEN's compact AEM electrolyzers power the green revolution from anywhere	Goutam Kumar Dalapati	Hydrogen Innovation Pte.Ltd.
Abstract At HYDGEN, we build compact AEM electrolyzers that produce 99.97% pure, fuel-cell-ready hydrogen on-site — no trucks, no tanks, no post-treatment required. Unlike grey hydrogen, which contains CO ₂ , CO, NO _x , and sulfur and needs costly purification, our systems deliver clean			

hydrogen from the start. Designed to integrate seamlessly into industrial setups, they can run on grid, renewable, or hybrid power. By removing the logistics layer — often 60%+ of hydrogen's cost — we make green hydrogen cost-competitive even before scaling. Our modular, scalable units are made from locally available, rare-earth-free materials, ensuring robust supply chains and growth with user demand. With a 2 MW facility in Mangalore and a tested 25 kW stack, we are now scaling to 250 kW pilots, UAE launch, and a 20 MW facility, enabling affordable, decentralized hydrogen for global markets.

P-17	Transforming homogeneous food waste into sustainable, probiotic-rich animal feed to enable resilient, circular food systems.	zihan poh	Frass pte ltd
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Abstract

Frass Pte Ltd is an agritech startup transforming homogeneous food waste into sustainable, probiotic-rich animal feed through proprietary enzyme hydrolysis and lactic acid fermentation. This low-energy, no-heat process reduces moisture content from over 90% to below 20% within days, producing stable, nutrient-dense feed suitable for poultry, swine, and aquaculture. By valorizing food industry by-products such as okara, spent grain, and fish offal, the solution directly addresses rising feed costs, waste disposal challenges, and methane emissions. Pilots in Vietnam, Cambodia, Indonesia, and Scotland have demonstrated adaptability across climates and proven farmer interest, with feed cost savings of 5–20%. The decentralized joint-venture model empowers local partners and farmers, enabling resilient, circular food systems while creating green jobs.

P-18	The world's first vegan and non-GMO heme iron, enabling meat-identical flavourings and bioavailable iron nutrition.	Max Tham Jing Rui	tHEMEat Company Pte Ltd
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Abstract

tHEMEat is an ingredient innovation company that develops novel, vegan ingredients that mimic the sensorial and nutritional properties of animal meats. We produce Vegan Heme (VEME®), the world's first, vegan, non-GMO and highly affordable heme iron derived from vegetables. VEME® enables the production of vegan meat-identical flavourings and bioavailable iron nutrition to be affordable (50% – 90% lower than competition), sustainable and suitable for all demographics. We also have developed a next-generation vegan animal fat product called VEME®-infused Vegan Animal Fats (VVAf) that replicates the sensorial and flavour properties of animal fats, such as pork, fish and unagi. VEME® is an effective iron supplement, being as bioavailable as animal heme (40%) but being 50% cheaper. tHEMEat has also pioneered the new field of Flavour Catalysis, a new way to understand, uncover and manipulate the molecular basis of meat flavours to produce any meat flavour using vegan ingredients.

P-19	Wrist-worn device to quantify post-stroke recovery, supporting treatment planning and providing survivors with positive feedback.	Yan Han Lee	NuPoint
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Abstract

Stroke is a leading cause of long-term disability, and while occupational therapy (OT) is critical to recovery, access remains limited by high costs, therapist shortages, and the need for frequent in-person visits. This often results in prolonged immobility, delayed reintegration into society, and widening inequalities in care. Current assessment tools rely on intermittent clinician observation and fail to capture real-world patient activity outside therapy sessions. We present NuPoint, a wrist-worn device designed for continuous use, which collects movement data to support therapists in evaluating treatment effectiveness and tailoring care plans. By shifting monitoring beyond the clinic and into daily life, NuPoint enables more personalized, data-driven OT while reducing dependence on costly hospital-based care. This approach has the potential to enhance recovery outcomes, lower barriers to access, and bring high-quality rehabilitation closer to all stroke survivors.

