



RESEARCH 2026

SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICAL SCIENCES (SCEMS)



ACKNOWLEDGEMENT OF COUNTRY

La Trobe University acknowledges our campuses are located on the lands of many Traditional Custodians in Victoria and New South Wales. We recognise their ongoing connection to the land and value their unique contribution to the University and wider Australian society. La Trobe University is committed to providing opportunities for Aboriginal and Torres Strait Islander people, both as individuals and communities, through teaching, learning, research and partnerships across all our campuses.

Wurundjeri
Melbourne
(Bundoora and City)

Dja Dja Wurrung
Bendigo

Dhudhuroa/Waywurru
Albury-Wodonga

Latji Latji
Mildura

Yorta Yorta
Shepparton

Gadigal
Sydney





THE SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICAL SCIENCES' (CEMS) RESEARCH VISION IS TO ADVANCE IMPACTFUL, OUTCOME-FOCUSED DISCOVERY AND APPLIED RESEARCH TO ADDRESS GLOBAL CHALLENGES AND DELIVER MEANINGFUL SOCIETAL BENEFIT.



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WELCOME

As the Dean of the School, I am pleased to present you the exciting and innovative research strengths that define our school as a leading force in advancing knowledge across the STEM disciplines – computing, engineering, mathematical and physical sciences. As well as core research and innovation in these areas, we are proud of our collaborative and multidisciplinary capabilities.

The School hosts four research centres: the Centre for Technology Infusion (CTI); the CISCO La Trobe Centre for Artificial Intelligence and Internet of Things; the Centre for Materials and Surface Science (CMSS); and the Australian Centre for Artificial Intelligence in Medical Innovation (ACAMI). In addition, the School hosts the Optics, X-Ray and Biosensing Innovation Group (Abbey Lab) and the Optus Digital Health team. Together, these centres and groups contribute to cutting-edge research which aims to deliver significant benefits to communities and industry.

I hope you will find this guide a useful summary of SCEMS's research capabilities which include artificial intelligence, cybersecurity, data science, smart sensor technology, mathematical modelling, physics, advanced manufacturing, sustainable infrastructure, x-ray science, materials science and quantum computing.

In SCEMS, we will continue to optimise our research strengths to develop solutions for healthcare, agriculture, transport, logistics, infrastructure and sustainable environments.



PROFESSOR WENNY RAHAYU
**(Dean, School of Computing,
Engineering and Mathematical
Sciences)**

We foster a research-driven culture of curiosity, creativity, and critical thinking, striving to provide an environment that supports academic excellence and nurtures talent.

Our expertise is empowered by a full research ecosystem, from fundamental blue-sky innovation to end-user engagement and commercialisation. We celebrate our ability to solve problems by building teams across this spectrum, with a breadth of discipline and innovation styles. This is a pivotal capability for bridging the gap between academia and industry, enabling original solutions for real-world applications. Our researchers have received prestigious fellowships (NHMRC Leadership fellow, ARC Future Fellows and DECRAAs) and awards, such as the Australian Eureka Museum Prize for Innovative Use of Technology, and the Victoria Prize for Physical Sciences, while our work with the LTU incubated start up GAIA Project, was runner up in Nasa's Deep Space Food Challenge.

The school supports four research centres. The Australian Centre for AI in Medical Innovation, a joint investment between the University and the Victorian State Government in conjunction with our partner BioNTech.

This is the world's first university innovation centre specialising in the application of AI to accelerate the discovery and development of immunotherapies, vaccines and medical innovation.

This centre is also home to Australia's first NVIDIA DGX H200 computer. The Cisco – La Trobe Centre for AI and IoT, a world first centre for the integration of AI and Internet of Things, with a key industry partner Cisco. The Centre for Materials and Surface Science, offering Australia's most comprehensive suite of surface science and surface analysis equipment. The Centre for Technology Infusion, our flagship centre for technology focussed innovation, offers end to end services to government and industry in all spaces: agri-tech, med-tech, energy, smart cities, defence and logistics.

I invite you to explore our research achievements in the SCEMS research capabilities guide and look forward to receiving your feedback and comments.



PROFESSOR MARCEL JACKSON
(Associate Dean, Research and Industry Engagement and Director of Graduate Research)

1. RESEARCH CENTRES

1.1 CENTRE FOR TECHNOLOGY INFUSION (CTI)

DR SHANMUGA SUNDAR DHANABALAN (DEPUTY DIRECTOR)

ASSOCIATE PROFESSOR HIEN NGUYEN (DEPUTY DIRECTOR)

ERIK VAN VULPEN (DEPUTY DIRECTOR)

The Centre for Technology Infusion (CTI) provides end-to-end services to government and industry across Agri-tech, Med-tech, Energy, Smart Cities, Defence and Logistics.

CTI collaborates with local and international partners to research, develop and test next generation technology solutions and solve problems affecting a wide range of industries today.

CTI is a one-stop-shop for partners from private, corporate and government projects to work together with our teams and help take conceptual designs into working prototypes for testing and large market production.

The combined expertise and experience of our multi-disciplinary teams gives CTI core capabilities in the following areas:

- problem diagnosis
- designing and developing a solution
- conducting field trials and assessing impact of solution
- product concept realisation as a market ready solution.

CTI utilises energy efficient and low-cost next-generation technologies to provide our partners with high performing solutions that deliver excellent connectivity.

Research and development at CTI focus on the following areas:

- smart technologies
- predictive technologies
- connected technologies
- miniaturised technologies.

To help drive the development of next generation technologies, this research also includes:

- wireless systems and sensors
- microchips
- firmware and software
- complex data processing.

CTI hosts 12 research programs that delivers advanced technological solutions across a wide range of industries including: agri-tech, med-tech, energy tech, smart cities, defence and logistics:

- Applied Robotics
- Mathematics, Statistics and Modelling
- Big Data Management Analytics and Systems
- Advanced Materials, Manufacturing and Mining
- Cybersecurity and Blockchain
- Technology Adoption
- AI and Machine Learning
- Infrastructure and Environment
- HCI Visualisation and User Experience
- Digital Communication Systems and Emerging Networks
- Micro-nano Systems
- Soft Electronics and Sensors.

THE SCHOOL OF COMPUTING, ENGINEERING AND MATHEMATICAL SCIENCES HOSTS FOUR RESEARCH CENTRES, AS WELL AS THE OPTUS DIGITAL HEALTH TEAM AND THE OPTICS, X-RAY AND BIOSENSING INNOVATION GROUP: ABBEY LAB



Asian Smart Cities Research Innovation Network (ASCRIN) – A CTI Initiative

The Asian Smart Cities Research Innovation Network (ASCRIN), an initiative initiated by CTI and participated by the 10 Schools of the University, was founded in 2019.

It is now La Trobe’s single largest research internationalisation initiative with joint investment of more than AUD \$43 million. Key partners in the network include: the Indian Institute of Technology Kanpur (IIT-K), Birla Institute of Technology and Science, Pilani (BITS-Pilani) and the Tata Institute of Social Sciences (TISS). The IIT Kanpur – La Trobe Research Academy (ASCRIN’s largest node in India) was established in 2020.

ASCRIN brings together a network of over 250 researchers, global industry partners, government collaborators and start-ups to advance research into smart city-related projects, helping to improve sustainability, liveability and efficiency of cities and towns in the region.

ASCRIN has over 50 projects underway that will make a tangible difference in the lives of people in South Asia, including:

- data-driven decision making to improve Dairy supply chains.
- re-using construction and demolition waste to reduce landfill.
- intelligent planning of energy grids to optimise consumption and reduce costs.
- using sensors to improve indoor growing conditions of medicinal crops.
- real-time crash prediction in traffic on urban roads and intersections to increase safety of all road users.

1.2 AUSTRALIAN CENTRE FOR ARTIFICIAL INTELLIGENCE IN MEDICAL INNOVATION (ACAMI)

PROFESSOR WEI XIANG (DIRECTOR AND CHIEF SCIENTIST)

DR JANE LEONG (DIRECTOR, DEVELOPMENT)

Australian Centre for AI in Medical Innovation (ACAMI) is dedicated to accelerating the research and development of vaccines, therapies and medical innovations through the application of Artificial Intelligence (AI) and Machine Learning.

Applying these capabilities across the medical research lifecycle, ACAMI is creating impact across discovery, development and delivery of new medicines into our communities.

Established through the support of the Victorian Government through mRNA Victoria, ACAMI works with research partners from academia, industry and healthcare to develop bespoke AI solutions to advance biomedical research from bench to bedside. Based at La Trobe University (Bundoora campus) ACAMI draws on expertise from across the university, including:

- multimodal generative AI for therapeutic target and drug discovery
- quantum machine learning for personalised antigen discovery
- deep neural network architecture for metabolomics data processing
- digital pathology algorithms to automate cell typing and counting
- digital twin development to support clinical decision making
- federated learning models for working across multiple sites with sensitive data.

These capabilities, combined with a well-established clinical trials network and recognised leadership in producing industry-ready graduates means that ACAMI is able to provide flexible solutions to collaboration partners at all stages of growth, including industry-partnered PhD programs, contract research and collaborative applications for grant funding.

latrobe.edu.au/research/acami

Core Programs

ACAMI's initiatives are structured around three key pillars:

- **Research Collaborations:** Partnering with industry and academic institutions to apply AI advancements in developing new vaccines, therapies, and medical innovations from initial discovery to practical application.
- **Clinical Trials Platform:** Utilizing AI, machine learning, and big data methods to transform the design and execution of clinical trials, thereby improving efficiency and outcomes.
- **Workforce Development:** Co-developing and delivering AI-focused education and training programs in collaboration with industry partners to build a skilled workforce in AI for medical research and biotechnology.

Strategic Partnerships and Infrastructure

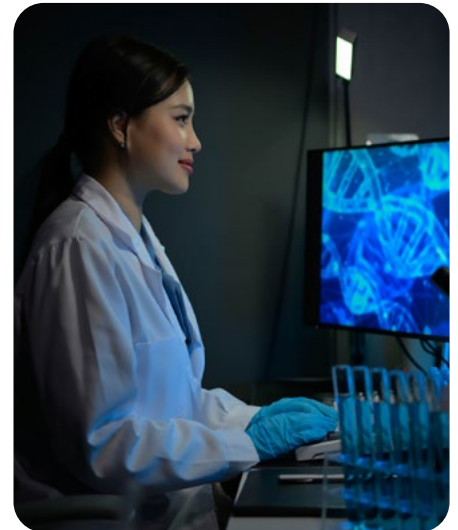
ACAMI collaborates with global biotechnology company BioNTech, which has established a state-of-the-art mRNA clinical-scale manufacturing facility at La Trobe's Melbourne campus. This facility supports researchers in developing investigational mRNA-based treatments and manufacturing candidates for clinical trials in the Asia-Pacific region.

To support its advanced research activities, ACAMI is equipped with Australia's first NVIDIA DGX H200 computer, providing significant computational power for AI-driven medical research.

