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ASSOCIATION OF VIETNAMESE INTELLECTUALS
IN BELGIUM AND LUXEMBOURG



VIETNAMESE BUSINESS ASSOCIATION
IN BENELUX

Workshop

Promoting Vietnam-EU Cooperation

In Science, Technology, and Trade

Brussels, Belgium

07th March 2026

Book of Abstracts



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Introduction

Dear Colleagues, Distinguished Guests, and Participants,

It is with great pleasure and a profound sense of purpose that we, as Chairs of the Workshop for Promoting Vietnam-EU Cooperation in Science, Technology, and Trade, welcome you to this inaugural event organised by the Association of Vietnamese Intellectuals in Belgium and Luxembourg (ViLaB) in collaboration with the Vietnam Business Association in BENELUX (VBAB BENELUX), with the support of the Embassy of Vietnam to the Kingdom of Belgium and the Grand Duchy of Luxembourg, Mission of the Socialist Republic of Vietnam to the European Union. Held on 7 March 2026 in Brussels, this workshop represents a pivotal milestone in fostering cross-continental synergies, bridging the intellectual and entrepreneurial strengths of the Vietnamese diaspora in Europe with the innovation ecosystems of Vietnam and the European Union.

ViLaB, established as a non-profit organisation of Vietnamese intellectuals residing and working in Belgium, Luxembourg, and across Europe, is dedicated to supporting mutual development, expanding exchanges among like-minded professionals, and contributing actively to the advancement of Vietnam, Belgium, Luxembourg, and the broader European community. Our focus spans critical domains such as digital transformation and high technology, renewable and nuclear energy, green technologies, healthcare and biotechnology, education, international integration, and business. VBAB BENELUX is a non-profit organisation to foster business and trade relations between Vietnam and the BENELUX countries (Belgium, Netherlands, Luxembourg), as well as the wider EU. It connects Vietnamese enterprises with European partners, promoting collaborations in areas like clean energy, logistics, and import-export to enhance economic ties and community standing. Through initiatives like this workshop, ViLaB and VBAB BENELUX aim to harness the expertise of overseas Vietnamese experts and entrepreneurs to drive Vietnam's national development goals, while promoting sustainable partnerships with European institutions, businesses, and governments.

This workshop emerges at a transformative juncture for Vietnam-EU relations, underpinned by shared commitments to innovation, sustainability, and economic resilience. Our key objectives are multifaceted: to facilitate strategic partnerships that align with Vietnam's priorities in science, technology, and trade; to spotlight advancements in high-impact fields including artificial intelligence (AI), biotechnology, nuclear energy and medicine, and business applications; and to inspire contributions from the Vietnamese diaspora to Vietnam's burgeoning innovation ecosystem. Ultimately, we seek to produce thematic reports that delineate critical pain points and challenges in existing cooperation frameworks between Vietnam, Belgium, and Luxembourg, while illuminating pathways for enhanced collaboration, innovation, and mutual prosperity.

The program of the workshop is structured around four thematic sessions, each featuring keynote presentations and panel discussions: Trade and Business with a focus on AI Applications in Small and Medium Enterprises; AI and Digital Transformation; Biotechnology; and Nuclear Medicine and Energy. These sessions draw upon the insights of esteemed speakers from academia, industry, and government, including representatives from institutions such as Belgian Nuclear Research Centre (SCK CEN), Ghent University, Phenikaa University, AI Academy, Open University, Innovation Hub Vietnam, VINUE and the 108 Military Central Hospital, as well as innovative enterprises like EmaxSolar, Eurogen BV, and Nam&Son BV. Their abstracts, compiled in this book, offer a rich tapestry of research, practical case studies, and forward-looking strategies—from leveraging digital twins for infrastructure in



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Vietnam to advancing microbial formulations for sustainable agriculture, and from AI-driven education models for Vietnamese children abroad to theranostics in nuclear medicine.

We extend our deepest gratitude to our sponsors and partners, whose support has made this event possible, and to the dedicated organising team—including our secretaries, communication leads, logistics coordinators, and program leads—for their tireless efforts. We also extend our sincere thanks to our keynote speakers for sharing their expertise and invaluable insights. Special thanks go to the Embassy for their financial support and invaluable contributions to the organisation, program, and suggestions during the organisation of the event.

As we convene in this spirit of collaboration, we invite you to engage deeply with the abstracts herein, participate in the discussions, and contribute to the collective vision of a stronger Vietnam-EU partnership. Together, let us chart a course toward innovative solutions that address global challenges and propel shared growth.

Phung Quoc Tri

President of ViLaB

Nguyen Thanh Vinh

President of VBAB BENELUX



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AGENDA

VIETNAM - EU COOPERATION WORKSHOP 07 - 03 - 2026

	9:00 - 9:30	Registration Networking coffee
	9:30 - 10:00	Opening Ceremony Welcome adress & Speeches
	10:00 - 12:00	AI & Digital transformation Parallel session - Room 1
	10:00 - 12:00	Trade & Business Parallel session - Room 2
	12:00 - 13:30	Lunch Networking & informal discussion
	13:30 - 15:30	Nuclear medicine & energy Parallel session - Room 1
	13:30 - 15:30	Biotechnology Parallel session - Room 2
	15:30 - 16:00	Coffee break
	16:00 - 17:00	Closing ceremony Recap, MoU, Closing speech
	17:30 - 20:30	Networking dinner



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Session 1:

AI and Digital transformation

Moderator:

Dr. Nguyen Duy Cu - Vice President of ViLaB



Vietnam's AI Law — Enabling the AI Economy

Author: Nguyen Thu Khue

As AI regulation accelerates globally with 38 countries having enacted AI laws as of early 2026, Vietnam has emerged as one of the most forward-thinking examples of strategic AI governance in the region. Drafted with clear awareness of existing global frameworks, including the EU AI Act, Japan's AI Law, and South Korea's approach, Vietnam's AI Law is not a simple adoption of foreign models. It is a deliberate, context-aware framework that aligns with international best practices while embedding strong, concrete support for business growth and innovation.

This presentation provides an overview of Vietnam's AI Law, highlighting its key pillars: a risk-based classification system, a clear accountability structure for AI actors, and most distinctively, an integrated approach to financial and regulatory support for businesses. Through mechanisms such as the National AI Development Fund (Article 22), government vouchers for SMEs and startups (Article 25), and a sandbox environment for controlled AI testing (Article 21), Vietnam directly embeds business enablement into its legal framework. The law also draws clear boundaries through Article 7, which defines prohibited practices: ensuring the framework has both the openness to foster innovation and the enforcement mechanisms to hold violators accountable.

Supporting this business-forward approach is Vietnam's early commitment to AI and data sovereignty: building national infrastructure, controlling data platforms, and investing in homegrown AI capabilities. At a time when major economies are only beginning to reckon with their dependence on foreign technology, Vietnam's foresight in legislating sovereignty from the outset creates a more stable, secure foundation for businesses to grow.

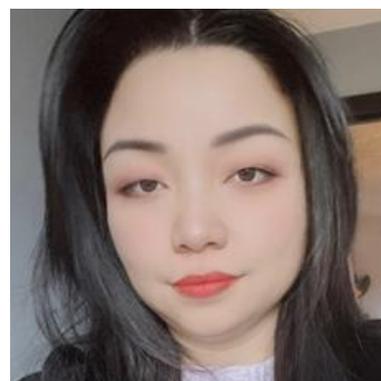
For businesses — domestic and international — Vietnam's AI Law signals a clear invitation: a structured, well-supported, and transparent environment in which to develop and deploy AI solutions. This talk aims to help business leaders, investors, and policymakers understand what the law means in practice, and how to navigate its opportunities with confidence.

Keywords: Vietnam AI Law, AI governance, AI sovereignty, AI investment, SME support, risk classification, AI prohibited practices, digital sovereignty, Southeast Asia.

Nguyen Thu Khue

VILAB / VBAB BENELUX

She is a data protection and AI law specialist (LL.M., CIPP/E) who has contributed to national discussions on data governance and AI regulation in Vietnam. A certified member of the IAPP and an early member of the Vietnamese National Data Association, she has provided legal and strategic input to policy dialogues with government stakeholders, including the Ministry of Public Security. She previously worked with multinational clients at Citibank Vietnam, supporting compliance, trade finance, and risk





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management. Based in Belgium, she engages with the Vietnamese Intellectuals Association (ViLab) and the Vietnamese Business Association in Benelux (VBAB BENELUX), providing ICT law consultation and fostering cross-border professional collaboration.