P-20	Collaborative VR system to explore new participation structures among designers to support collaborative design.	Kheng Boon Heong	SUTD
Abstract Collaborative Virtual Reality (VR) platforms offer shared environments where multiple users engage with the same visual and spatial data, such as images and 3D models. While prior research has shown their potential, fewer studies have examined how such platforms support new structures of participation among designers. Co-Create is a collaborative VR system that explores this through two discursive mechanics: (1) avatars with asymmetrical design capabilities that users can switch between, and (2) a spatialised archive that tracks concurrent design activity. This study reveals how VR systems shape collaboration, highlighting a broader design space for mediated forms of engagement and offering insight into the relationship between collaborative practice and the tools that structure it.			
P-21	Plasma-Activated Water (PAW), enriched with reactive oxygen and nitrogen species (RONS), to enhance seedling germination.	Tan Kin Seng	Nanyang Technological University
Abstract Seed germination is a vital stage in the plant life cycle and directly influences agricultural productivity. Successful germination ensures strong crop establishment, uniform growth, and timely harvests, all of which are essential for sustainable farming and food security. Even small improvements in germination can significantly boost yields and resource use. Plasma-Activated Water (PAW), enriched with reactive oxygen and nitrogen species (RONS) when plasma interacts with water, is one such option. Studies show PAW enhances germination and seedling vigor in black gram, mung bean, radish, and wheat. Low to moderate RONS levels stimulate growth, while excessive amounts may inhibit it, highlighting the importance of optimizing concentrations for specific seeds. This study investigates PAW's effects on germination efficiency and early growth of leafy vegetables, exploring its potential as an eco-friendly biostimulant for agriculture.			
P-22	Refer to Poster	Sunday	Bright Future 3Dtech Academy
Abstract Bright Future 3DTEch Academy (Nigeria) is pioneering the integration of 3D-printing into K–12 education with a mission to equip young learners with skills for the future of manufacturing. Founded by Sunday Adeyemi, the academy addresses the shortage of edtech infrastructure by introducing an ecosystem of 3D printers, digital design tools and online tutorials. The curriculum merges STEAM learning with hands-on additive-manufacturing projects. With industry linkages (such as GE Additive) and planned regional expansion, the academy offers a scalable model for transforming foundational learning and nurturing next-generation innovators.			
P-23	AI co-engineer transforming text prompts into ready-to-prototype designs to make hardware creation accessible, safe, and scalable.	Chai Chang yao	Overhaul
Abstract Buildables is an AI co-engineer that transforms text prompts into ready-to-prototype hardware designs. It allows users to visualize, simulate, and iterate on products instantly, integrating both software logic and physical components into a single generative workflow. The system merges 3D modeling, digital twin simulation, and firmware synthesis to enable rapid, low-risk experimentation. By focusing on hybrid “phygital” design—bridging digital simulation and real fabrication—Buildables makes hardware creation accessible, safe, and scalable for businesses,			

educators, and creators worldwide.

P-25	Synthetic biology-driven CRISPR diagnostic platform that enables rapid detection of pathogens and resistance genes.	Amaladoss Anburaj	Temasek Polytechnic
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Abstract

Antimicrobial resistance (AMR) and emerging infectious diseases threaten human, animal, and environmental health, underscoring the need for integrated One Health solutions. Conventional culture and sequencing methods are slow and resource-intensive, delaying intervention. We developed a synthetic biology-driven CRISPR diagnostic platform that enables rapid, sensitive, and field-deployable detection of pathogens and resistance genes across clinical, veterinary, and aquaculture systems. Integrating programmable Cas-guide RNA modules with multiplex microfluidic assays, the platform achieves single-copy DNA and ultra-low RNA detection with high reproducibility. Incorporating eDNA-based surveillance extends its utility to real-time ecosystem monitoring. This modular and portable technology exemplifies how CRISPR diagnostics can transform One Health biosurveillance, bridging molecular precision with actionable public-health impact.