Leadership and Team

The centre is led by Professor Wei Xiang, who serves as the Director and Chief Scientist. Dr Jane Leong is Director, Development. The multidisciplinary team includes experts in AI, machine learning, computer vision, and medical research who contribute to ACAMI's innovative projects and educational programs.

For more information about ACAMI's initiatives, research opportunities, and collaborations, please visit the ACAMI website.



1.3 LA TROBE-CISCO CENTRE FOR ARTIFICIAL INTELLIGENCE AND INTERNET OF THINGS

PROFESSOR WEI XIANG (DIRECTOR)

DR DI WU (DEPUTY DIRECTOR)

The La Trobe-CISCO Centre for AI and IoT at La Trobe University builds upon a decade-long partnership between Cisco and La Trobe University.

Cisco is a worldwide technology leader that has been making the Internet work since 1984. Their people, products, and partners help society connect and seize tomorrow's digital opportunity today. Cisco's digital-ready solutions are enabling Australian businesses of all sizes to realise the benefits of digital transformation – disrupting industries and reimagining what's possible for their business.

This Centre is the first-of-its kind in Australia in terms of exploiting the synergy between state-of-the-art AI and IoT technologies through partnering with Cisco and the wider industry and end-user community.

The Centre helps to create opportunities for students and academia. The Centre is creating a new home for co-innovation and collaboration, enabled by access to world leading programs that encourage creativity and connection to deliver ideas that will drive Australia's digital future.

The Centre has a mission to drive technology innovation through high-quality research, teaching, training and practice. It also has the important goal of giving students the technical and digital skills required to help solve real-world industry problems.

The Centre works with La Trobe researchers, particularly in smart health and agriculture, by applying AI-empowered IoT technologies to these strategic sectors. The Centre also works with industry partners to deliver real-world industry solutions in areas such as:

- digital health
- digital agriculture
- industry 4.0
- smart manufacturing
- smart cities
- smart transportation.



1.4 CENTRE FOR MATERIALS AND SURFACE SCIENCE (CMSS)

PROFESSOR PAUL PIGRAM (DIRECTOR)

The Centre for Materials and Surface Science (CMSS) brings together experts from physics, chemistry, materials science and electronic engineering, and offers world class capabilities in nano characterisation focused on the surface science, analysis, imaging and synchrotron domains.

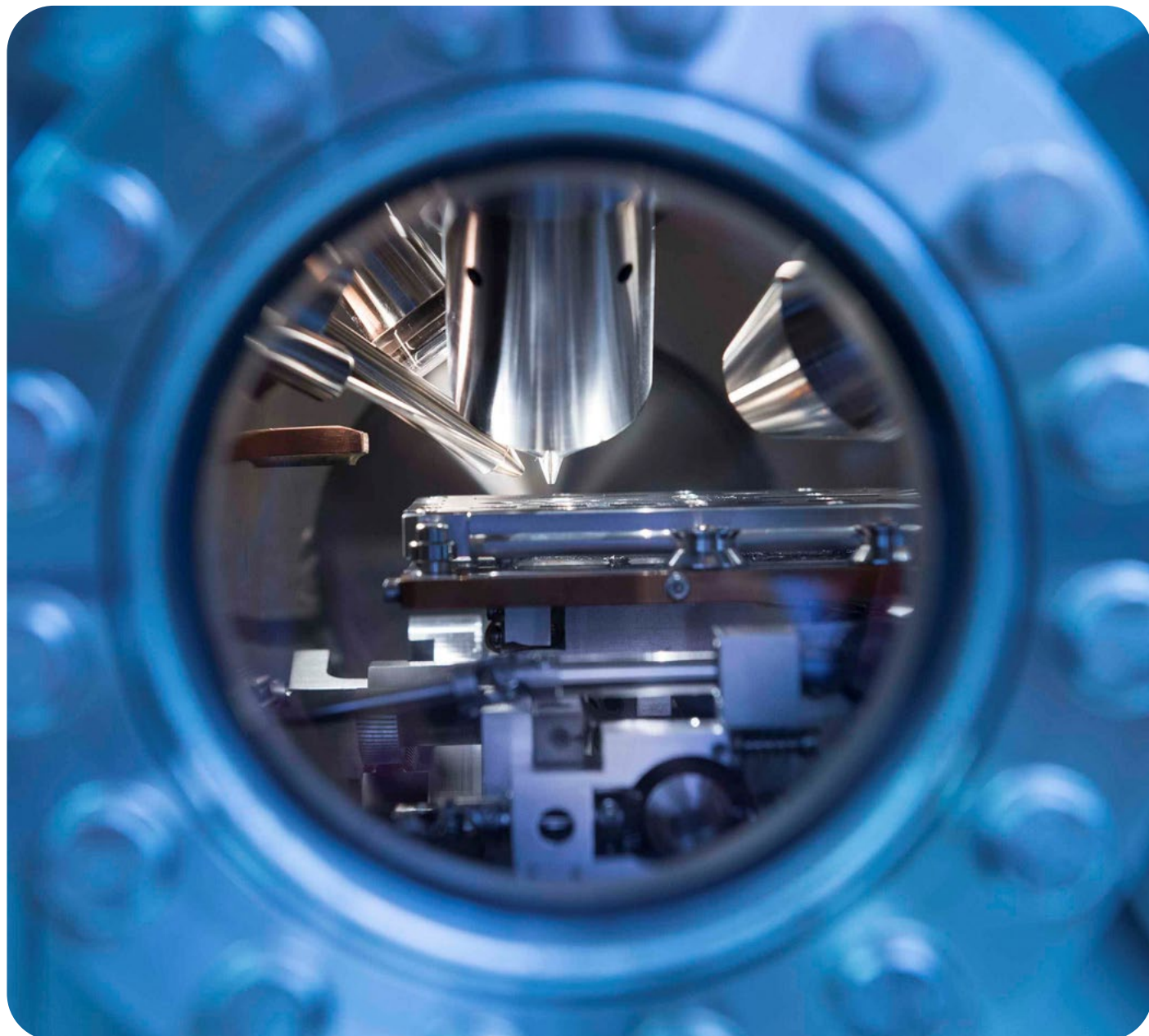
CMSS through La Trobe University is a partner in the Australian National Fabrication Facility (ANFF) and a foundation investor in the Australian Synchrotron.

CMSS is an interdisciplinary research centre located at La Trobe University's Melbourne Campus and involves staff from across La Trobe.

CMSS aims to:

- promote co-operative activities and programs in education and research
- encourage collaboration between local and international organisations
- provide, receive, and disseminate information in the areas of the centre.

CMSS leads and collaborates in research activities with local and international partner organisations and companies.



1.5 RESEARCH GROUP: OPTUS DIGITAL HEALTH RESEARCH

LEAD PROFESSOR NILMINI WICKRAMASINGHE, OPTUS CHAIR IN DIGITAL HEALTH

The OPTUS Digital Health Research Group focusses on designing developing and deploying intelligent, fit for purpose digital health solutions which have high clinical fidelity, are useful, useable and responsible.

The aim of all the group's designed solutions is to support healthcare delivery needs 24/7, 365 days of the year, anywhere, anytime and for anyone, with applications ranging from prevention to acute care, rehabilitation to aged care, and other relevant contexts. Underpinning our focus is a desire to ensure that we support the provision of hyper personalised, precise and patient centred high value healthcare delivery.

Recognising the current challenges of inequity with respect to quality of care between regional, remote, rural versus metro as well as between vulnerable groups, CALD populations and Indigenous populations, we strive to ensure our solutions have multilanguage capabilities and are culturally sensitive. Thus, at all times we seek to ensure that we deliver to a healthcare value proposition of superior access, quality and value.

Further, given our collaborations with OPTUS, we are continually looking to ensure we leverage and deploy the benefits of networks, private 5G, satellites, mobile phones and best practices with respect to cyber security.

Our flagship areas include:

Digital Twins

We are one of the first worldwide groups to develop digital twins to support clinical decision making, be it focused on specific organs like the heart or lung, healthcare processes such as the patient going to the emergency department, or for management of disease such as cancer or dementia.

Mobile and platform solutions

We have designed, developed and deployed various mobile solutions to support self-management, monitoring, informing and educating patients be it around chronic conditions such as diabetes, for rehabilitation with teleassessment as well deployment in other clinical contexts.

Robots, avatars and empathetic chatbots

As digital health and automation expand in healthcare delivery we focus on the design and development of fit for purpose robots, avatars and empathetic chatbots for diverse contexts including aged care and dementia care.

Artificial Intelligence and Machine Learning (AI / ML)

All our digital health solutions incorporate the latest and continually emerging advances in AI / ML including Generative AI, Conversational AI, Explainable AI and Agentic AI.



1.6 OPTICS, X-RAY AND BIOSENSING INNOVATION GROUP: ABBEY LAB

PROFESSOR BRIAN ABBEY (DIRECTOR)

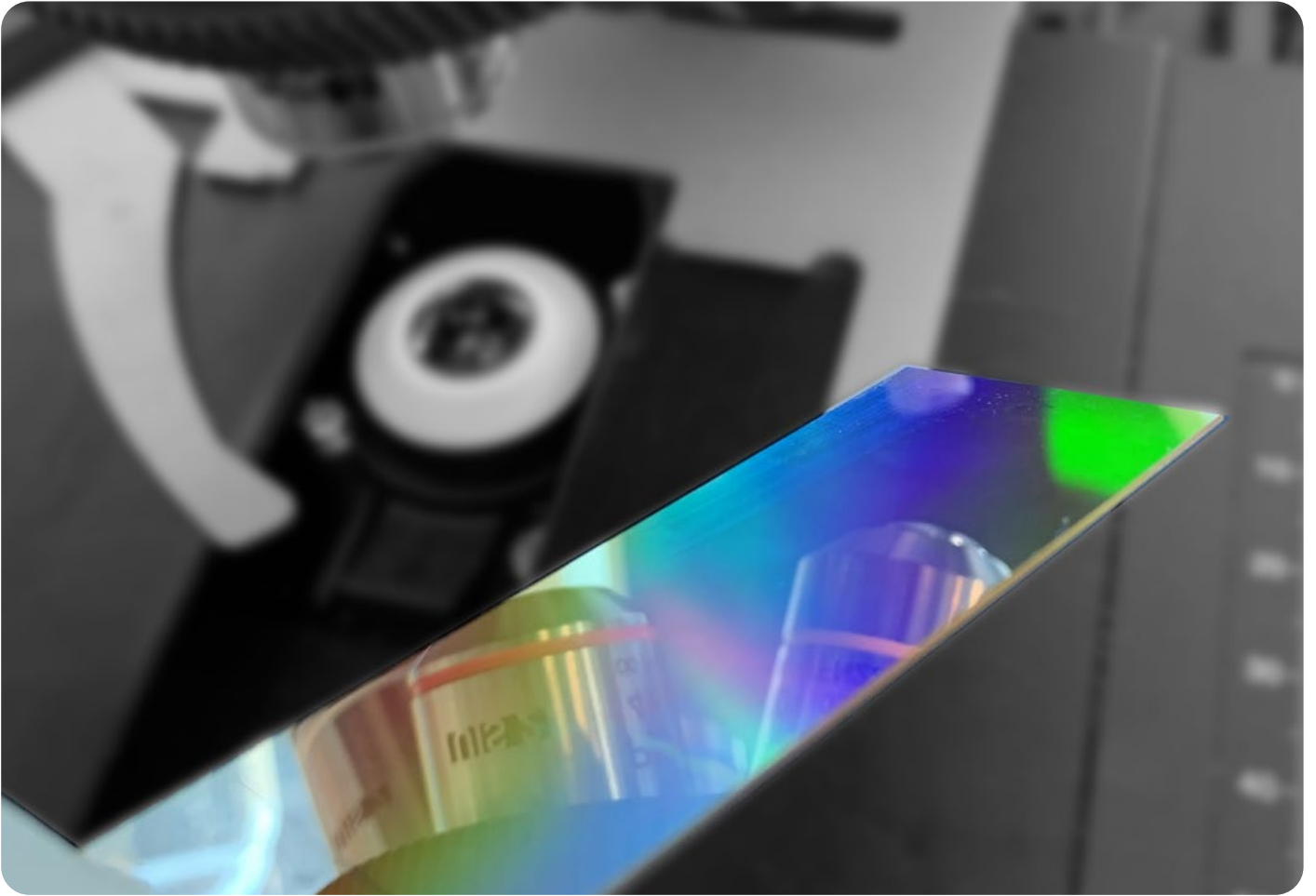
Distinguished Professor Brian Abbey leads a multidisciplinary research program at La Trobe University that brings together nanofabrication, biosensing, x-ray science and optical imaging. His work drives innovation in cancer diagnostics and rural health. The team bridges fundamental physics with practical medicine, creating tools that translate advanced materials and imaging science into clinical impact.