The AI Era — One Person, One Startup, Global Impact

Author: Chu Quang Thai, Nguyen Bao Thuy

The proliferation of the digital economy and Artificial Intelligence (AI) has significantly accelerated the global trend of "Solopreneurship" or the "One-Person Company" (OPC), enabling individuals to operate independent businesses with high efficiency. However, in Vietnam, the current legal framework lags behind these practical developments. Consequently, millions of workers in the informal sector - ranging from household businesses and freelancers to online retailers - face significant barriers to accessing formal resources and social welfare. This paper analyzes international experiences, specifically from India and Singapore, alongside Vietnam's unique socio-economic context, to propose a legal model for the "One-Person Company". The study argues that with the support of digital infrastructure, electronic identification (e-ID), and automated tax administration, formalising this model is entirely feasible. This approach not only enhances market transparency and expands the state tax revenue base but also empowers citizens with economic autonomy, aligning with the national strategy for digital economy development and innovation.

Keywords: One-Person Company (OPC), Legal framework, Informal economy, Digital transformation, Public policy.

Chu Quang Thai

President of Vietnam Innovation Hub

Chu Quang Thai is a Mechatronics Engineer with expertise in robotics and investment project development. Currently serving as the Southern Representative for Vietnam's National Startup and Innovation Support Center (NSSC) under the Ministry of Science and Technology, Mr. Thai focuses on building and operating the national startup portal Startup.gov.vn, connecting northern startup ecosystems, and linking corporations with startups in e-commerce and logistics.



His notable research includes leading projects on Industry 4.0 applications for specialised e-commerce in real estate and construction (e.g. chothicong.com), digitising supply chains with blockchain for traceability and bidding, enhancing construction liquidity via smart contracts, and ongoing work on real estate crowdfunding. He has also co-led initiatives like precision agriculture for shrimp farming using 4.0 technologies. Thai offers strengths in fundraising, commercialisation, branding, and digital platform development to support innovation networks, while seeking practical inventions to foster startups and contribute to Vietnam's scientific, technological, and economic growth.



Nguyen Bao Thuy

Vice President of Vietnam Innovation Hub

Nguyen Bao Thuy is the Vice President of Vietnam Innovation Hub, with over 15 years of experience in operations, corporate services, governance, and innovation programs across Vietnam. She collaborates with government agencies, universities, enterprises, and international partners to develop policies and ecosystems that support micro-entrepreneurs and "one-person enterprises" in the digital economy. Currently, Thuy champions the formalisation of one-person businesses, drawing on global models like India's OPC, Singapore's Sole Proprietorship, and European freelance frameworks. Her initiatives focus on streamlined registration, digital tools, finance, social protection, and tax incentives to enable individuals to start, run, and scale solo ventures.



Her core expertise includes corporate services and program operations, governance and risk management, gender equality and social inclusion (GEDSI), budget oversight, government engagement, organizational development, innovation ecosystems, and digital transformation.

Key roles include leading strategic initiatives at Vietnam Innovation Hub, heading the organising team for Startup Flight 2025 (a national competition by Vietjet Air, NSSC, and UNUP), and prior positions such as Deputy Director at Clevai English, Director of Partner Development at Funix Online Education, and Head of Administration at Vietnam International Bank (VIB).

In advisory capacities, she has trained on gender equality in climate adaptation for UN Women and Vietnam Women's Union, and serves as an Innovation Training Expert for startups.

Thuy holds a Master's in Human Resource Management from the University of Trade Unions, Bachelor's degrees in Economics from Foreign Trade University and English from Hanoi University, plus certifications in executive leadership and digital transformation.



Scaling AI for Enterprises - The role of Enterprise Semantic Modelling

Author: Nguyen Xuan Hoai

In this talk, the author will explain why enterprise AI initiatives often stall—not because of model performance, but because of missing semantic foundations. Scaling AI across an enterprise requires more than data availability and advanced algorithms. It requires a coherent representation of how the business actually works. This is where business semantic modelling becomes vital. Enterprise business semantic modelling establishes a shared, structured, and machine-interpretable understanding of capabilities, processes, rules, roles, risks, and decision logic. Without this semantic backbone, AI systems remain isolated pilots—disconnected from governance, compliance, and strategic intent. With it, AI can be embedded into core operations, enabling explainable decisions, reusable intelligence components, and cross-domain automation. The author will introduce the TRAIDA framework developed by Engage Meta as a structured method for assessing enterprise AI readiness and orchestrating transformation. TRAIDA evaluates architectural maturity, information coherence, decision structures, automation capability, and transformation governance. It provides measurable indicators of readiness and a clear roadmap for evolving toward AI- and data-native operating models. The session will also include practical, real-life examples illustrating how semantic alignment accelerates AI integration across business units—reducing fragmentation, increasing trust in AI outputs, and enabling sustainable scaling. Participants will gain both conceptual clarity and actionable guidance for building a strategy and roadmap that positions AI as an institutional capability rather than a collection of disconnected tools.

Prof. Nguyen Xuan Hoai

AI Academy Vietnam

Nguyen Xuan Hoai is an Associate Professor of Computer Science at HUTECH Technical University in Vietnam and the Co-founder and Director of AI Academy Vietnam. He earned his PhD in Computer Science from the University of New South Wales, Australia, in 2005. With over 20 years of experience in research, teaching, and consulting in artificial intelligence and computer science, his primary research focuses on evolutionary computation, machine learning, operations research, and AI applications in meteorology and hydrology. He has contributed to various projects and publications, including work on water level forecasting models, and has held positions at institutions such as the Vietnamese Military Technical Academy and Le Quy Don University.





A National Institute for QA in Software and AI: A Strategic Pillar for Ensuring Robust Development and Global Market Access

Authors: Mai Xuan Phu, Phung Thanh Xuan

Vietnam's ICT sector has emerged as a dynamic engine of economic growth, with industry revenue reaching approximately \$165-170 billion in 2024-2025 and contributing significantly to GDP and exports. This rapid expansion positions Vietnam as a rising player in the global digital economy, which now exceeds \$5-6 trillion and continues growing at 5-6% CAGR, driven by cloud computing, AI integration, and digital transformation across industries.

Yet this growth trajectory faces a critical threat: the absence of robust quality assurance practices. Recent high-profile incidents in 2024-2025, including major software outages in banking, transportation, and AI-driven systems, have resulted in billions of dollars in losses, operational disruptions, and risks to public safety. The global cost of poor software quality reaches trillions of dollars annually, revealing that inadequate QA is not merely a technical oversight but an existential business risk that undermines market competitiveness and sustainable development.

This challenge intensifies as AI becomes deeply embedded in software systems. AI's non-deterministic behaviours render traditional testing methods inadequate, yet the stakes have never been higher. The EU AI Act now mandates rigorous testing, validation, and quality management for high-risk AI applications, transforming quality assurance from best practice into a legal prerequisite for market access. This regulatory shift signals a fundamental change: quality compliance has become the gateway to global markets.

This keynote systematically addresses these challenges by examining Vietnam and global ICT market dynamics, analysing recent quality failures and their cascading consequences, exploring regulatory frameworks including the EU AI Act's testing requirements alongside emerging domestic regulations including Vietnam's Law on Artificial Intelligence (2025) and policy directions oriented by Resolution No. 57/NQ-TW (2024), and introducing advanced methodologies such as metamorphic testing, a promising approach for validating non-deterministic AI systems through input-output relationship verification rather than fixed oracles.

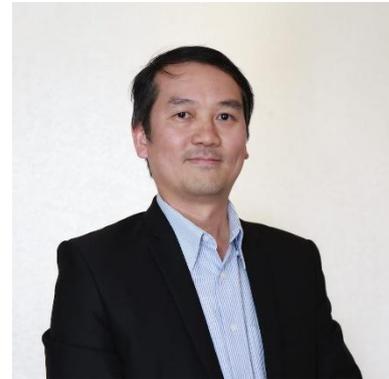
The keynote concludes with a strategic proposal: the timely establishment of a National Institute for Quality Assurance in Software and AI. This Institute will be built in structured collaboration among three key actors: government, academia, and corporations. Academia contributes foundational research and standardised frameworks into advanced QA methods; corporate partners can provide practical methodologies, pilot implementations, and real-world feedback from industry deployment; and the government would serve as an independent regulator and auditor, ensuring compliance, transparency, and alignment with national digital governance objectives. Such model would not only ensure the Institute's relevance and applicability but also facilitate EU collaboration, and position Vietnam as a global trusted provider of high-quality digital solutions, bridging domestic growth with global competitiveness in the AI era.



