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Profile:

I am a Lecturer in the School of Information Technology at Monash University Malaysia, working at the intersection of artificial intelligence and energy systems, with a focus on scalable solutions for climate resilience and decarbonisation. My research centres on digital twins for buildings, particularly hybrid energy storage systems (HESS) that integrate thermal energy storage with complementary technologies such as batteries and renewable generation. I develop data-driven models and intelligent control strategies to enable the coordinated optimisation of these systems, improving energy efficiency, flexibility, and cost performance.

I adopt an interdisciplinary approach that combines machine learning, optimisation, and engineering systems to bridge theory and real-world implementation in the built environment. During my doctoral research, I developed deep learning frameworks for thermal energy storage air-conditioning (TES-AC) systems, achieving high predictive accuracy and improving operational efficiency in commercial buildings. My recent work extends to climate-responsive and urban-scale applications, including privacy-preserving AI models for urban heat island prediction, aligning advanced analytics with ethical and societal needs.

I am also passionate about AI upskilling and responsible workforce transformation. I believe AI should be approached as a tool developed to improve human efficiency—not simply to remove people from the workplace. Through effective training, tasks that are repetitive or suitable for automation can be streamlined, while employees are upskilled to undertake higher-value, more creative, analytical, and strategic responsibilities. My training approach therefore focuses on helping individuals and organisations use AI confidently, responsibly, and purposefully to improve productivity and generate measurable value.

As an HRD Corp Accredited Trainer, I bring together academic knowledge, applied AI experience, and industry-oriented learning approaches. I completed my HRD Corp Train-the-Trainer certification in June 2026 and received HRD Corp trainer accreditation in July 2026. Alongside my research, I integrate industry into education through project-based learning and collaborations with external partners. My goal is to translate AI-driven innovations into practical, investment-ready solutions leveraging hybrid energy storage and digital twin technologies, while fostering collaboration across academia, industry, and policy to accelerate low-carbon and climate-resilient systems.

Professional Training Credentials:

- HRD Corp Accredited Trainer (ID: 71710), July 2026
- HRD Corp Train-the-Trainer Certification, June 2026

Education:

- Doctor of Philosophy, University of Nottingham (2019-2024) 36-month doctorate
 - Interdisciplinary: Civil Engineering & Computer Science (Research Focus: Applied machine learning for optimizing thermal energy storage air-conditioning (TES-AC) systems in commercial buildings.)
- Master of Science in Computer Science, University of Nottingham (2018-2019) 12 months Master's
 - Research Focus: Evaluated virtual reality (VR) as a pedagogical tool for interactive teaching and learning for engineering students in higher education. Interdisciplinary project: Human-Computer-Interaction and Civil Engineering Education (Scored 74%)
- Bachelor of Science with Honors in Software Engineering, University of Nottingham (2015–2018) 3 years
 - First Class, 72%. Final-Year Project: Developed a GPS-based blood donation app to support emergency medical response. (Scored: 80%)

Current position and previous positions:

Lecturer, Teaching and Research, School of Information Technology Monash University Malaysia (September 2025-Present)

- Unit Coordinator - FIT4002 Software Engineering Industry Experience Studio, managing industry-based projects with external partners e.g. AMSolar, TranxEnergy, Zero Range Healthcare, and Source Code Asia to provide real-world student projects. Organised industry guest lectures featuring experts from Intel, IBM, Work Inspires, Chamrun Digital, and Cancer Research Malaysia.

- Academic Supervisor - FIT3199 Industry Work Experience, supervising 11 students placed at organisations including L'Oreal, Khind, Sunday Digital, Prince Court Medical Centre, Shopee, PwC, SK Intellix, 7-Eleven, and Bosch. Initiated an industry collaboration with Bosch to support final-year projects for FIT3163/FIT3164.
- School of IT representative of Executive Education for Monash University Malaysia (2026).

Graduate Research & Teaching Assistant, Faculty of Science and Engineering, University of Nottingham Malaysia (2019–2023)

- Researched and designed gamified virtual labs for STEM education (Biology, Chemistry, Stereochemistry, Civil Engineering), integrating innovative technology into higher education. Designed virtual tours for pharmaceutical students and developed a prototype software tool within the Capabilities in Academic Policy Engagement (CAPE) framework to support research on soft skill development.