P-26	Replicating nature's biological defense mechanisms to unlock new frontiers in biotechnology and commercial innovation.	Kannan Tay, Ganesh	HealBac/A*STAR
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Abstract

Nature defends itself through complex biochemical cascades that remain largely untapped for industrial applications. HealBac's platform replicates this biological defense mechanism using fat cells challenged with bacteria to stimulate secretion of novel bioactives. Through this system, we have identified potent antimicrobial peptides effective in food preservation, aquaculture, and veterinary applications, as well as extracellular vesicles with skin-rejuvenating properties. Both classes of molecules are naturally derived, clean-label, and scalable, addressing global demands for sustainable food safety and consumer wellness. Our approach exemplifies how mimicking natural immunity can unlock new frontiers in biotechnology and commercial innovation.

P-27	O.space creates modular, prefabricated interior systems enabling flexible, sustainable, and reusable space design.	Aaron	O.Space
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Abstract

O.space is a design-led modular innovation company redefining how interior spaces are created—through adaptable, prefabricated systems that prioritize ease, flexibility, and sustainability. Our modular wall and furnishing systems allow users to assemble, reconfigure, or relocate spaces without demolition or waste. Designed for plug-and-play installation, O.space's approach eliminates traditional construction mess, reduces time and cost, and extends the life cycle of interiors through reusability. By combining architectural intelligence with product design thinking, we deliver a consumer-centric solution that empowers users to shape their environments effortlessly. O.space envisions a future where building interiors becomes as simple and intuitive as assembling furniture—clean, fast, and circular by design.

P-28	Automating construction inspections with IBIS, boosting efficiency, accuracy, and accountability through a data-driven process.	Chua Khiong Kiat	BETEEK Pte Ltd
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Abstract

The Integrated BIM Inspection System (IBIS) revolutionizes construction quality assurance by automating site inspections through BIM and LiDAR integration. IBIS enables on-site workers to

capture 3D scans, automatically align them with BIM models, and perform AI-driven defect detection and compliance verification within minutes—eliminating the need for manual reinspection or technical supervision. Designed for contractors, precast manufacturers, and consultants, IBIS reduces inspection time by up to 90% and manpower requirements by 75%. By transforming traditionally fragmented inspection workflows into a seamless, data-driven process, IBIS empowers the construction industry to achieve higher productivity, precision, and accountability throughout the project lifecycle.

P-29	AI-enhanced "one-stop" platform to perform high-accuracy diagnostics for coronary artery disease (CAD).	Yu Liang Choo	A*STAR Bioinformatics Institute (BII)
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Abstract

Coronary artery disease (CAD) is a leading cause of cardiac mortality, responsible for 19% of deaths in Singapore. Its incidence continues to rise with ageing and diabetes, creating urgent demand for efficient diagnostic tools. Computed Tomography Coronary Angiography (CTCA) is the first-line investigation, yet current manual reporting requires 3–6 hours per case and shows ~20% inter-observer variability, limiting consistency and scalability. In this project, we developed an AI-enhanced “one-stop” platform for simultaneous quantification of calcium scores, epicardial adipose tissue (EAT), plaque, and stenosis. The AI achieved average Dice scores of 0.95 for calcium and 0.91 for EAT, while also reaching high classification accuracy for plaque and stenosis. This integrated system shortens reporting time, reduces variability, and enhances reproducibility, offering strong clinical and research value in diagnosis, management, prognosis, and therapy response prediction.

P-30	Refer to Poster	SHO	EYO
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Abstract

EYO is a Singapore-based nutrition company that develops plant-based, gut-friendly powdered drink sachets tailored for seniors’ unique nutritional needs. Its flagship product, EYO1, was created by founder “Sho” after his own struggles with unpalatable hospital nutrition drinks following multiple surgeries. The formula is designed to be vegan, allergen-friendly (avoiding common triggers like soy and lactose), and nutritionally complete enough to replace multiple supplement pills. Backed by third-party lab testing and regulatory approval, EYO offers not just a product but expert nutritional guidance for healthy, vibrant aging.