Dr. Mai Xuan Phu

Jemmic (Luxembourg)

Dr. Mai Xuan Phu is a Quality Assurance Manager at Jemmic in Luxembourg and a member of the Management Board of the Association of Vietnamese Intellectuals in Belgium and Luxembourg (ViLaB). With 15 years of specialised experience in software quality assurance, security testing, and automation, he bridges his academic and teaching roots in Vietnam with cutting-edge industry practices in Europe. In Vietnam, he served as a lecturer at Ho Chi Minh City University of Science and the Industrial University of Ho Chi Minh City (2011-2016), where he taught computer networks and information security while founding and operating the Security Club. He earned his PhD from the University of Luxembourg (2016-2020). During his doctoral research, he pioneered innovative approaches, including the metamorphic testing framework specifically for automated security testing of web systems, which addresses the oracle problem in complex, non-deterministic software, a challenge now central to testing AI-integrated applications. At Jemmic, Dr. Mai leads quality assurance for Conversational Framework (serving Swiss banking institutions), developing advanced automation frameworks for Web, Android, and iOS. He designed and deployed efficient internal mobile device farms, and implemented rigorous quality monitoring processes. His expertise spans automation testing, security testing, and metamorphic testing methodologies for traditional and AI-integrated software systems



Phung Thanh Xuan

Chairwoman, LTS Group

Phung Thanh Xuan is the Founder and Chairwoman of LTS Group, the first independent software testing firm established in Vietnam. She founded the company in 2016 with a clear vision to build dedicated software quality engineering capabilities and elevate the role of quality in the global digital ecosystem. Starting from a small founding team, she has grown LTS Group into an organisation of more than 500 professionals, with offices in Vietnam, Japan, South Korea, and the United States.



Under her leadership, LTS Group has evolved from a specialised testing company into an international technology services provider, supporting clients across major global markets. Software quality engineering has remained at the core of the company's identity, reflecting her long-standing commitment to building reliable, scalable, and trustworthy digital systems.

As Chairwoman, she continues to guide the company's long-term vision, advocating for the strategic importance of quality.



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A Multimodal Deep Learning Framework for Detecting Advertising Law Violations in Vietnam

Authors: Nguyen Anh Hoan*, Le Ngoc An, Nguyen Thuy Huong, Hoang Bao Chi, Mai Trung Phu, Nguyen Vinh Phu, Hoang Tuyet Minh, Nguyen Duc Manh

Hanoi Open University

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We propose an end-to-end multimodal advertising compliance framework that integrates caption text, visual creatives, and OCR-extracted embedded claims to better capture compliance-sensitive content commonly found on banners and posters. The task is formulated as multi-label violation detection, allowing a single advertisement to trigger multiple violation categories, with a taxonomy (ALV1...ALVn) aligned with Vietnamese advertising law.

Beyond prediction, a Check-Var legal-mapping layer links detected violations to specific articles, clauses, or points in a version-controlled legal knowledge base and integrates supporting evidence from caption/OCR text and relevant image cues, thereby improving interpretability and auditability. The system outputs actionable risk levels (PASS/CAUTION/HIGH RISK/CRITICAL) and recommended actions (allow, edit, mandatory review, block), computed from prediction confidence, severity, evidence strength, and mapping confidence. A pilot text-only study (n=180) establishes feasibility and highlights key challenges (label imbalance, category overlap, threshold sensitivity), motivating multimodal, imbalance-aware, legally grounded modelling.

Background: Vietnam's digital advertising ecosystem is rapidly expanding across social platforms, increasing the volume and heterogeneity of ad creatives and, consequently, the frequency of compliance-sensitive claims. In practice, legally relevant signals are often multimodal, appearing not only in captions but also as embedded text, badges, and visual cues in banners and posters.

Objective: This study aims to develop an automated compliance-screening framework that reduces multimodal blind spots and provides legally grounded, auditable justifications beyond simple content flagging.

Methods: We propose a multimodal deep learning architecture that encodes Vietnamese text with PhoBERT and creative content with Swin Transformer V2, followed by feature-level fusion for cross-modal reasoning in a multi-label violation setting. An OCR module is integrated to extract embedded on-image text and mitigate claim-missing errors. To enable actionable compliance, we introduce a Check-Var legal-mapping layer that links predicted violations to relevant legal bases (articles, clauses, points) in a structured legal knowledge base and provides supporting evidence. Outputs are operationalised through a four-level warning scheme (PASS/CAUTION/HIGH RISK/CRITICAL) computed from model confidence, evidence strength, and mapping reliability.

Results: A pilot text-only experiment (n = 180) demonstrates feasibility and highlights key challenges under label imbalance, motivating imbalance-aware evaluation. We further define a multimodal experimental protocol that includes unimodal baselines, targeted ablations (fusion, OCR, legal mapping), and error analysis to quantify each component's contribution.



Conclusions: The proposed framework supports scalable pre-publication compliance screening for SMEs and triage-oriented monitoring for regulators, thereby improving transparency by linking model predictions to statutory provisions through evidence-based evidence.

Keywords: advertising compliance; multimodal learning; OCR; PhoBERT; Swin Transformer; multi-label classification; LegalTech

Nguyen Anh Hoan

Lecturer at Hanoi Open University

Nguyen Anh Hoan is a PhD candidate in Science and Technology Management at the University of Social Sciences and Humanities, Vietnam National University, Hanoi (VNU-USSH). He holds a master's degree in Educational Management and serves at the Student Affairs Office of Hanoi Open University (HOU).



His work centres on enhancing student entrepreneurship and innovation in higher education, emphasising mentor networks and university–industry–investor partnerships for venture creation and commercialisation. His research explores university-based entrepreneurship ecosystems, multi-actor support models, policy mechanisms for startup development, investment fund models, financing pathways, and evaluation frameworks for entrepreneurship education and incubation outcomes.

At HOU, he led the university-level project “Research on Solutions to Develop Student Entrepreneurship Activities at Hanoi Open University” (Code: MHN2024-02.18), focusing on program design, stakeholder coordination, and impact measurement.

He actively disseminates research through conferences and publications on entrepreneurship, innovation, and investment funds, bridging evidence-based policy with practical implementation in Vietnamese higher education.



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Session 2:

Trade and Business - AI Applications in Small and Medium Enterprises

Moderator:

Mr. Nguyen Thanh Vinh – President of VBAB BENELUX



From Digital Twins to Data Economy in Infrastructure

Author: Pham Huy Hoang

Theme: Leveraging European Lessons in Digital Twin Implementation to Catalyse a Sustainable Data Economy for Vietnam's Infrastructure.

In the contemporary era of urban transformation, physical infrastructure—comprising bridges, roads, buildings, and complex underground utilities—is no longer a static asset. It has become a dynamic source of high-value data. This presentation explores the strategic evolution from **Digital Twins**—the high-fidelity virtual representation of physical assets—to a robust **Data Economy in Infrastructure**, where data is treated as a strategic capital asset to drive efficiency, safety, and economic growth.

The first part of the presentation analyses the **European experience**, focusing on the maturity of Building Information Modelling/Management (BIM) standards and the emergence of "Digital Urban Twins" in Europe. Europe has successfully moved beyond mere 3D modelling by integrating real-time IoT sensor data and Geographic Information Systems (GIS). Key takeaways include the implementation of the EU Data Act and the Common European Data Spaces, which provide the legal and technical "soft infrastructure" necessary for cross-sector data sharing. These frameworks have enabled **Predictive Maintenance**, reducing lifecycle costs of national assets by up to 20%, and significantly mitigating the risks associated with "blind" excavations of underground systems.