A key technology from the Abbey lab is the NanoMslide. This is a nanofabricated glass microscope slide that enables instant, label-free detection of cancer cells through colour visible to the naked eye. NanoMslide changes how biological samples are analysed by providing a near-instant assessment. It also forms the foundation of AlleSense, a biotechnology spin-out translating the technology into a regulatory-approved, point-of-care diagnostic platform for cancer.

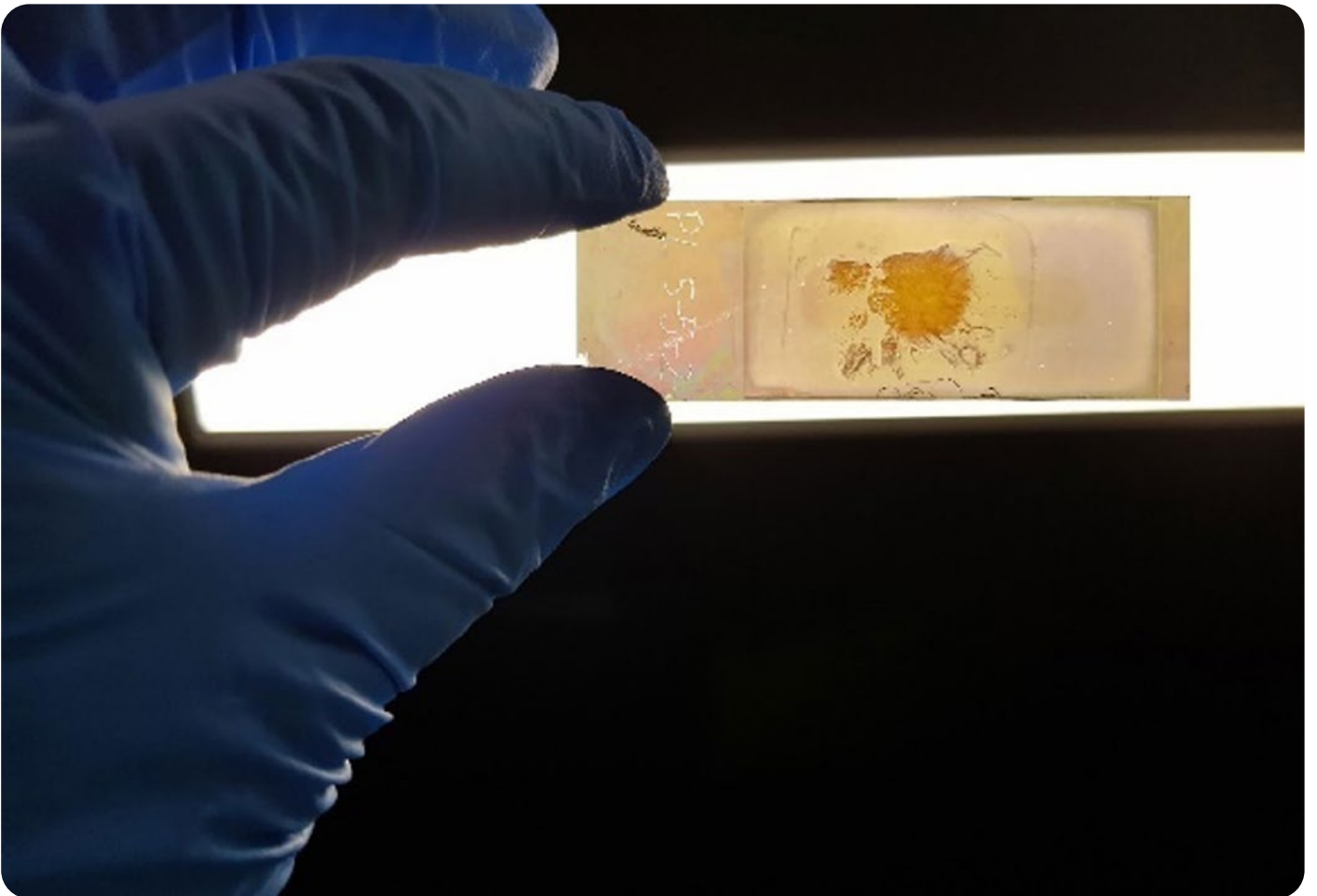
Abbey's group also develops new biosensing and optical imaging methods, as well as advanced x-ray diffraction techniques. Current projects combine nanophotonics with electrochemical sensing to produce ultra-sensitive and low-cost diagnostic tools.

In parallel, Abbey's expertise in x-ray science drives advances in nanoscale imaging. His team uses synchrotron and x-ray free-electron laser facilities to map the structure of complex biomaterials.

Through partnerships with ACAMI, community health organisations, the BEST Centre and the ARC MOBIUS Hub, Abbey's program emphasises community-engaged innovation. By aligning cutting-edge nanotechnology with local health priorities, his research delivers both scientific discovery and real-world benefits, with a strong focus on rural and remote communities.



NanoMSlide – Brian Abbey group



Detecting cancer cells, NanoMSlide

2. UNIVERSITY RESEARCH AND INNOVATION

University Vision

We seek to understand the world and the major challenges it faces and to use our research for positive change and societal impact. Our discovery and applied research is outcome-focused and highly valued by our partners and the communities we serve. It is conducted responsibly, ethically and with integrity.

Our researchers work with local, regional and global industry, community, government, and academic partners to transform lives, address inequities and grow economies. We embrace the diversity of our research workforce and our graduate researchers who will be sought after for their ability to apply their knowledge, to collaborate, to adapt and innovate through new ideas and technologies. We achieve groundbreaking outcomes that have major positive impacts on communities both in Australia and overseas.

The University's full Research Strategy 2030 can be found here:

latrobe.edu.au/research/vision







DR KIKI ADHINUGRAHA

Lecturer, IT

My research is primarily focused on the field of data science and its multifaceted applications.

I delve into various aspects such as data structure and design, data acquisition, integration, preprocessing, analytics, and query performance evaluation.

My expertise extends to both relational and non-relational database environments, ensuring a thorough understanding of data management.

I have a particular interest in spatial data science and GIS, applying these technologies within diverse domains including transportation, health, and socioeconomics.

Additionally, I explore the potential of big data to enhance these applications, aiming to improve data-driven decision-making processes and solve real-world challenges.

Through my research, I strive to advance theoretical knowledge and make a tangible impact across multiple sectors.

Keywords: data science, spatial database and big data



DR DAMILOLA ADU

Research Officer

My research interest spans public health research and evaluation. I am currently contributing to an MRFF-funded Heart Health Project that assesses an innovative model of care designed to make it easier for Australian rural populations to check their heart health either at home, in local pharmacies or at local community health centres. This model has the potential to remove accessibility and service delivery barriers to cardiovascular disease risk assessment, which are common in rural and regional areas of Australia. The study is being conducted across rural and remote communities in the Murray and Mallee regions of Victoria and New South Wales.

Working with international and Australian researchers, I have supported projects in the areas of primary health care, health promotion and education, epidemiology, clinical trials and health technology interventions.

Keywords: public health, health evaluation, rural and remote health



DR HOOMAN ALAVIZADEH

Lecturer, Cybersecurity

My research focuses on security modelling and analysis, AI in cyber defence, Moving Target Defence (MTD), cloud security, and cryptography.

I am particularly interested in leveraging AI techniques to combat next-generation cyber threats, including AI-based and intelligent cyber-attacks.

I am also interested in developing cyber situation awareness system to monitor the security posture of the network system using security metrics.

I also have particular interest in security modelling and analysis, especially, network and cloud security modelling. Moreover, my research focuses on proactive defence systems such as Moving Target Defence (MTD) that are affordable and effective defensive strategies.

I am also interested in utilising mathematical and graphical models to evaluate the effectiveness of deployed defensive approaches.

The graphical security models can be utilised to capture the best defence deployment strategy in the given environment.

Keywords: security modelling and analysis, AI in cyber defence, deep Q learning and cloud security



PROFESSOR PHOEBE CHEN

Computer Science

My research focus is to find effective solutions for visualizing, integrating, analysing and mining big data, complex structures and functions for scientific and biomedical applications.

I have been working in many emerging areas such as bioinformatics, multimedia, artificial intelligence, scientific visualization, pattern recognition, health informatics, deep learning, data mining, and databases.

My current research includes Knowledge Discovery for RNA Structure and Function, Deep Learning Approach and its Applications, Visual and Data Analysis in Disease Diagnosis including cancer, Medical Image Analysis with Pattern Recognition, Drug Design by Visualization and Machine Learning Approach, Mining Protein and Genome Regulatory Networks using Graphic Models.

I have recently been appointed to the ARC College of Experts and have published over 350 research papers, many of them appeared in top journals and conferences.

Keywords: bioinformatics, multimedia and artificial intelligence



DR ZHE CHEN

Lecturer, Computer Science

My research primarily advances computer vision and artificial intelligence technologies for next-generation intelligent machines.

My expertise in areas such as object detection, visual tracking, and 3D modelling. In particular, my research specifically focuses on introducing reliable visual context reasoning algorithms to significantly enhance the reliability of AI systems.

My research outputs have been regularly published in prestigious AI journals and conferences like IJCV and CVPR and have accumulated high citations as an early career researcher. In addition, my work also aims to bridge theoretical advancements with practical implementations, as demonstrated by pioneering a visual perception system for autonomous vehicles and developing a multi-camera AI-driven system for comprehensive environmental understanding in robotics.