Research Output

- Total publications: 9 peer-reviewed journal articles, 4 conferences, 1 book chapter
- Citations: 262 (Google Scholar, August 2026) h-index: 8 (Google Scholar)

High Impact publications:

1. **Sanzana, M. R.**, Maul, T., Wong, J. Y., Abdulrazic, M. O. M., and Yip, C. C. (2022) 'Application of Deep Learning in Facility Management and Maintenance for HVAC', *Automation in Construction*, 141, 104445. doi:10.1016/j.autcon.2022.104445 (*cited 135 times; among the journal's most downloaded*)
2. **Sanzana, M. R.**, Abdulrazic, M. O. M., Wong, J. Y., Maul, T., and Yip, C. C. (2023) 'Effects of External Weather on the Water Consumption of Thermal-Energy-Storage Air-Conditioning Systems', *Energy Nexus*, 10, 100187. doi:10.1016/j.nexus.2023.100187 (*cited 17 times*)
3. **Sanzana, M. R.**, Abdulrazic, M. O. M., Wong, J. Y., Maul, T. and Yip, C. C. (2023) 'Charging Water Load Prediction for a Thermal-Energy-Storage Air-Conditioner of a Commercial Building with a Multilayer Perceptron', *Journal of Building Engineering*, 75, 107016. doi:10.1016/j.jobbe.2023.107016 (*cited 10 times*)

Research Highlights

- Developed a deep learning framework for thermal energy storage air-conditioning (TES-AC) systems, achieving 93.4% predictive accuracy
- Developed a privacy-preserving AI model for water pollution detection and urban heat island prediction without geolocation data (EY AI & Data Challenge recognition)
- Contributed to gamified virtual labs and VR-based learning tools adopted in STEM education
- Research spans AI-driven HVAC optimisation, energy efficiency, and climate-responsive systems

Grants and Recognitions

- OpenAI Build Week 2026 – Outstanding Project, Education Category
- Code Without Barriers Hackathon 2026 Champion in Developing Personal AI Assistant (Funded by Microsoft)
- EY AI & Data Challenge 2026 (Top 5 finalists out of 24000 submissions) -First in Asia, Second Highest Score. Global Finalist
- Marie Skłodowska-Curie Actions Postdoctoral Fellowship (MSCA-PF) – Seal of Excellence, European Commission (2025 Call), Score: 90/100. Awarded 2026.
- Monash Seed Grant: Data-Driven Energy Management Systems, Monash University Malaysia (2026), MYR 30,000, Principal Investigator.
- Science and Engineering Postgraduate Research Scholarship for PhD (2019–2023)
- WomenTech Global Awards – Second Place IT Graduate of the Year (2022)
- AWS AI & ML Advanced Program Scholarship (2023)

Invited presentations

- Research Presenter, International Greentech & Eco Products Exhibition and Conference Malaysia (IGEM) 2026, October 2026: Scheduled to present research on AI-driven energy management and the coordinated optimisation of hybrid thermal and electrical energy storage systems.
- Invited Speaker, BETT Asia 2026, September 2026
- Invited Speaker, AWS Community Day Malaysia 2026, September 2026: "Building Your Custom AI That Thinks Ahead for You with Amazon Bedrock"
- Invited Speaker, Google Developer Groups (GDG) Kuala Lumpur Meetup, July 2026: Delivered a session on agentic AI and its practical applications in insurance, including customer support and claims triage.

- Invited Speaker, Google Developer Groups on Campus (GDGoC), Sunway University: Delivered “Prototype in Minutes,” a practical session on using AI tools to rapidly transform ideas into working prototypes.
- Invited speaker and Panelist at Women Atlas 2 Day Summit, She Leads Brands (Panel- What leadership really looks like behind the scenes: courage, doubt, and uncertainty)
- Keynote speaker, *Ciptrix AI Education Conference 2025* (Malaysia, scheduled to be held on 16 November 2025): Presentation on Global Trends and Innovations in STEAM Pedagogy, highlighting how educators are reimagining STEAM to foster creativity, collaboration, and problem-solving with current AI-enabled tools.
- Keynote speaker, *Heritage Forum 2025* (Malaysia, scheduled 3 November 2025): AI & She: Empowering Women in the Digital Age. I will contribute insights on AI’s role in advancing gender equity, digital inclusion, and practical applications of AI in society.
- Invited Speaker, *WomenTech Global Conference* (2023): Delivered a talk on encouraging women to pursue careers in AI and ML, emphasizing equality and inclusion in the tech sector.