The second part of the presentation will be dedicated to the **Vietnamese context**. As Vietnam undergoes rapid urbanisation and massive investment in transport and energy infrastructure, it faces a critical challenge: "Data Silos". Infrastructure data (especially subsurface utilities) remains fragmented, leading to costly construction delays and safety hazards. By adopting European methodologies, Vietnam can bypass the trial-and-error phase. The presentation proposes a roadmap for Vietnam focusing on:

1. **Mandating Open BIM Standards** for public works to ensure data interoperability.
2. **Developing a National Infrastructure Data Space** to bridge the gap between transport, electricity, and telecommunications sectors.
3. **Monetizing Infrastructure Insights**, transforming raw structural health data into actionable intelligence for the logistics, insurance, and urban planning industries.

Ultimately, the transition from Digital Twins to a Data Economy represents a paradigm shift: from managing "bricks and mortar" to orchestrating a sophisticated "Infrastructure-as-a-Service" (IaaS) model. By digitising the physical backbone of the nation, Vietnam can foster a transparent, resilient, and highly competitive digital economy.



Dr. Pham Huy Hoang

VINUE

Dr. Pham Huy Hoang is an experienced BIM Process Manager and Digitalisation Expert with over a decade of specialised expertise in managing and delivering complex industrial and infrastructure projects, ranging from bridges and tunnels to water treatment facilities. Currently serving as the BIM Process Manager at BESIX in Brussels, Dr. Pham leads digitalisation development, leveraging BIM technologies to foster cross-functional synergy and increase project success rates.



Beyond his corporate leadership, Dr. Pham is a prominent figure in the international professional community. He serves as the Chairman of VINEU (Vietnam Innovation Network in Europe) and the Vice Chairman of VIDEN (Vietnam Data Expert Network). In these roles, he has made significant contributions to fostering business and scientific collaboration between Vietnam and Europe, bridging the gap between global innovation hubs and regional expertise.

His career is marked by leadership in high-profile projects, including the Oosterweel verbinding and the Sludge Mono Treatment Facility in Gent, where he applied advanced BIM applications to manage complex phasing and design coordination. Dr. Pham holds a PhD in Engineering Science from the University of Leuven, where his research focused on the integrated modelling of wastewater treatment systems.



Innovation and AI in SMEs

Author: Nguyen Dieu Linh

Vietnam's export-led industries have been a major driving force behind the country's rapid economic growth over the past three decades. Key export sectors such as electronics, textiles and garments, footwear, furniture, and agricultural products have helped Vietnam become an important manufacturing hub in the global economy. However, increasing global competition, rising labour costs, and changing technological trends are creating new challenges for Vietnam's export-oriented industries. As a result, the adoption of artificial intelligence (AI) and technological innovation has become essential for maintaining competitiveness and supporting long-term economic development.

Artificial intelligence is transforming production processes in Vietnam's export industries by improving efficiency, reducing costs, and enhancing product quality. AI technologies such as machine learning, smart sensors, robotics, and data analytics are increasingly used in manufacturing and supply chain management. For example, in electronics manufacturing, AI-based systems are used for automated quality inspection and production optimisation. In textile and garment factories, AI helps forecast demand, plan production schedules, and detect fabric defects. In the furniture industry, digital design technologies and automated cutting machines improve material efficiency and reduce waste. In agricultural exports, AI supports precision farming and better product grading to meet international standards.

Innovation also plays a key role in helping Vietnam move from low-cost manufacturing toward higher-value production. By adopting advanced technologies, Vietnamese firms can increase productivity and produce more sophisticated goods that meet the strict requirements of export markets such as the United States, the European Union, and Japan. Technological upgrading also strengthens Vietnam's participation in global value chains and attracts foreign investment in high-tech industries.

Despite these opportunities, Vietnam faces several challenges in implementing AI and innovation. Many small and medium-sized enterprises lack the financial resources and technical expertise needed to adopt advanced technologies. In addition, shortages of skilled workers, limited research and development capacity, and gaps in digital infrastructure slow the pace of technological transformation. Government policies promoting digital transformation and Industry 4.0 have supported innovation, but further investment in education, training, and technological infrastructure is necessary.

Overall, AI and innovation are becoming increasingly important for Vietnam's export-led industries. The successful adoption of advanced technologies will help Vietnam maintain its global competitiveness, improve product quality, and achieve sustainable economic growth in the future.



Nguyen Dieu Linh

Founder and CEO of Nam&Son BV

Dieu Linh Nguyen is a dynamic entrepreneur and accomplished professional based in Tervuren, Belgium, where she serves as Founder and CEO of Nam&Son BV since October 2019. Her company acts as a vital hub for importing timber from Europe, America, South Africa, and Uruguay to Vietnam for furniture production, while exporting Vietnamese furniture to the UK and US markets, with a mission to bridge Binh Duong enterprises to international clients and a vision to guide Vietnamese startups in establishing import/export operations in Belgium. Holding an Executive MBA from the Solvay Brussels School of Economics and Management (ULB), where she earned top honours including a leadership scholarship, a top-three graduation thesis on food sharing innovation, and the role of EMBA Ambassador for 2024-2025, she also completed an Accelerated Management Programme in 2016 and holds bachelor's degrees in Business and English from Foreign Trade University (2006) and Singing from Vietnam National Academy of Music (2005), complemented by multiple national music awards from her early career. Fluent in Vietnamese, English, and Dutch with basic French, Linh's interests in music and sports reflect her multifaceted background blending artistic talent with business acumen.





Robotic Automation for Dutch Dairy Farmers

Author: Jacco van der Maas

Dutch dairy farming is undergoing a profound transformation through the strategic deployment of robotic automation technologies, which enhance productivity, improve animal welfare, and advance environmental sustainability. This presentation provides a comprehensive overview of an integrated automation framework currently implemented on leading Dutch dairy operations and outlines planned expansions.

At the core of the system are fully automated robotic milking stations coupled with real-time sensors that continuously measure milk fat, protein content, yield, and overall quality. Individual cow tracking chips monitor locomotion patterns and behavioural indicators, enabling data-driven health and welfare management. An intelligent automatic gate system regulates access to pasture by predefined schedules and cow groups, while autonomous barn floor cleaning robots maintain optimal hygiene standards. Calves are reared using automated milk feeding stations, and on-site solar energy storage combined with market-responsive electricity trading optimises renewable energy utilisation and operational costs.

These livestock-focused innovations are seamlessly integrated with precision crop production technologies applied by agricultural partners. Smart camera-equipped weed control machinery selectively targets vegetation detrimental to cattle health, while automated systems provide continuous quantification of grass biomass and moisture content. High-precision GPS guidance ensures accurate planting and variable-rate fertiliser application, minimising input waste and environmental impact.

Future investments will extend automation to robotic feeding systems for adult cows and autonomous pushers for routine cleaning and maintenance of feeding alleys. Collectively, these technologies reduce labour dependency, elevate precision in resource management, and reinforce the Netherlands' position as a global leader in high-tech, sustainable dairy production. The presentation discusses technical implementation challenges, economic outcomes, and the broader implications for the future of European livestock agriculture.

Jacco van der Maas

VOF Van der Maas – Dang

Jacco van der Maas is a dedicated Dutch dairy farmer and agricultural economist. He graduated from Aeres University of Applied Sciences in Dronten with a degree in agricultural economics. He completed an internship at the U.S. Dairy Forage Research Center in Madison, Wisconsin. Upon returning to the Netherlands, Jacco joined his family's farming operation, VOF Van der Maas - Dang, a family owned dairy farm originally established by his parents. It began modestly with just one cow and basic equipment.





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Under the family's stewardship—including Jacco's involvement—the farm has grown significantly. Today, it manages 150 milking cows and a total herd of around 300 animals, encompassing dairy cows, calves, and beef cattle.

In response to increasing labour costs in the Dutch agricultural sector, the farm embraced modernisation. In 2015, VOF Van der Maas transitioned to a robotic milking system. Since then, Jacco and the team have prioritised automation across various farm operations to boost efficiency, lower costs, and ensure long-term sustainability.



Applying AI to Human-Centered Education for Vietnamese Children Abroad

Author: Dong Phong

Private Early Childhood and Primary Education Enterprises in the AI Era: The “Vietnamese Language - UNESCO Values - Local Culture” Model for Vietnamese Communities in the EU

In the context of digital transformation and increasing migration across the European Union, education for children in Vietnamese communities faces a dual challenge: preserving language and cultural identity while ensuring sustainable integration into host societies. Across Europe, there are currently an estimated 800,000~1,000,000 people of Vietnamese origin. Representative communities include about 70,000 in the Czech Republic, 6,000~7,000 in Slovakia, alongside larger populations in Germany and France. Children and adolescents account for roughly 20-30% of this population—hundreds of thousands of young people whose development will shape the community’s future identity and integration capacity.