Most recently, I have been researching about leveraging cost-effective, large-foundation AI models for enhanced visual understanding, aiming to introduce substantial benefits for healthcare and robotic systems.

Keywords: computer vision, artificial intelligence and deep learning



DR ZIJING CHEN
Lecturer, Artificial Intelligence

I am a teaching-focused lecturer specialising in data science, machine learning, AI, and AI-enhanced higher education.

My work centres on innovative pedagogy and developing engaging learning experiences that support student success in an AI-driven era. I completed my PhD in computer science at the University of Technology Sydney in 2019, where I researched human-centred video understanding.

My research in visual tracking and emotion analysis led to publications in leading journals and conferences.

Building on this foundation, my focus has broadened to improving how AI and data science are taught and applied in higher education.

I also contribute to educational leadership through initiatives that develop students' industry-ready skills and SoTL projects which promote the effective and meaningful use of AI in learning.

Ultimately, I aim to foster an inclusive, student-centred learning environment that prepares graduates to thrive in a rapidly evolving digital world.

Keywords: artificial intelligence, machine learning, computer vision



**ASSOCIATE PROFESSOR
PENG CHENG**

Computer Science

My research focuses on the Internet of Things (IoT) and wireless communications, with a particular interest in integrating AI, IoT, and signal processing.

The aim is to develop innovative algorithms and frameworks that enhance the efficiency, reliability, and security of wireless IoT networks. By leveraging machine learning techniques, I strive to create intelligent IoT systems capable of autonomously adapting to dynamic environments, optimizing multi-dimensional resource allocation, and providing seamless massive connectivity.

Additionally, my work explores advanced signal processing methods to improve data acquisition, transmission, and interpretation in IoT applications.

Through this research, I seek to advance smart technologies that can transform industries.

Keywords: IoT, machine learning and signal processing analysis, AI in cyber defence, deep Q learning and cloud security



DR LIANHUA CHI
Senior Lecturer, IT

My main research interest is in making sense of big data with effective, agile and interactive data analytics, especially in Health care area.

Currently, I am working on AI on Autism Screening. My research focuses on making sense of big data with effective and agile data analytics, especially with hashing techniques.

In particular, my work is on graph stream classification and hashing technique innovation.

I have built a data mining framework leveraging advanced hashing algorithms to efficiently process massive data without changing the nature of the data much.

I have received the following awards: "Best Paper Award in PAKDD13", "Top 200 Young Researchers Globally and Romberg Grant Award by HLF16", "Young Global Changer by G20/T20 Germany", "IBM External Honors".

Keywords: knowledge representation and machine learning



PROFESSOR NAVEEN CHILAMKURTI
Cybersecurity, Associate Dean, International Partnerships

I am the Head of the Cybersecurity discipline in the School of Computing Engineering and Mathematical Sciences.

I also received the Australia-India Cybersecurity Infrastructure Grant, jointly funded by DFAT and the Indian government.

In addition, I am a keynote speaker at various international conferences and has been recently elected as an IET (UK) fellow and have published 370 journals/conference articles in Cybersecurity, Blockchain, Privacy and Authentication, IoT, Anomaly detection in IoT, the Internet of Medical Things, Federated Learning in IoT, wireless multimedia, and software-defined networks.

I am active in editing and authoring 9 books with Elsevier, Springer, IGI-Global and NOVA publishers.

I have successfully attracted 24 research grants since 2000 to support PhD Scholarships, fellowships, and travel grants for research collaboration.

These competitive grants are from various sources, including SMART SAT CRC, Data61/CSIRO, Defence Science Institute, and the Australian Academy of Science.

Keywords: cybersecurity, blockchain technologies and internet of things



DR JAVED CHOWDHURY
Senior Lecturer, Cybersecurity

My research focuses on cybersecurity, cybercrime, and blockchain technologies.

I am particularly interested in understanding and mitigating cyber threats across emerging digital environments, including distributed ledger systems, IoT, and healthcare networks.

My work spans blockchain security, consensus mechanisms, fraud detection, malware analysis, and secure data sharing frameworks.

I have extensively studied blockchain platforms and their applications, including decentralized finance, smart contracts, notarization services, and circular economy implementations.

In addition, I explore the integration of artificial intelligence and machine learning techniques to enhance malware detection, fraud prevention, and risk assessment in cyber systems.

An emerging theme in my work is developing practical frameworks for secure and privacy-preserving data sharing, as well as promoting cybersecurity education and awareness, including tailored pathways for diverse audiences such as students, practitioners, and high-risk sectors.

Keywords: cybersecurity, cybercrime, blockchain, malware detection, data/privacy security, AI in security, cybersecurity education



DR EMMA CORDON

Research Officer, IT

I am based at La Trobe's Bendigo Campus and work within the School of Computing, Engineering and Mathematical Sciences as a Research Officer with Associate Professor Simon Egerton.

I am currently providing project management support for the MRFF-funded Proactive Heart Health Check Model for Rural Populations Feasibility Study.

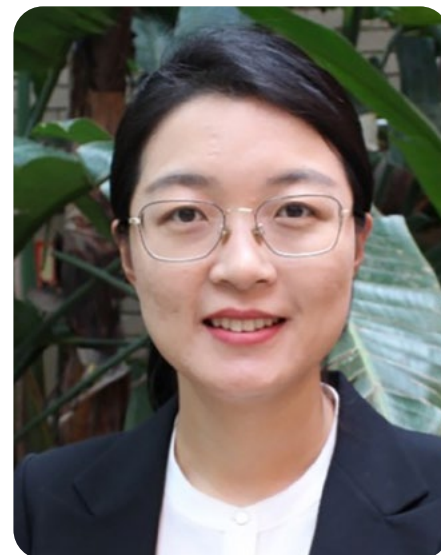
This two-year project evaluates an innovative heart health check kit designed to improve cardiovascular health outcomes through early detection.

The study uses co-design approaches to ensure solutions are practical, scalable, and tailored to the needs of underserved communities.

My broader research interests include rural health innovation, salutogenic (health-asset) approaches to wellbeing, and strategies for pandemic/public health crisis preparedness.

My recent PhD, titled "A Salutogenic Exploration of Regional and Rural Healthcare Worker Wellbeing for Future Pandemic Preparedness", examined protective factors for wellbeing among rural healthcare workers during the COVID-19 pandemic using network analysis, cross-sectional and longitudinal methods.

Keywords: mental health, salutogenesis, rural health, public health crisis preparedness, health promotion, workforce, wellbeing



DR LYDIA CUI

**Senior Lecturer,
Computer Science**

My research interests and expertise are in biomedical image analysis, machine Learning, deep Learning, and biomedical and health Informatics.

My current research topics and projects include integration of imaging with non-imaging biomarkers, segmentation in biomedical images, cancer analysis in histopathology images, and AI for precision oncology, early diagnosis and prognosis of disease and cancer, etc.

I work closely with industry partners, clinicians and radiologists from major hospitals in China and Australia to translate the developed medical technologies into clinical workflow and industry applications.

Keywords: artificial intelligence, image processing, knowledge representation, machine learning, biomedical and health informatics



DR RUMPA DASGUPTA

Lecturer, Cybersecurity

My research expertise lies in the security and privacy of cyber-physical systems such as smart grids, electric vehicles, digital health platforms, and IoT infrastructures.

My work involves detecting cyber attacks, analysing their consequences, and designing effective mitigation and prevention mechanisms.

I also engage in human-centric cybersecurity research, focusing on the ethical and privacy implications of AI integration.

Furthermore, I explore secure and privacy-preserving AI deployment approaches and contribute to the development of cybersecurity policies to guide the secure and ethical use of AI technologies.

Keywords: cyber-physical system security, smart grid security, IoT security, human-centric cybersecurity, AI-driven cybersecurity solutions, security, cyber policies and ethics



DR TONY DE SOUZA-DAW

Lecturer, IT

My research covers a wide technical spectrum, applying computing, engineering, and analytical methods to real-world problems.

This includes projects in cloud-based architectures, networked systems, systems engineering, data security, intelligent systems, big data, IoT applications, and technology delivery models that enhance both learning and industry practice.

I collaborate broadly across academia and industry to advance effective educational design, technical innovation, and sustainable program structures.

I am always interested in internship partnerships and research opportunities.

Keywords: employability, computing and IT education, cloud and software engineering, IoT/networking/security applications, intelligent systems



DR SHUO DING

Lecturer, Computer Science

My research focuses on Intelligent Transport Systems (ITS), IoT, telecommunication systems, and AI for intelligent, connected, and future mobility systems.

In ITS, I specialise in Cooperative ITS and V2X communication, including DSRC, C-V2X, connected and autonomous vehicles, transport safety applications, localisation, and simulation-based evaluation, with a particular focus on the real-world deployment of low-latency, safety-critical intelligent transport systems and digital mobility solutions.

My research also spans AI for ITS, including LLMs, multimodal foundation models, AI agents, and knowledge systems for transport decision support, automation, and natural-language interaction. My research further covers physical AI for autonomous driving and robotics, high-precision positioning and sensor fusion, digital-twin evaluation, and trustworthy AI for safety-critical transport deployment.

I also specialise in IoT technologies, developing end-to-end sensing, communication, and data analytics platforms for intelligent infrastructure across smart cities, logistics, agriculture, and virtual care. My research also includes 5G and emerging 6G telecommunication technologies and standards for connected and data-driven systems.

Keywords: intelligent transport systems (ITS), internet of things (IoT), applied AI



**ASSOCIATE PROFESSOR
SIMON EGERTON**

**Deputy Head of Dept,
Computer Science and IT**

I am based at La Trobe's Bendigo Campus and Director of the Technology Innovation Lab. In addition, I lead the Regional Rural Remote Digital Health Research Group.

My research involves the application of the technology (Internet of Things, Social Robotics, Artificial Intelligence) to improve health and wellbeing outcomes in regional, rural, and remote communities through the co-design of digital health research.

A focus for my research is the application of digital health technology for the mitigation and management of chronic disease across regional, rural, and remote Australia.

Keywords: digital health, chronic disease early detection and management, remote patient monitoring, telehealth



DR DALAL HANNA

Lecturer, Cybersecurity

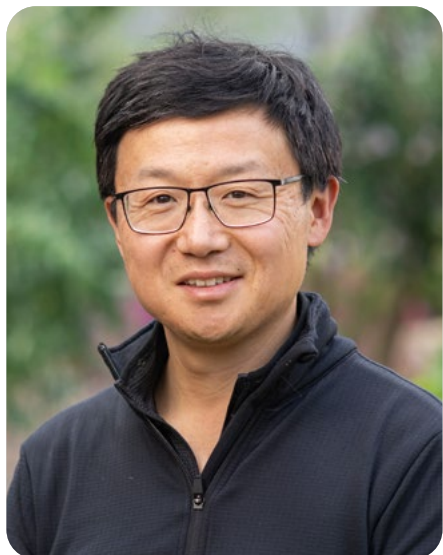
My teaching and professional interests span a range of cybersecurity disciplines, particularly cybersecurity governance frameworks, security standards, organisational security practices, and the psychology of hackers.