The first generation of Vietnamese migrants in Europe focused primarily on learning local languages to stabilise their lives and establish economic standing. By contrast, younger generations born or raised in Europe face a different challenge: the gradual loss of their heritage language and a growing cultural distance from their roots. Teaching Vietnamese to children is therefore no longer merely a family concern; it has become a strategic issue linked to sustainable community development, intergenerational continuity, and long-term socio-economic cooperation potential.

Proposed Model: A Community-Based Educational Enterprise Scalable Across the EU

This paper proposes a private educational model for Vietnamese and Vietnamese heritage preschool and primary school children in Europe, built upon three strategic pillars:

1. Vietnamese Language - Foundation of Identity and Intergenerational Connection

Vietnamese serves as a cultural anchor and a bridge within families. Maintaining the heritage language from early childhood whether in Vietnamese or mixed-heritage households supports bilingual development, multicultural thinking, and confident integration. The proposed support ecosystem includes:

- 1- Vietnamese book collections in homes, schools, and community space.
- 2- Visually engaging bilingual learning materials (e.g., multilingual picture dictionaries, children’s life-journey journals).
- 3- Reading programs and author exchanges involving Vietnamese and other languages
- 4- Standardized digital platforms and learning resources, AI-assisted tools for parents, teachers, and mentors...

Vietnamese is the language of cherish, peace, and unity.



2. UNESCO Values - A Framework for Holistic Education

The model applies four educational pillars: *Learning to Know*, *Learning to Do*, *Learning to Be*, and *Learning to Live Together*. Among these, *Learning to Live Together* is emphasised as a core competency. Children develop respect for differences, intercultural dialogue skills, collaboration, and social responsibility. Education also prioritises digital-age competencies, including safe internet use, personal data protection, and ethical, transparent applications of artificial intelligence.

Learning to live together fosters sharing, responsibility, and lasting connections. It respects the unique identities and identities of different cultures and peoples in a world of rapid change and information highways.

Learning to live together in a safe and secure online world where personal identity and image are protected. AI is used responsibly and ethically. Today's generation of children, along with AI and its rigorously enforced laws, are protected to the maximum extent, ensuring user safety and personal development.

This philosophy aligns with the traditional strengths of Vietnamese communities as connectors within multicultural environments, while also preserving communal values during integration.

3. Local Culture - Positive Integration and Adaptive Flexibility

The curriculum is designed as an open framework adaptable to each host country. In Slovakia, for example, it may integrate civic education and local cultural content; in Belgium or other EU countries, it can be aligned with national educational standards and cultural contexts. This approach helps children avoid feeling “between two cultures” and instead empowers them to become active bridges between Vietnam and their societies of residence.

In Slovakia, the Vietnamese community was officially recognised as a national minority in 2023 and has received government support for Vietnamese language classes for children. However, these initiatives remain fragmented and lack standardised curricula and teaching materials, highlighting the urgent need for a structured and scalable educational model.

Belgium, with its multilingual identity, strong civic culture, and central geopolitical position in Europe, provides an especially suitable environment for implementing such a model. Here, AI is not only a technological tool but also part of broader policy and innovation ecosystems, enabling practical and scalable applications.

Within Europe's diverse cultural landscape, Vietnamese culture resonates with enduring values: historical continuity, adaptability, cooperation, and especially the central role of family and education. Regardless of technological progress, sustainable development ultimately rests on core human values—tradition, heritage, empathy, and mutual support. Drawing on thousands of years of history and decades of peace, today's and tomorrow's Vietnamese youth are expected to be dynamic, connected, innovative, and deeply integrated global citizens.

The Role of AI in the Model

Artificial intelligence is positioned as a personalised pedagogical assistant. It supports bilingual development, tracks learning progress, optimises educational resources, and assists teachers.



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Technology is applied in accordance with EU ethical and data-protection standards, while human interaction remains at the centre of education.

Strategic Significance and Scalability

The long-term goal is to build an integrated ecosystem linking education, community, and enterprise for Vietnamese populations across Europe. In this ecosystem, younger generations become strategic human capital—individuals with clear cultural identity, global mindset, and sustainable collaborative capacity in the AI era.

This proposal is intended as a policy reference for Vietnamese governmental bodies responsible for overseas communities and is also shared with educational institutions, associations, and partners across Europe to foster dialogue and networked cooperation.

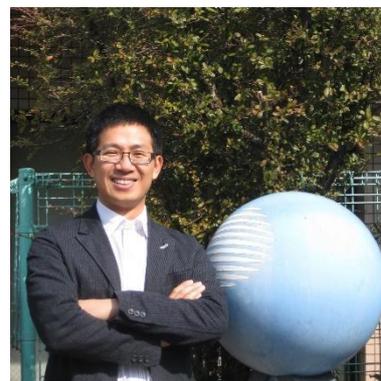
Core Message:

Investing in Vietnamese language education and cultural values for younger generations today and tomorrow is an investment in the future network of community connectivity and sustainable socio-economic cooperation for Vietnamese enterprises and communities across Europe.

Dong Phong

Team VietAssist

Mr. Dong Phong, who has studied, lived, and worked in Vietnam and Japan and is currently based in Slovakia. His background combines architecture, digital technology, and business development. Through his experience applying AI in real projects and raising his own children in a multicultural environment, he recognised the need for human-centred, inclusive, and sustainable education solutions for Vietnamese children growing up abroad.



Together with his partners, he formed Team VietAssist - an interdisciplinary group of professionals dedicated to building meaningful education models in a globalised world. The team includes Ms. Niki Trang Pham, a community activist in Slovakia and co-founder of Korene; Mr. Nguyen Duc Tho, an education researcher and Chairman of YOLO Education & Entrepreneurship Consulting JSC in Vietnam; and Dr. Vu Tri Tue, a medical doctor, certified coach, and management science researcher in Vietnam.

The VietAssist project applies Artificial Intelligence (AI) to early childhood and primary education in Vietnam and Central Europe, especially Slovakia and the Czech Republic. It develops a blended learning model connecting schools, families, and communities and AI, guided by three core values - Subtlety, Compassion, and Depth - and a holistic framework of Awareness, Recognition, Understanding, Belief, Action, and Sharing.

The project is designed from the start to comply with EU regulations, including GDPR and the EU AI Act, ensuring strong data protection, transparency, and ethical use of AI for children. VietAssist operates as an impact-driven EdTech business, combining subscription-based digital platforms with



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school partnerships and community programs, aiming for both financial sustainability and long-term social value.

Our main target group is Vietnamese children living in the European Union. For these children, AI acts as a dual bridge - helping them maintain Vietnamese language and cultural identity while supporting confident and successful integration into local education systems. Through this approach, VietAssist contributes to a more inclusive, humane, and future-ready education ecosystem in Europe and Vietnam.



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Startup Challenges in Innovation and Digital Transformation in the Renewable Energy Sector

Author: Vu Van Thong

Europe's commitment to attaining net-zero carbon dioxide emissions by 2050 is profoundly reconfiguring the energy paradigm. This decarbonisation imperative is catalysing substantial investments in renewable energy sources, transportation electrification, intelligent thermal management systems, and energy-efficient architectural designs. As the European Union advances toward a sustainable energy framework, technological innovation and digital transformation emerge as foundational elements underpinning this transition.

In this keynote presentation, the speaker elucidates the research and innovation endeavours at EMAX Belgium and EmaxSolar, delineating the mechanisms by which nascent technologies are operationalised into viable, commercially deployable solutions. The discourse addresses the multifaceted challenges inherent in commercialising research-derived innovations within a startup context, encompassing technology validation, capital acquisition, market penetration, and operational scalability amid intense competition in the energy domain.

Furthermore, the presentation examines the strategic integration of Artificial Intelligence (AI) across the speaker's enterprises and the wider energy ecosystem, spanning household and corporate scales. Through empirical case studies from industry applications, it illustrates AI's role in optimising solar photovoltaic production and consumption patterns, mitigating operational expenditures, augmenting user engagement, and elevating enterprise efficacy. Leveraging insights from EmaxSolar's digital transformation trajectory, the session imparts critical lessons, strategic frameworks, and pragmatic implementations that underscore the synergistic potential of innovation, entrepreneurial acumen, and AI in expediting Europe's energy transition, while offering transferable insights for analogous initiatives in Vietnam.