I am passionate about fostering an engaging and inclusive learning environment that helps students build strong practical and ethical foundations in cybersecurity.

My work also involves promoting academic integrity across the university, supporting fair processes, and guiding students and staff in maintaining high academic and ethical standards.

I am committed to contributing to a positive, high-performing academic culture and ensuring our cybersecurity curriculum aligns with industry needs and emerging challenges.

Keywords: cybersecurity governance, security standards and frameworks, psychology of hackers, academic integrity, cybersecurity education, organisational security practices



**ASSOCIATE PROFESSOR
ZHEN HE**

Computer Science

I lead a deep learning research group at La Trobe University which mainly focuses on applying deep learning methods to solve real world problems.

One of the most significant contributions is the development of the SPARTA 2 swimming competition analysis software with the AIS which was used to perform all competition analysis during the Tokyo Olympics.

I also work extensively with oncologists and pathologists to use AI to help diagnose cancer using large whole slide images. The algorithms are designed to predict relapse risk for cancer and thereby inform treatment plans. He also works extensively with the Center for Alcohol Policy Research at La Trobe University.

This collaboration has developed algorithms that detect alcohol use in images, video, audio, and text.

The information can be used by alcohol policy makers.

Keywords: artificial intelligence, deep learning computer vision



DR ASM KAYES

Senior Lecturer, Cybersecurity

My research focuses on data-driven cybersecurity, particularly data security and access control.

Unlike classical access control theory, which only applies to centralised environments, my dynamic access control theory addresses users' changing needs and controls secure access to data and information resources in distributed environments.

My specific interests include security, privacy, and trust practices, with a focus on context-aware access control, malware/ransomware detection and defence, IoT, fog, and cloud security, and cybersecurity incidents and data/privacy breaches.

I am particularly interested in modelling security and privacy policies to safeguard data and leveraging artificial intelligence and machine learning techniques to enhance decision-making.

An emerging theme in my work is providing specialised cybersecurity education and training pathways for neurodiverse individuals, high school students, and veterans.

Keywords: cybersecurity education and awareness, access control, data/privacy breaches



DR DEEPAK KUMAR

Associate Lecturer, IT

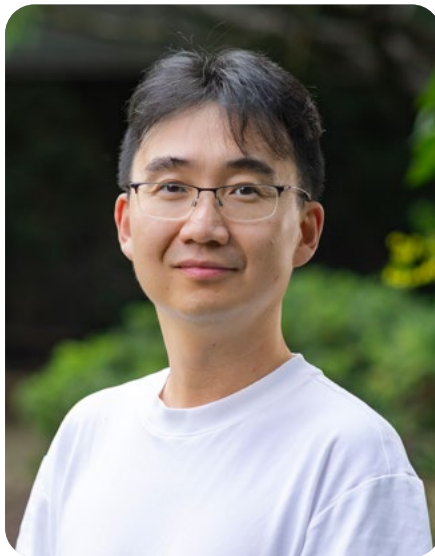
My research lies at the intersection of blockchain technology, artificial intelligence, entrepreneurship, and SME finance.

I explore how emerging technologies can reshape access to credit, enhance digital trust, and support innovation in small and medium enterprises.

My work spans blockchain-based lending, decentralized identity, AI-driven entrepreneurial decision-making, FinTech credit systems, and responsible AI frameworks.

I am also actively exploring how technology-enhanced learning can strengthen professional capability development for IT and entrepreneurship students.

Keywords: blockchain, fintech, SME finance, artificial intelligence, entrepreneurship, technology adoption



DR CHANG LIU

Lecturer, Computer Science

My research focuses on the transformative integration of artificial intelligence (AI) and high-dimensional data analysis within the intelligent Internet of Things (IoT).

My work tackles critical smart radio challenges, including low spectrum efficiency, limited coverage area, and restricted functional interaction. By leveraging machine learning (ML) approaches, I aim to revolutionize IoT systems through three key technologies: smart spectrum cognition, intelligent reflecting communication, and intelligent integrated sensing and communication.

My research includes developing ML-based frameworks, practical signal processing schemes, and employing explainable AI (XAI) techniques via Bayesian statistics and neural network visualizations.

My contributions are paving the way for future advancements in intelligent IoT systems, enhancing their efficiency and expanding their applications.

Keywords: machine learning, intelligent IoT, smart radio



**ASSOCIATE PROFESSOR
ABDUN MAHMOOD**

Cybersecurity

I have done extensive research in cyber security using Machine Learning and Artificial Intelligence (ML and AI).

The main theme of my ML research is inventing efficient algorithms to analyse large amounts of data, including clustering; concise representation (summarization) of big data; and query processing from streaming data.

In the area of cyber security, I have applied these and other AI for SCADA security and vulnerability analysis; detecting state-of-the-art attack vectors on Smart Grid; network traffic anomaly detection; privacy guaranteed data analysis; AI-based Phishing detection; AI-based malware detection and prediction.

I have established a research team working in the following areas: Detecting anomalies from Big data, Vulnerabilities and risk assessment of Smart Grid and SCADA measurement data.

Keywords: detecting anomalies from big data, vulnerabilities and risk assessment of smart grid and SCADA measurement data, machine learning and artificial intelligence



DR JOSHUA MILLWARD
Lecturer, Computer Science

With a background in computer vision and deep learning, my special interest in applying these technologies to address real-world problems across various domains.

My PhD research focussed on using AI to analyse histopathology images, addressing challenges encountered in clinical practice. This work involved segmenting tissue structures and detecting various cell types to replicate manual analyses in an automated and interpretable manner.

Given the large size of histopathology images (often around 100,000 x 100,000 pixels), I have successfully developed specialised software to facilitate their efficient analysis. This area remains the focus of my current research activities, and I maintain active collaborations with experts from cancer research institutions across Australia.

I also have industry experience at the Australian Institute of Sport, where I developed custom systems using AI to analyse video data. Additionally, I have contributed to multidisciplinary projects in collaboration with the Centre for Alcohol Policy Research and the Johnson Lab.

Keywords: deep learning, computer vision, AI in histopathology



**ASSOCIATE PROFESSOR
LEANNE NGO**
**Director Student Engagement
and Employability (SEE)**

My research focuses on Scholarship of Teaching and Learning (SoTL), digital learning, employability, and student engagement.

I explore how learning and assessment design, feedback, and ePortfolios develop evaluative judgement, professional identity, and active participation in learning.

My work includes the use of microcredentials and AI to enhance authentic, inclusive, and employability-focused learning experiences.

I also research cybersecurity culture and education, with a focus on human behaviour and gender inclusion to strengthen participation of women in cyber and build national cyber resilience.

Keywords: digital learning, scholarship of learning and teaching (SoTL), assessment, ePortfolios, AI in education, microcredentials, women in cyber, cybersecurity culture and education



**PROFESSOR
ERIC PARDEDE**
**Computer Science
Associate Dean, Learning
and Teaching**

I am serving as the Associate Dean of Learning and Teaching within the School of Computing, Engineering and Mathematical Sciences.

My core research interest is in databases and data management across multiple domains.

My research extends to data analytics and security, with a particular focus on IoT security frameworks and concept drift detection in streaming data.

I have published extensively on entrepreneurial intention models, collaborative learning systems, e-mentoring platforms, and adaptive learning technologies. Recent applied machine learning projects include developing assistive technology classification systems, innovation frameworks for software startups, educational data mining for learning personalisation.

I emphasise practical applications that address real-world challenges in education, security, and data-driven decision making.

Keywords: data analytics, data modelling, privacy and security, higher education pedagogy



DR TRAN KHOA PHAN

Senior Lecturer, Computer Science

My research interests are broadly design, control, optimization, and security of next-generation communications networks with applications in the Internet of Things (IoT), satellite systems, smart grids, and cloud computing.

My research aims to apply machine learning tools such as deep learning, federated learning into designing intelligent secure cyber physical systems. My research has pioneered novel orthogonal time frequency space (OTFS) waveforms, which is now considered for next-generation communications standards. OTFS is currently dominant research area in wireless communications and my research are first works on efficient interference cancellation and channel estimation techniques for OTFS.

Keywords: IoT, wireless communications, machine learning



DR TAFLINE RAMOS

Professor of Practice, IT

I am an experienced and passionate quality engineering specialist and thought leader, with over 17 years experience in quality engineering, quality assurance and testing, and over 20 years in ICT.

I am an active member of the international standards community in both software engineering and artificial intelligence.

I am chair of the Software and Systems Engineering Committee at Standards Australia, am a founding member and secretariat of the ISO software testing working group (ISO/IEC JTC1/SC7 WG26), was fundamental in the establishment of the ISO Agile and DevOps working group (ISO/IEC JTC1/SC7 WG29), co-author of the ISO/IEC/IEEE 29119 Software Testing standard series, contributed to the IEEE 2675 DevOps standard, technical editor for updates to the IEEE 730 Software Quality Assurance standard, and an Australian representative on the ISO/IEC JTC1/SC42 Artificial Intelligence committee.

Keywords: quality engineering, lifecycle optimisation, quality and test management, audits, international standards, training and mentoring



**PROFESSOR
WENNY RAHAYU**
**Computer Science,
Dean of School SCEMS**

I am currently the Dean of Computing, Engineering and Mathematical Sciences School at La Trobe University. Before this appointment, I was the Head of Department of Computer Science and Information Technology from 2012-2014.

In the last 10 years, I have done substantial work in the area of data engineering, data integration and optimization, knowledge discovery, and big data analytics.

So far, I have published around 300 papers with more than 7500 citations on these topics.

I have been a chief-investigator of three ARC (Australian Research Council) Industry Linkages, international grants (Open Geospatial Consortium and FAA – USA, Japan JSPS, and Australia Indonesia AIGRP), industry funding (Airservices Australia and IPL), VPAC (Victoria Partnership for Advanced Computing), the Australian Army (Army Research), the AAS (Australia Academy of Science), and CSIRO (Commonwealth Scientific and Industrial Research Organisation).

Keywords: data engineering, data integration and data security and privacy



DR AHMED SALEHI SHAHRAKI
Lecturer in Cybersecurity

I am a researcher in Cybersecurity, with research interests encompassing security, privacy, and trust practices, focusing on access control, applied cryptography, and blockchain technologies.

I have made significant contributions through my roles at La Trobe, RMIT, Monash University, and CSIRO's Data61. Notably, I have played key roles in projects like the Digital CBD funded by the Victorian Government, Cybersecurity Education, and decentralized authentication and authorization applications funded by Monash University.

I participate in major conferences and journals, with publications in top-tier Cybersecurity venues. I am also engaged in numerous industry research projects, including the publication of "How Do We Secure Our Future."

I have received several research grants, including InnoHealth Australia, funded by the German government. I am a member of IEEE, ACM, and AISA and have supervised multiple research students. My involvement extends to numerous industry consulting projects and partnerships in Cybersecurity and blockchain technologies.

Keywords: cybersecurity, applied cryptography, blockchain



DRAGO SIJAN
Professor of Practice, IT

I am a Professor of Practice with more than 40 years of industry experience, specialising in Technical Solutions Architecture, with broad expertise across technology, industry, and customer domains. My appointment is part of a close partnership between La Trobe University and Cisco, contributing to the establishment of the La Trobe –Cisco Centre for AI and IoT.

I have experience working with enterprise customers across the region and globally, particularly in the financial services, retail, and mining and resources sectors. My expertise spans mainframe, distributed, and cloud computing environments, supporting the transition of customer applications and communications across these platforms.

In my current role as Professor of Practice, I provide technology leadership, mentorship, and an innovation focus to drive industry collaborations within the research centre. I also work closely with the Computer Science and IT department to enhance the software-defined networks curriculum, ensuring alignment with current industry standards.

Keywords: technical solutions architect, industry collaboration, software-defined networks



DR NASSER SABAR

**Senior Lecturer,
Computer Science**

My research primarily focuses on designing adaptive algorithms using hyper-heuristics and evolutionary computation, with a strong emphasis on addressing complex real-world problems.

Key areas of interest include the automatic design of optimisation methodologies, hyper-heuristic approaches, and meta-learning approaches.

I am particularly interested in applications such as big data optimisation, cloud computing, clustering, scheduling, load and packing, timetabling, feature selection, and dynamic optimization.

My work also explores computational efficiency and adaptability, aiming to push the boundaries of problem-solving capabilities across various real-world problems.

Keywords: artificial intelligence, knowledge representation and machine learning, neural, evolutionary and fuzzy computation and operations research



DR MOHAMMAD SHERKAT

Lecturer, IT

A defining area of my research contribution is in emotionalism in digital design, exploring the critical role of human emotion and psychological factors in developing successful digital products and applications.

My professional expertise is grounded in over 18 years of academic experience and broader research interests spanning Artificial Intelligence (AI), Machine Learning (ML), IT Project Management, and System Design and Implementation.

I collaborate closely with industry partners to deliver innovative IT solutions for real-world challenges, including AI-driven and enterprise systems.

Keywords: emotionalism, artificial intelligence (AI), machine learning (ML), digital design, human-centred computing, IT project management, system design



DR RICHARD SKARBEZ
Senior Lecturer, IT

My primary research interests are the design and evaluation of novel interactive systems, especially in virtual, mixed, and augmented realities (hereafter referred to collectively as MR).

I am a leading expert with regard to user experience in such systems, with multiple highly regarded publications in the area of “presence research,” which seeks to understand how users perceive, think about, and react to MR stimuli and experiences.

This work is highly interdisciplinary in nature, bringing together insights and collaborators not only from computing, but also psychology and philosophy.

Particular interests include bridging the gap between MR and “mainstream” human-computer interaction (HCI) research, developing new tools and techniques to enable improved knowledge work with and through MR technology, and using MR to study human behaviour in ways never before possible.

Keywords: virtual/augmented/mixed reality (VR/AR/MR), human-computer interaction (HCI), visualisation



ASSOCIATE PROFESSOR BEN SOH

Cybersecurity

My substantial research contributions span a diverse range of cutting-edge domains. In cybersecurity, my work addresses advanced threat detection, risk assessment, and mitigation strategies, with a focus on emerging cyber threats and vulnerabilities.

My research in Distributed Ledger Technology explores blockchain applications for secure and transparent transactions, enhancing trust and efficiency in digital ecosystems.

In the field of Fault-Tolerant and Secure Computing, my Internet of Things (IoT) research investigates energy-efficient IoT architectures and data privacy solutions for interconnected devices.

In Cloud Computing, I focus on optimising cloud infrastructure for performance, security, and scalability. Lastly, my contributions to Educational Technology and Computing seek to enhance learning experiences through AI-driven educational tools and platforms, addressing both technical and pedagogical challenges.

Keywords: cybersecurity and fault-tolerant computing, distributed ledger technology, IoT and cloud technology



DR ALEX TOMY
Senior Lecturer, IT

My research focuses on data analytics, software engineering, IoT applications, social intelligence, graduate employability, and data-driven entrepreneurship.

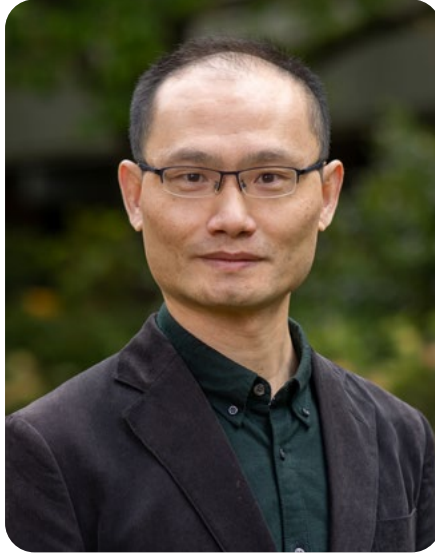
I design and develop data-driven techniques to improve system performance and support decision-making in real-world applications.

I specialise in integrating analytics and intelligent automation into information systems to create efficient, adaptive, and scalable solutions.

My research also involves developing and evaluating privacy policies and frameworks for applications and social networks to ensure secure and responsible digital environments.

I embed these innovations into teaching and curriculum design to enhance student learning and prepare graduates to drive innovation in data-driven, technology-intensive industries.

Keywords: data analytics, visual data exploration, software engineering, information systems development, internet of things, privacy, social intelligence, graduate employability and data-driven entrepreneurship



DR HUAWEI TU
Senior Lecturer, IT

My research interests primarily lie in Human-Computer Interaction (HCI) and Virtual Reality (VR).

I conduct both fundamental and applied research, combining theory and experimentation to explore how to enhance user experience in VR with HCI technologies. Specifically, my research is focused on three basic VR interactions: selection, locomotion and manipulation. Selection refers to target acquisition.

I am interested in how novel paradigms (e.g., crossing) can facilitate target selection in VR. Locomotion concerns navigation in virtual environments.

I explore body-centric locomotion design and modelling. Manipulation relates to target translation, rotation and scaling. My studies mainly look into two-handed manipulation in VR.

Keywords: human-computer interaction, virtual reality, user experience



**ASSOCIATE PROFESSOR
PRAKASH VEERARAGHAVAN**

Cybersecurity
Head of Department,
Computer Science and IT

I am the Head, Department of Computer Science and IT.

My research spans the spectrum of cybersecurity, especially protecting networks, people, privacy, and data.

Thus, it includes protecting a corporate network from internal, external, and collaborative attacks, OSINT, detecting cyber-grooming through AI techniques, cyber-forensics, Malware analysis, and various data privacy and anonymising techniques (for possible information leaks).

I also work on cyber governance and cyber policy frameworks.

Besides, I am working on abstract mathematical modelling to solve the above complex problems.

Keywords: network security, data privacy, OSINT, cyber-forensics, malware analysis, cyber policies and governance and mathematical modelling



DR KAN YU
Senior Lecturer,
Computer Science

I am a Lecturer in the department's Bendigo campus.

As I have extensive experience in collaborating with international industry partners, I am a member of IEEE Standards Association P1451.5p Working Group for radio frequency channel specifications for performance assessment of industrial wireless systems.

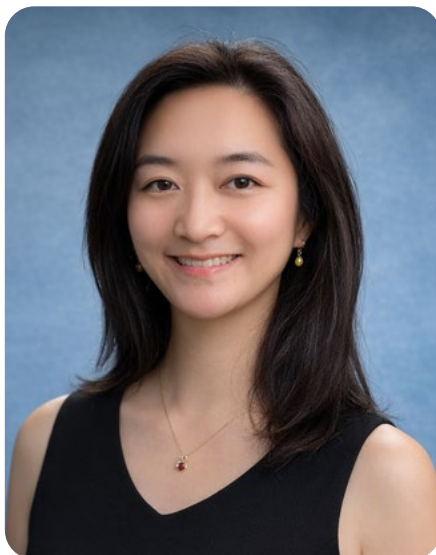
I was a guest editor in IEEE Transactions on Industrial Informatics, SI on "Industrial Cyber-Physical Systems: new trends in computing and communications" in 2020.

I completed my PhD and was a postdoc researcher at Malardalen University (Sweden) in 2014.

I was a visiting researcher at the University of Sydney in 2015.

I have a deep understanding of both academia and industry.

Keywords: artificial intelligence of things (AIoT), industrial internet of things, healthcare IoT, reliable and low-latency industrial wireless communications



DR YANG ZHAO
Lecturer, IT

My research interests lie broadly in the field of computer vision and deep learning, including but not limited to deep metric learning, (ultra) fine-grained image classification, facial landmark detection, human pose estimation, and generative 3D modelling.

An emergent theme to my interests is AI for health, primarily in medical image learning in orthopaedic and ophthalmology, and AI for digital and computational pathology.

Keywords: computer vision and image processing, artificial intelligence, AI for health



DR RUIQI ZHENG
Research Officer, Cybersecurity
and Deep Learning

My research focuses on building scalable AI-enabled data and analytics systems by combining decentralized learning architectures with emerging agentic AI approaches.

I work on methods that help organisations make better use of complex and distributed data, with an emphasis on privacy-aware model training and intelligent decision support.

My recent work examines decentralized model learning, agent-based intelligence on edge devices, and large language models for behaviour modelling and security analytics.

I am also interested in developing prediction methods that support software quality, risk assessment, and dynamic user behaviour understanding.

Keywords: decentralized learning, agentic AI, behaviour modelling, security analytics, privacy-aware intelligence



**PROFESSOR HOSSAM
ABOEL-NAGA**

**Civil Engineering
Head of Department,
Engineering**

I am the Head, Department of Engineering and Adjunct Professor at Chongqing University, China. Previously, I was Senior Lecturer and Leader of Geo-Engineering at The University of Manchester, UK; Senior lecturer at The University of Auckland, New Zealand; and Research fellow at Monash University, Australia.

I have had over 30 years of experience in geotechnical engineering, specialising in soil behaviour under multi-physical coupled processes. Applications of this research area include nuclear waste disposal technology, methane hydrate mining technique, energy foundations, ground improvement, landfill lining system, and more.

I have over 100 publications in international refereed journals and conferences. I served as panellist for National Science Foundation (USA) and assessor for Swiss National Science Foundation, and Australian Research Council. In addition, I am Guest Editor and member of editorial team of several international engineering journals.

Keywords: geothermal, geoenvironment, stabilization



**DR ABOFAZL (NIMA)
BAGHBANI**

**Associate Lecturer,
Geotechnical Engineering**

I am an Associate Lecturer in Geotechnical Engineering and a Chartered Professional Engineer (CPEng, NER) with over a decade of experience spanning senior geotechnical practice and academic research.

I teach Geotechnical Design and Soil Mechanics and supervise undergraduate and postgraduate research projects.

My work sits at the intersection of geotechnical engineering, artificial intelligence, and sustainable infrastructure.

I have led and contributed to industry and government-funded projects on unsaturated soils, mine rehabilitation, and ground improvement using recycled and biopolymer-based materials.

I have published widely in international journals and conferences and serve as a reviewer and editorial board member for several geotechnical and civil engineering journals.