Dr. Vu Van Thong

EMAX/EmaxSolar

Dr Thong Vu Van is Founder and CEO of EMAX and EmaxSolar, active in the Belgian and Luxembourg markets, delivering end-to-end green energy solutions for private and commercial customers. He was involved and led the development of IT-driven solutions for green energy, smart operations, and customer engagement. With over 25 years' experience in energy innovation and 10+ years leading companies, he combines deep technical insight with business execution. He holds a PhD in Energy from the University of Leuven, Belgium.



He has led numerous European R&D projects, contributed to smart grid policy frameworks, and authored 30+ scientific publications. His talk bridges industry application, innovation strategy, and real-world impact of AI in climate-tech and energy systems.



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Session 3:

Nuclear Energy and Nuclear Medicine

Moderators:

Mr. Le Nguyen Tung - Secretary of ViLaB

Dr. Phung Quoc Tri - President of ViLaB



Energy, prosperity & long-term sovereignty

Author: Eric Van Vaerenbergh

Vietnam: Building a Nuclear Fleet – 10 Strategic Mistakes to Avoid

As Vietnam evaluates the relaunch of a nuclear power program, this keynote offers a pragmatic analysis grounded in four decades of European experience.

Nuclear energy is not merely a generation technology. It is long-term strategic infrastructure that shapes national sovereignty, industrial competitiveness, and macroeconomic stability.

Through ten major mistakes observed in Europe — loss of public trust, stop-start policy, capturable governance, regulatory overcomplexity, weakened supply chains, and underinvestment in human capital — this presentation highlights the systemic risks that can undermine even technically sound programs.

The central message is straightforward: the real risk is not nuclear technology — it is strategic incoherence.

Vietnam holds a unique advantage: starting now, with global lessons available, and the opportunity to design a coherent, stable, and future-oriented energy strategy aligned with long-term prosperity.

Eric Van Vaerenbergh

ATENAS Belgium and SOCOEL Limited Asia

Electromechanical engineer Eric Van Vaerenbergh is the Managing Director of ATENAS Belgium and Director of SOCOEL Limited Asia. He is also a lecturer in high-voltage electrical equipment and networks at ECAM.

He supports industrial stakeholders in tackling high-criticality issues such as electrical safety, risk management, regulatory compliance, and operational continuity.

Active across Europe and Asia, he adopts a pragmatic approach to energy policies and infrastructure, grounded in operational requirements, system robustness, and the sustainability of technical choices.

Through his work and publications, he offers a perspective on the interrelation between energy, industry, and sovereignty, with a particular focus on dispatchable low-carbon nuclear power, which he views as a key driver of long-term prosperity, resilience, and competitiveness.





Nuclear development in China - Lessons learnt for Vietnam's nuclear programme

Author: Bui Nguyen Hoang

China's rapid rise as a global nuclear power offers valuable insights for Vietnam who has revived its civilian nuclear programme in 2024. Over nearly four decades, China has transformed from operating its first French-assisted reactors in 1993 to becoming the second-largest country globally in number of operating reactors, with 59 reactors in operation by the end of 2025. It has also become the third-largest country (58.06 GW) in nuclear installed capacity, following the United States (96.95 GW) and France (63.0 GW). Today, a high proportion of nuclear equipment is sourced from Chinese suppliers. China has achieved optimised construction durations, with multiple projects completed in under 60 months, significantly faster than the global average in the world.

The Taishan 1 & 2 EPR project illustrates China's nuclear strategy. It was built as part of a joint venture (TNPJVC) between CGNPC and EDF, and based on the advanced 1750 MWe EPR design. The project demonstrates a progressive and structured transfer of technology and responsibilities from foreign suppliers to domestic Chinese teams between Unit 1 and Unit 2.

For Vietnam—currently preparing the construction of its first reactors to respond to the country's rising electricity demand and decarbonisation goals—China's experience provides several great lessons learnt.

Bui Nguyen Hoang

Project Manager, EDF Energy, UK

Bui Nguyen Hoang currently serves as a Project Manager within the MEH (Mechanical, Electrical and HVAC) programme at Hinkley Point C. He is a principal civil engineer and project leader with 18 years of experience in nuclear new-build projects across Finland, China, France and the UK. He has led multi-disciplinary teams in delivering complex civil engineering design and construction works.

Beyond his engineering and project leadership roles, Bui is a founding member and former General Secretary of AVSE Global (2011–2019), and since May 2025 he has been a founding member and President of VietNuc (Vietnam Nuclear Professional Network).





Securing the radioligand therapy value and supply chain: A Belgian perspective from isotope production to patient access

Authors: Koen Hasaers, Sarah Baatout

Radioligand therapy (RLT) is revolutionising targeted cancer treatment by uniting the precision of molecular medicine with the therapeutic potential of radionuclides. As clinical successes continue to grow, the challenge lies not only in delivering these therapies reliably and safely, but also in ensuring they are accessible to patients in a **timely, equitable and affordable** manner.

Belgium, leveraging its unique position within Europe and worldwide nuclear medicine landscape, offers a comprehensive approach to building a **resilient and innovative RLT value chain**. From the production of medical radioisotopes in nuclear research reactor and accelerators to the development of GMP-compliant radiopharmaceuticals and hospital-scale delivery, Belgium is addressing critical points of vulnerability and opportunity along the entire RLT supply chain.

This webinar will explore how Belgium is reinforcing the entire RLT value and supply chain, highlighting efforts in preclinical and translational research, upscaling production and innovative R&D approaches in radiochemistry, radiobiology and dosimetry to ensure a robust and sustainable supply chain.

It will also highlight how these elements, alongside investments in infrastructures, skilled workforces and robust logistics, contribute to a more **resilient and responsive European and global supply chain**, capable of delivering radioligand therapies **equitably and sustainably** across healthcare systems and supporting the continued growth of RLT in clinical practice.

By highlighting cross-sector collaboration—from science to policy—this session aims to inspire international stakeholders with concrete strategies to ensure that the full promise of radioligand therapy can be **fulfilled for all patients**, now and in the future, in a sustainable and equitable manner.

Koen Hasaers

Director of the Institute of Nuclear Medical Applications at SCK CEN

Koen Hasaers serves as the Director of the Institute of Nuclear Medical Applications at SCK CEN, where he leads a dynamic team of approximately 100 accomplished scientists and supporting staff members. Under his guidance, the institute stands at the forefront of groundbreaking research in nuclear medicine and cancer therapy.

The dedicated team focuses on various aspects, including radiopharmaceutical research and development, cutting-edge cancer treatments, and the efficient supply chain management and production of medical radioisotopes.

K. Hasaers' expertise covers complex markets, where he excels as a business developer and product innovator. His international supply chain skills extend across Europe, the US, China and the emerging markets.





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His ability to navigate and optimise the logistics of radioisotope production, distribution, and regulatory compliance has made him a recognised leader in this essential sector. As a business developer and product innovator, he excels in addressing the challenges of the nuclear medicine market, driving sustainable solutions that enhance the accessibility and effectiveness of medical treatments.

As a governance specialist, he has chaired the board and successfully secured funding from major Venture Capital funds. His academic background includes MSc degrees in Bioengineering, Engineering and Automation from Ghent University, Belgium.