In parallel, my education research focuses on Work Integrated Learning (WIL), authentic assessment, and industry-engaged curricula that connect students directly with real-world engineering challenges and accelerate their transition into professional practice.

Keywords: geotechnical engineering, soil mechanics, artificial intelligence, recycled materials, sustainable ground improvement, mine rehabilitation, education research, work integrated learning (WIL), industry partnerships, student employability



DR AVINASH BAJI
Senior Lecturer,
Manufacturing Engineering

My research interest focuses on the fabrication of bio-inspired materials. In my earlier work, I used electrospun fibres to mimic the hydroxyapatite-reinforced collagen fibrous architecture that is found in bones and tissues.

In this study, we used electrospun fibres reinforced with hydroxyapatite and analyzed their deformation behaviour at multiple length scales, identifying a critical length scale below which the fibres exhibit an abrupt increase in tensile modulus and strength.

I was among the first researchers to characterize the mechanical deformation behaviour of individual nanofibers and systematically evaluate phenomena arising from spatially limited polymers.

In other studies, we used nanotextured surfaces to mimic the dry-adhesion mechanisms of natural materials, creating reusable adhesives for climbing robot applications.

Similarly, we fabricated fog-harvesting materials by mimicking the carapace of the desert beetle, which can capture water from fog.

Currently, my focus is on mimicking the mechano-bactericidal mechanisms of natural materials to produce antibacterial materials.

Keywords: bio-inspired materials, polymer composites, nanomaterials



DR COLLETTE BURKE
Professor of Practice,
Engineering

My research focuses on construction economics and industry development, with a particular interest in how construction companies achieve competitive advantage and maintain profitability both domestically and internationally.

Key topics within this area include productivity, insolvency, market entry, market segmentation, and procurement strategies.

I have provided advice to the governments of Malaysia and Indonesia on industry development issues and have contributed to various construction industry studies, development initiatives, and policy formulation.

My extensive experience in the petrochemical and construction industries spans several years in Singapore and Malaysia, including consulting roles for major construction and multinational companies across Asia and Oceania.

Keywords: construction engineering, industry economics, development policy



ASSOCIATE PROFESSOR
TOONG-KHUAN CHAN
Construction Engineering

My research focuses on construction economics and industry development, with a particular interest in how construction companies achieve competitive advantage and maintain profitability both domestically and internationally.

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Keywords: construction engineering, industry economics, development policy



DR MATT FELICETTI

Lecturer, Electronics Engineering

My research firstly focuses on collaborative partnerships with industry as part of the RAMPs R&D group to implement innovative engineering solutions utilising electronics, sensors, embedded systems, robotics, AI, and algorithm design, with a particular interest in field robotics and machine vision in agriculture.

Beyond industry applications, I am interested in randomised artificial intelligence algorithms for addressing complex industrial challenges.

Particularly utilising Stochastic Configuration Networks and looking to optimise the Stochastic Configuration algorithm to enhance AI in industrial environments.

This includes exploring low-level computing, such as binary operations, data encoding, and hardware implementation on FPGAs or small embedded devices.

Keywords: field robotics, embedded systems, randomised learning



DR FERNANDO GALETTO

**Research Officer
SmartCrete CRC Project**

My primary areas of research are Computer Vision, Machine Learning and Internet of Things (IoT).

My research focuses on designing intelligent systems, harnessing the power machine learning and artificial intelligence (AI) for real-time applications on Edge devices.

Keywords: computer vision, machine learning, internet of things (IoT). and artificial intelligence



DR TOMMY HUYNH
Senior Lecturer, Robotic and Electronics Engineering

I am specialised in the fields of robotics and mechatronics, Internet of Things (IoT) and wireless communications.

My work integrates advanced robotics with IoT technologies to develop innovative solutions for various real-world applications.

By combining mechatronics with IoT, I strive to create interconnected systems that improve efficiency and performance across diverse industries.

I have also worked to the enhancement of wireless communication protocols, ensuring robust and efficient data transmission in IoT networks.

Keywords: robotics and mechatronics, IoT and wireless communication



DR ELSUIDA KONDO
Senior Lecturer, Work Integrated Learning (WIL)

I am a Senior Lecturer in Engineering with a strong interest in engineering education, graduate employability, and industry-engaged learning. My work focuses on supporting students to develop the skills and experience needed for professional practice, through curriculum design, Work Integrated Learning (WIL), and industry-partnered capstone projects.

My research interests include engineering education, as well as applied work in biomedical and chemical engineering and mathematical modelling. These areas inform my teaching and research practice, particularly in developing interdisciplinary and research-led learning experiences that connect theory with real-world application.

I have been involved in the design and delivery of a range of engineering education initiatives that aim to improve employability outcomes and access to authentic industry experiences for students across metropolitan and regional contexts. This work is informed by ongoing collaboration with industry, academic colleagues, and students.

I have published over 25 peer-reviewed journal articles and book chapters across engineering education, biomedical and chemical engineering, and mathematical modelling.

Keywords: engineering education, biomedical, chemical engineering, mathematical modelling, employability, work integrated learning (WIL), industry engagement



PROFESSOR ING KONG
Manufacturing Engineering, Deputy Associate Dean Research and Industry Engagement and Deputy Director Graduate Research

As a materials and manufacturing engineer, I possess a diverse research portfolio focusing on 3D bioprinting for tissue engineering, waste reduction and recycling, the development of high-performance composites, and sustainable packaging.

My interdisciplinary research addresses critical challenges and drives innovation across multiple sectors. In 3D bioprinting, I develop advanced biomaterials and techniques to create complex tissues essential for regenerative medicine, including custom-engineered tissues for transplantation and disease modelling.

Additionally, I design sustainable solutions to minimize waste and enhance recycling, converting waste into valuable resources that support a circular economy and reduce environmental impact. I also investigate high-performance composite materials tailored for the construction, aerospace, and defense industries, emphasizing enhancements in mechanical properties, durability, and sustainability to create resilient infrastructure and components.

Finally, my research in sustainable packaging focuses on developing eco-friendly materials that reduce plastic waste, particularly through biodegradable and compostable films that promote solutions aligned with global environmental goals.

Keywords: high-performance composites, 3D bioprinting, waste reduction and recycling



**ASSOCIATE PROFESSOR
VIPUL PATEL**
**Civil Engineering, Deputy Head
Department of Engineering**

My research interests focus on the development of sustainable construction using recycled aggregates, fly ash, steel furnace slag, and graphene oxide.

The geopolymer concrete developed by my team aims to reduce carbon emissions from traditional cement-based concrete. Laboratory trials are currently underway to develop concrete with nanomaterials such as graphene oxide.

My research also includes finding the remaining life of sewer concrete pipes using machine learning models. In addition, my research interests include demountable connections for steel-concrete modular structures.

I have developed fiber-based computational techniques and finite element models for simulating the behaviour of steel-concrete composite columns.

My research on the use of stainless steel, aluminium, and ultra-high-strength concrete is innovative, new, and timely, aligning with current industry trends in the construction sector.

I have published over 80 journal articles, two books, and numerous conference papers.

Keywords: sustainable construction materials, geopolymer concrete, machine learning in structural engineering



DR ALI RASHIDI
**Senior Lecturer,
Construction Engineering**

I am a Senior Lecturer in Construction and Engineering Management.

I am also an Adjunct Researcher and Lecturer at Monash University, with campuses in Australia and Malaysia.

Prior to joining La Trobe, I gained extensive experience as a research fellow and lecturer in construction engineering and management at three different campuses (Clayton, Caulfield, and Malaysia) of Monash University in two regions (Australia and Malaysia).

Before Monash, I also held a senior lecturer position at the University of Putra Malaysia.

Since 2020, I have served as the research theme coordinator of Digital Project Management at the Building 4.0 Cooperative Research Centre (CRC) program in Australia.

Keywords: Construction Engineering, Project management, Building Construction Management and Project Planning, Virtual Reality and Related Simulation, Digital education, Built Environment and Design



**ASSOCIATE PROFESSOR
ROBERT ROSS**
**Robotics and Electronics
Engineering**

My research relates to design of robotics, sensors and embedded IoT systems to better understand world around us.

My robotic systems have primarily been deployed for infrastructure condition assessment (e.g. sewers, water tanks) and in agricultural settings to facilitate improved productivity.

I was also responsible for designing several systems for wildlife applications including WomBot (to study munge within wombat burrows) and WildTrack which is a system of IoT RFID scanners for wildlife studies.

I take a hands-on engineering approach to design including fabricating mechanical designs, designing of PCBs and writing embedded code to tie it all together.

My other area of research is around Educational Escape Rooms, which are hands on immersive activities which strongly engage students in peer problem-solving.

As part of this research, I developed the world's first reconfigurable electronic decoder box which has been used at several universities and schools across a range of educational fields.

Keywords: robotics, sensor systems, educational escape rooms



DR ALEX STUMPF
**Senior Lecturer, Robotics and
Electronics Engineering**

I have completed my PhD in the field of electric drives and motor control. My current research areas lie with the Centre for Technology Infusion and the RAMPS group.

I am currently working on the digital design for active RFID tracking devices. This project recently received a national innovation award (2017 National AIIA Awards).

In addition to this project, I am working with the Victorian water authorities to develop a novel and cost-effective sewer profiling robots.

The research project aims to produce a robot which can profile the sewer system ensuring that problem areas can be prioritised and repaired.

This research will increase the efficiency of repairs and will help reduce maintenance costs which on a yearly basis extend into multi-million dollar repairs.

Keywords: automation and control engineering, electronic engineering, engineering, engineering design knowledge, engineering systems design, mechanical engineering, software engineering



DR LONG TRUONG
Senior Lecturer, Civil Engineering

My research addresses critical transport challenges related to traffic congestion and crashes.

My work revolves around developing innovative solutions by harnessing intelligent techniques and technologies, with a keen interest in mobility management, public transport, and intelligent transport systems.

My recent work focuses on developing a comprehensive framework that integrates transport modelling and traffic crash prediction to shed light on the efficiency and safety implications of mobility management strategies and infrastructure investments.

Additionally, my research extends to cost-effective safety designs for regional railroad level crossings using driving simulation and field experiments.

Keywords: traffic safety, transport engineering, transport planning



**ASSOCIATE PROFESSOR
THUC VO**

Civil Engineering

My research interests have been devoted towards the development of shear deformation theories to investigate structural responses of composite structures (laminated, functionally graded material and micro/nano structures) and machine learning for structural engineering applications.

I have published more than 120 research papers in the prestigious journals and international conferences.

I moved from Northumbria University (UK) to join La Trobe University in December 2019 as an Associate Professor in Structural Engineering.

At Northumbria University, I was a Senior Lecturer in Civil Engineering and later led this program as Program Leader (2013–2019). Prior to that, I worked as a Lecturer at Airbus' Advanced Composite Training and Development Centre and Wrexham Glyndwr University (2011–2013) and Research Associate at University of Liverpool (2010–2011).

Keywords: machine learning for structural engineering applications



DR GOKHAN YILMAZ

**Senior Lecturer,
Civil Engineering**

My research focuses on climate change hydrology, hydrological modelling, extreme value analysis, statistical hydrology, and AI applications in water resources management.