Prof. Sarah Baatout

Deputy Director of the Institute of Nuclear Medical Applications at SCK CEN

Professor Sarah Baatout is the Deputy Director of the Institute of Nuclear Medical Applications at the Belgian Nuclear Research Center (SCK CEN) in Mol, Belgium. Leading a team of 100 staff members, she specialises in radiopharmaceutical development, medical radioisotope production and cancer treatment research, with a focus on promising radioisotopes for targeted radionuclide therapy. She chairs the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), advises the European Nuclear Society and the European Space Agency, and teaches at UGent and KULeuven in Belgium. With over 200 publications and nearly 30 PhD mentees, her work significantly impacts medical radiopharma and cancer field





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Nuclear Medicine in Vietnam and Hospital 108: Chance and challenge in new era of theranostics

Author: Mai Hong Son

Theranostics represents an inevitable trend in modern nuclear medicine, seamlessly integrating diagnostic imaging and targeted therapy to provide personalised care for oncology patients. In Vietnam, while the field has achieved important milestones over the past five decades, development remains uneven across different regions, necessitating urgent national and international collaboration. This report examines the strategic framework proposed by the 108 Military Central Hospital to deal with the challenges and opportunities of this new era. The core of this initiative involves establishing a comprehensive Theranostics Practice Center alongside a state-of-the-art Radiopharmaceutical Research and Development (R&D) Centre. Central to these efforts is the development and clinical application of next-generation radiopharmaceuticals, specifically 18F-FES, 18F-PSMA, and 18F-FAPI for precision molecular imaging and 177Lu-PSMA for targeted radionuclide therapy. Looking toward future horizons, the hospital aims to implement high-LET (Linear Energy Transfer) therapies utilising 161Tb, 211At, and 225Ac-PSMA to address treatment resistance and microscopic disease. By fostering partnerships with international entities such as SCK CEN, 108 Military Central Hospital seeks to bridge technological gaps, standardise clinical protocols, and position Vietnam as a regional leader in the global theranostics landscape.

Dr. Mai Hong Son

Department of Nuclear Medicine, 108 Military Central Hospital

Mai Hong Son, MD, PhD, is a highly accomplished and internationally recognised expert in Nuclear Medicine, currently serving as Chair of the Department of Nuclear Medicine. He is also an invited lecturer at Hanoi Medical University and the 108 Institute of Clinical Medical and Pharmaceutical Sciences in Hanoi, Vietnam, where he excels in communicating complex scientific and clinical concepts to diverse audiences, advancing fields like molecular imaging, radionuclide therapy, and AI applications in nuclear medicine.



Dr. Mai's key expertise spans diagnostic nuclear medicine (including PET/CT, SPECT/CT, and hybrid imaging), radionuclide therapy (theranostics, personalised medicine, and dosimetry), molecular imaging (radiopharmaceuticals, biomarkers, and drug development), and clinical research (image interpretation and outcome analysis). In teaching and mentorship, he has guided doctoral and master's theses and delivered notable invited lectures, such as a 2019 e-learning module on 18F-FDG PET/CT in oesophageal cancer for the Regional Campus Agreement in Seoul, Korea, and a 2023 presentation on a novel dosimetry method for treating intermediate and advanced-stage HCC at the Malaysian Society of Nuclear Medicine & Molecular Imaging in Putrajaya, Malaysia.



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His achievements include serving as Vice Chair of the Nuclear Medicine Department at Hospital 108, receiving the Young Laureate award from the Hanoi Medical Department, the Prime Minister's Laureate for contributions to nuclear medicine, and acting as National Project Coordination Officer for an IAEA project. Dr. Mai's work continues to drive innovations in personalised and precision medicine.



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Session 4:

Biotechnology

Moderator:

Dr. Nguyen Thi Ninh Thuan - Board of Directors of ViLaB



Microplastic-Associated Bacterial Communities and Antimicrobial Resistance in the Red River Delta: Opportunities for Vietnam–EU Biotechnology Cooperation

Authors: Vo Hoai Hieu^{1,2}, Nguyen Van Tu^{1,2}, Thao Le Thanh^{1,2}, **Huong Thi Thuy Ngo^{1,2*}**

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Microplastics (MiPs) are emerging global pollutants of serious concern, not only due to their physical persistence but also because their surfaces serve as selective substrates for pathogenic bacteria and antibiotic resistance genes (ARGs). The plastisphere — the biofilm community colonising MiP surfaces — acts as a mobile vector capable of transporting pathogens and ARGs through aquatic food webs, from primary producers to fish and ultimately to human consumers. Addressing this transboundary health threat requires advanced biotechnological approaches and robust international collaboration, making it an ideal focus for Vietnam–EU scientific partnership.

This study presents the first comprehensive assessment of MiP-associated bacterial communities and antimicrobial resistance risks in the Red River Delta (RRD), Vietnam, conducted under a One Health framework. From February to April 2024, 1,191 samples were collected across 14 sites in Hanoi, Ha Nam, Nam Dinh, and Ninh Binh, encompassing water, sediments, MiPs, and suspended matter (SM). A standardised biofilm extraction protocol was developed, achieving a 2,095-fold improvement in bacterial recovery (28,020 CFU/particle; 26.5 ng/μL DNA) compared to conventional methods. A semi-automated laboratory simulation system was further established to investigate plastisphere dynamics and stress responses under antibiotic and heavy metal pressure.

Field results revealed bacterial densities of 10^2 – 10^7 CFU/mL in water, 10^5 – 10^7 CFU/g in sediment, and 10^3 – 10^5 CFU/MiP piece, with MiPs and SMs consistently harbouring higher pathogen loads than surrounding water. Among 1,502 suspected pathogenic strains isolated, *Pseudomonas* spp. were confirmed in 17.7% of isolates and *Salmonella* spp. in 34.3%, with five critical hotspots identified (HN1, HNa, NB1, NB2, NB3). Crucially, pathogens were detected on MiPs even when absent in bulk water or sediment, demonstrating the role of MiPs as selective enrichment surfaces that concentrate and shield pathogens from environmental dilution.

Metagenomic analysis revealed that MiP bacterial community composition is consistently distinct from that of ambient water, with significantly enriched opportunistic pathogens — *Acinetobacter*, *Pseudomonas*, *Aliarcobacter*, and *Aeromonas* — on particulate matrices. ARG abundance was invariably higher on MiPs and SMs than in water, with fluoroquinolone, rifampicin, and fosfomycin resistance genes predominating. Pathogens exposed to ciprofloxacin or lead stress displayed elevated minimum inhibitory concentrations, confirming co-selection of resistance under environmental stressor conditions. These findings establish MiPs as not only pathogen reservoirs but active amplifiers



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of antimicrobial resistance, with ARG-laden biofilms posing a direct risk of transmission through the food chain — from contaminated river systems to fish tissue and human consumption.

This research opens concrete avenues for Vietnam–EU scientific partnership in environmental biotechnology, particularly in plastisphere surveillance, next-generation AMR monitoring technologies, and evidence-based risk assessment frameworks. Future work includes whole-genome sequencing of multidrug-resistant strains, mobile genetic element analysis, antibiotic residue quantification, and quantitative microbial risk assessment (QMRA). Collaboration in these areas can contribute to shared One Health goals of environmental and public health protection across both regions.

Acknowledgement: This work was funded by the projects the project “Microplastic-Mediated Antimicrobial Resistance in Aquatic Ecosystems: One Health Implications” (Grant No. MOHIP-2024) and ‘Sources, Sinks and Solutions for Impacts of Plastics on Coastal Communities in Viet Nam’ - NE/V006088/1 sponsored by UKRI-GCRF via the programme ‘Reducing the Impacts of Plastic Waste in Developing Countries’.

Prof. Ngo Thi Thuy Huong

Phenikaa University

Dr. Ngo Thi Thuy Huong is an environmental scientist specialising in ecotoxicology and environmental health. She received her PhD from the University of Bayreuth (2008) and is currently a research group leader and lecturer at Phenikaa University.

She has led or co-led 17+ research projects (total funding > USD 5 million) supported by GCRF/NERC (UK), USAID/NAS (USA), VLIR-UOS (Belgium), and MoNRE and NAFOSTED (Vietnam). Her research focuses on water and soil pollution, microplastics, phytoremediation of Agent Orange–contaminated sites, antimicrobial resistance, and disease biomarkers.

Dr. Huong has published extensively, supervised many students, and presented internationally. She has strong experience in international collaboration, leadership, and working effectively under pressure.





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BioTech solutions in Aquaculture: successes and challenges

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In the face of increasing pressures in aquaculture such as infectious diseases (AHPND/EMS, WSSV, EHP), antimicrobial resistance, and environmental pollution, biotechnology is playing a central role in the global aquaculture sector's strategy for sustainable development. This report (1) evaluates breakthrough biotechnological solutions that have been successfully applied, (2) analyses how countries with advanced technological capacity and large aquaculture production have overcome implementation challenges, and (3) proposes practical applications in Vietnam to establish a sustainable and economically efficient aquaculture system.

Practical evidence shows that Recirculating Aquaculture Systems (RAS) and Biofloc Technology (BFT) have demonstrated effectiveness in nitrogen control, cost reduction, and performance improvement. Probiotics and synbiotics enhance gut microbiota balance and strengthen shrimp immune responses. Advances in RNA interference (RNAi) and CRISPR/Cas gene editing have opened new opportunities for developing disease-resistant strains. Notably, bacteriophage therapy has emerged as a highly specific biological solution for controlling pathogens (*Vibrio* spp.), reducing dependence on antibiotics and mitigating antimicrobial resistance.

Major aquaculture-producing countries such as Ecuador, India, Chile, and Norway have integrated scientific and technological approaches into aquaculture to optimise environmental management and disease control. Belgium, with its advanced biotechnology sector, has developed numerous innovative solutions addressing current challenges in the aquaculture industry. In Vietnam, experimental studies indicate that biotechnology applications can increase shrimp survival rates by 15–20%; however, challenges remain at the large-scale production and commercialisation stages due to limitations in field data, GMP standards, and regulatory frameworks.

This report proposes an integrated model, “R&D – Precision Monitoring – Biosafety”: leveraging research and development (R&D) expertise from technologically advanced countries such as Belgium, Denmark, and the United States; drawing on precision aquaculture practices implemented in India, Ecuador, and Norway; and adapting biosafety farming systems to Vietnam's specific ecological, climatic, infrastructural, and production conditions. This approach aims to bridge the gap between research and field application, enhance the effectiveness of biotechnology solutions (probiotics, phage, biofloc, RAS, etc.) in Vietnamese aquaculture, meet EU export standards, and promote long-term sustainable development.



Nguyen Qui Quynh Hoa

Eurogen BV

DVM, MSc. Nguyen Qui Quynh Hoa is a molecular biotechnology scientist with 18 years of R&D experience. Specialised in AMR, One Health, and bacteriophages, she bridges the gap between lab research and field applications in livestock, aquaculture, and environmental management through sustainable, non-antibiotic biological therapies.



As a **valedictorian** and **Cargill Research Prize** winner, she held prestigious scholarships for her Master's studies in **Belgium** and continued advanced scientific education and training in **Japan, Italy, and Sweden**. She is the author of 15 scientific publications. Her research focuses on applying advanced molecular biotechnology to develop robust biological solutions that are ready for real-world deployment. As an experienced speaker at international conferences and research mentor, her academic career also includes mentoring young researchers and actively contributing to international research collaborations.

Alongside her academic work, she has led **large-scale national programs** and **industry-focused R&D**. As National Manager for Vietnam's Avian Influenza pandemic-preparedness programs (USD 38 million), she coordinated surveillance across 11 provinces and established ISO17025 protocols for 8 regional laboratories, strengthening outbreak response capacity. With over 15 years as an applied biotechnology advisor, she has consulted companies in developing sustainable, bacteriophage and non-antibiotic biological solutions. She has also contributed to vaccine development, One Health programs, and international collaborative research.

Her future work will continue to focus on **translating advances in biotechnology into sustainable, practical biological solutions** - leveraging applied biotechnology, microbiology, phage therapy, and antibiotic alternatives - to support livestock production, veterinary, aquaculture, and environmental management.



Advancing plant tissue culture for crop propagation and breeding

Author: Danny Geelen

Plant tissue culture started over a century ago and since the discovery of callus culture in the '60s it has led to studies in cytology, nutrition, somatic embryogenesis, plant genetic modification, pathogen-free plants and germplasm storage, secondary metabolite biosynthesis, etc. The most broadly used application of tissue culture is the clonal propagation of elite varieties. Advances in plant tissue culture technology have mainly relied on empiric experimental approaches testing different compositions of culturing media, genotypes, explants etc. While this has led to successes for some species, at a larger scale progress has been erratic and coincidental. In recent years much progress has been made in unravelling molecular processes underlying plant tissue culture. For instance, several genes have been identified that are important for the formation of shoots, roots or somatic embryogenesis, as well as regeneration competence, the capacity of a cell or tissue to regrow into an entire plant. These molecular studies in combination with technological breakthroughs such as CRISPR/Cas genetic transformation and single cell sequencing technology will have an important impact on the process of crop breeding accelerating the introduction of novel traits and on the propagation of elite plant varieties. I will give these and other examples of innovative technologies that have the potential to reshape the future of plant tissue culture.

Prof. Danny Geelen

HortiCell, Dep. Plants and crops, Faculty Bioscience Engineering, Ghent University

Danny Geelen is Full professor at Ghent University. He graduated with a master's in biology, direction Plant Biotechnology from Ghent University (UGent, Belgium) and holds a PhD in Plant Biotechnology. He was principal investigator at the Plant Systems Biology (VIB) from 2000-2005 heading the plant cell biology research unit. Thereafter he was appointed professor at the faculty of Bioscience Engineering leading the research unit HortiCell (www.horticell.ugent.be). His



research is at the cross section of fundamental and applied research. HortiCell develops innovations in plant tissue culture, plant breeding, and plant biostimulants. Since his appointment, he is promoter of 25 PhD studies, published >200 papers cited >10.000 times with h-index 60.

His expertise covers:

In Vitro Culture: adventitious roots and shoot formation, microspore embryogenesis, protoplast regeneration. These processes are studied using cell biological (microscopy), molecular genetics and metabolic techniques.

Biostimulants research: Biostimulant research at HortiCell includes the development of novel biostimulants from organic waste extractions and bacterial isolates from hydroponic cultures. The mode of action of biostimulants is investigated using tissue culture bioassays (aseptic conditions) and in controlled environment conditions (hydroponics culturing systems).



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Plant Sexual Reproduction and Breeding: The impact of the environment on sexual reproduction, meiosis and microsporogenesis. In this section the impact of high temperature stress on male meiosis and microsporogenesis is studied.



Microbial formulation for sustainable agriculture: Recent advances and perspectives for Vietnam

Authors: Trang Tran-Minh, Kris Audenaert

The transition toward sustainable agriculture is being accelerated by global policy frameworks such as the EU “*Farm to Fork*” strategy, which emphasises the need to reduce pesticide use, minimise nutrient loss, and expand organic farming by 2030. These international market pressures are increasingly relevant for Vietnam, where agricultural production is shifting toward greener and more organic farming under the National Action Plan (*Decision 300/QĐ-TTg*). Within this context, and under increasing pressure from climate change and high disease incidence in tropical weather, microbial formulations are emerging as promising tools to support sustainable crop protection and productivity.

Recent advances have significantly expanded the potential of microbial solutions. High-throughput discovery platforms, omics technologies, and improved screening strategies now enable faster identification of beneficial microorganisms. The field is also shifting from single-strain applications toward microbial consortia and synthetic communities, supported by advances in formulation technology and a deeper understanding of field performance and environmental interactions. Looking forward, precision agriculture, microbiome engineering, and the development of postbiotics and phage-based approaches represent key future directions.

For Vietnam, translating these innovations into practice requires a practical roadmap. Priority should be given to export-relevant crop–pest systems, alongside investment in advanced formulation technologies and the establishment of clear and science-based regulatory guidelines for the registration of new microbial products in Vietnam. Equally important are strategies that ensure adoption by smallholder farmers, supported by enabling policies and stronger research–industry–government collaboration to convert research outcomes into practical industrial solutions.

Overall, microbial formulations offer a realistic and science-driven pathway toward more sustainable and resilient agriculture. By aligning scientific advances with local agricultural needs and policy frameworks, Vietnam can accelerate the transition toward greener production systems by 2030 while maintaining competitiveness in global markets.

Dr. Tran Minh Trang

Ghent University

Dr. Tran Minh Trang is a plant–microbe interaction scientist specialising in priming, biocontrol, and biostimulants for sustainable crop protection. He obtained his PhD from Ghent University in 2021 and is currently a postdoctoral researcher at Ghent University, Belgium.

He has held postdoctoral fellowships at INRAE Bordeaux (France, 2022–2023) and KU Leuven (Belgium, 2023–2024), where he investigated antifungal plant metabolites and carbohydrate-based priming agents against biotic stress in major crops. His research focuses on plant–microbe–metabolite interactions, microbial biocontrol, and the use of priming strategies to enhance plant immunity.





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Dr. Tran Minh Trang has published 14 peer-reviewed articles (13/14 Q1 papers), supervised PhD and master's students, serves as a reviewer for leading journals in plant and food sciences, and is actively involved in academic evaluation committees. His long-term ambition is to establish an independent research line developing metabolite- and microbe-inspired solutions for crop protection.