I develop and apply hydrological models to assess climate change impacts, use extreme value theory for flood and drought analysis, and integrate statistical methods to comprehensively evaluate hydro-meteorological data, with a particular interest in trend, change point, and non-stationarity analysis.

Also, I explore the intersection of traditional hydrology with emerging technologies like machine learning to address complex water challenges.

I employ machine learning techniques specifically for streamflow modelling, and drought and flood assessment.

Keywords: climate change hydrology, extreme value analysis, hydrological modelling



3.3.1 MATHEMATICS AND STATISTICS DISCIPLINES



**DR SANTIAGO BARRERA
ACEVEDO**

Lecturer, Mathematics

My research interest lies in the interplay between algebra and combinatorics, particularly in the emerging area of algebraic design theory.

This field explores the use of algebraic techniques to solve combinatorial problems, providing a rich framework for developing new mathematical structures and theories.

I am particularly interested by how algebraic methods can be applied to design theory, allowing insights and solutions to complex combinatorial configurations.

Keywords: algebraic design theory, algebra and combinatorics, discrete mathematics



DR HU CAO

Research Officer, Mathematics

My research focuses on data mining, machine learning, and mathematical modeling of infectious diseases, including Group A Streptococcus and COVID-19.

I am particularly interested in how external factors – such as non-pharmaceutical interventions, human mobility, and vaccination – affect disease transmission dynamics and public health outcomes. I work with Dr Rebecca Chisolm.

Keywords: data mining, machine learning, mathematical epidemiological modeling



ASSOCIATE PROFESSOR REBECCA CHISHOLM

Mathematics

My current research interests are focused on developing and using mathematical and computational models of the transmission of infectious diseases (such as Group A Streptococcus, scabies, and onchocerciasis) to understand details of their transmission pathways and how to reduce disease burden.

Past areas of research interest have included understanding the emergence of drug resistance in cancer-cell populations, segmentation and morphogen gradient formation in developmental biology.

Keywords: infectious disease modelling, mathematical biology, mathematical epidemiology



DR OWEN DEARRICOTT

Research Officer, Mathematics

I am a Riemannian geometer with expertise in Riemannian foliations, embeddings, and special geometric structures.

Historically, my best-known work is in the study of positive sectional curvature on 7-manifolds, where I found such metrics related to quasi-regular 3-Sasakian geometries. More recently, my interests have extended to integrable systems, expanding Hitchin's work in the theory of isomonodromic deformations to arrive at previously unknown closed forms for anti-self-dual Einstein metrics in terms of radicals on 4-dimensional orbifolds.

At La Trobe, with Yuri Nikolayevsky, I have been using my knowledge of the structure equations of Riemannian submersions to classify Killing tensors on quaternionic projective spaces and to give an alternative method to Eastwood's classification of Killing tensors on complex projective spaces.

Keywords: global Riemannian geometry, including pinching; foliations (differential geometric aspects); special Riemannian manifolds (Einstein, Sasakian); hyper-Kähler and quaternionic Kähler geometry, "special" geometry; twistor methods in differential geometry; global submanifolds; momentum maps; symplectic reduction



DR ALYSHA DE LIVERA

Senior Lecturer, Statistics

I am a researcher in biostatistics and statistics.

I conduct methodological research in high dimensional data analysis, meta-analysis, data integration, removing unwanted variation, and missing data, with a particular interest in applications to problems in medicine, biology, public health, and epidemiology.

I enjoy research in multidisciplinary, collaborative environments, working closely with scientific investigators from diverse backgrounds, contributing my statistical expertise to answer a wide range of scientific problems.

In my recent work, I have contributed to the development of novel statistical methods and software for the analysis of high-dimensional biological data including metabolomics and single cell data.

Keywords: biostatistics, meta-analysis, high-dimensional biological data

3.3.1 MATHEMATICS AND STATISTICS DISCIPLINES



ASSOCIATE PROFESSOR MUMTAZ HUSSAIN

Mathematics

My research focuses on metric number theory, dynamical systems, and their interactions. Within metric number theory, I primarily work in metric Diophantine approximation. This research area combines ideas from number theory, (convex) geometry, dynamics, analysis, probability, and measure theory, naturally attracting significant interest from a broad range of mathematicians.

I have made substantial contributions and continue to work on establishing asymptotic and uniform Diophantine approximation theories for various limsup and liminf sets of interest.

Keywords: metric number theory, diophantine approximation, continued fractions, ergodic theory and dynamical systems



PROFESSOR MARCEL JACKSON

Mathematics.

Associate Dean, Research and Industry Engagement and Director, Graduate Research

I am the School's Associate Dean in Research and Industry Engagement. My research lies predominantly in algebra and its interaction with logic, combinatorics and theoretical computer science. Specific interests within algebra include semigroup theory, relation algebras, and universal algebra; my research considerably blurs the boundaries between these areas.

I have a particular interest in computational complexity considerations (including algorithmic decidability) within algebra, as well as in algebraic and logical methods within computational complexity (polymorphism algebras, descriptive complexity, finite model theory).

Questions around logical definability are also a significant theme to my work, as is the development of techniques for encoding structures inside other structures; hypergraph encodings are an example technique that is currently yielding many insights in semigroup-related topics.

An emergent theme to my interests is mathematical biology, primarily in the mechanistic modelling of cell processes.

Keywords: algebra and discrete mathematics, logic, theoretical computer science



DR MITRA JAYAZERI

Senior Lecturer, Statistics

My research is centred on statistics education, particularly factors that influence student learning and the role of generative AI in higher education.

I lead a SoTL research group examining the impact of AI on students' learning outcomes and developing practical tools to support educators undertaking similar research.

I am also committed to Indigenising mathematics and statistics, contributing to departmental initiatives, and drawing on training and national engagement in this area to integrate Aboriginal and Torres Strait Islander knowledge systems into teaching and curriculum design.

Throughout my career – from running a maths clinic after first immigrating to Australia to my current leadership roles – I have been dedicated to creating inclusive, supportive learning environments and advancing innovative, student-centred approaches to statistics education.

Keywords: statistics education, generative AI, indigenising mathematics and statistics



PRATYUSH KOLLEPARA

Research officer Mathematics

I am interested in designing mathematical models of disease transmission and apply them to infectious diseases that are of interest from a public health perspective. Currently, I am working on such models for Group A Streptococcus and Mpox (previously known as monkeypox). In the past, I have worked on wide-ranging theoretical aspects of disease spread such as ethics of non-pharmaceutical interventions, contact structure heterogeneity and generation interval distributions. I am also learning how to use likelihood-free inference methods to fit mathematical models to data collected from observational studies.

Keywords: Infectious disease modelling, mathematical epidemiology, inference



DR IAN MARQUETTE

Senior Lecturer, Mathematics

My research interests lie in the field of mathematical physics. They concern integrable, superintegrable and exactly solvable systems, their related symmetries and special functions.

These models take many forms, but one common feature is to provide a deeper understanding into the structure of quantum systems in condensed matter, atomic and nuclear physics. They are central in our knowledge of matter as they describe in an analytical way a wide variety of phenomena such as phase transition.

I have also made contributions to different areas of mathematics such as Painlevé transcendents, Lie algebras and deformations of Lie algebras, classical and exceptional orthogonal polynomials, Casimir invariant and representations theory.

More recently, I started working on generalized and conditional symmetries and applications to biology and differential equations associated with Lotka-Volterra models.

Keywords: mathematical physics, Lie algebras, quantum integrable systems

3.3.1 MATHEMATICS AND STATISTICS DISCIPLINES



**ASSOCIATE PROFESSOR
JOEL MILLER**

Mathematics

I primarily study infectious diseases, dynamic processes on random networks, and the spread of infectious diseases in random networks.

My recent research has focused on COVID-19 mitigation in many different contexts.

I have also been focused on how heterogeneities in the structure of a population affects the spread of infection. Infectious disease modelling is a highly interdisciplinary subject.

I describe myself as an applied mathematician who uses a wide array of techniques from physics and computer science to study biological questions with impact on public health.

My major contributions are the text "Mathematics of Epidemics on Networks" with Istvan Kiss and Peter Simon and the software package "Epidemics on Networks".

Keywords: infectious disease modelling network theory



**ASSOCIATE PROFESSOR
HIEN NGUYEN**

**La Trobe-Kyushu Associate
Professor of Applied Statistics**

I am a computational and mathematical statistician specializing in modeling complex, heterogeneous processes.

My approach centers on using finite mixtures and regression models to analyze multi-population data, defining sub-populations within larger datasets. This technique finds extensive applications, and I've collaborated with professionals across diverse fields, including neural and cell biology, satellite and brain imaging, fisheries and agricultural sciences, and economics.

My expertise extends to optimization theory for statistical and probabilistic methods, concentrating on Majorization-Minimization algorithms, and their stochastic and mini-batch variants for handling large or streaming datasets. Another focus of my work is studying the mathematical properties of mixture models to understand their capabilities and limitations in statistical analysis. This guides my efforts in model selection, where I develop methods to systematically choose the most appropriate statistical models.

Additionally, I explore Bayesian approaches, focusing on approximate inference techniques for complex data-generating processes that require accurate approximations.

Keywords: computational statistics, machine learning, optimization theory



ASSOCIATE PROFESSOR YURI NIKOLAYEVSKY

Mathematics

My mathematical interests lie in the areas of Riemannian and differential geometry, Lie Theory and theory of homogeneous and symmetric spaces, and in Topological graph theory.

I have been studying submanifolds of homogeneous and symmetric spaces with various restrictions on their intrinsic or extrinsic geometry, classification of geodesic orbit spaces, and recently, the structure of Killing tensors, a special class of geometric objects playing a crucial role in the theory of integrable systems on the spaces with symmetry; this research lies in the overlap of Hamiltonian mechanics, Riemannian geometry and Representation theory.

In Topological graph, my interest lies in the study of graph drawings with special crossing patterns and in the questions of planarity of graph coverings.

Keywords: Riemannian and differential geometry, homogeneous geometry, Lie theory, topological graph theory



ASSOCIATE PROFESSOR ANDRIY OLENKO

Statistics

My research interests include a broad range of topics, in particular, the theory of stochastic processes, spatial statistics, Shannon and wavelet stochastic approximation, statistical inference, and applied data analysis.

My theoretical work focuses on investigating the asymptotic properties and statistical analysis of long-range dependent models. I am interested in the applications of those theoretical results and stochastic modelling to signal processing and cosmology.

Recently, I have begun working on various data science applications related to property price estimation, material sciences, and educational data analysis.

Keywords: stochastic processes, spatial statistics, data science



PROFESSOR LUKE PRENDERGAST

Statistics. Deputy Dean (SCEMS) and Associate Dean, Domestic Partnerships

My research interests in statistical methodology include robust statistics, dimension reduction and visualization of high dimensional data, meta-analysis and applied statistics.

Together with Professor Bob Staudte, I lead the Dimension Reduction and Meta-Analysis (DRAMA) research group which includes staff, alumni and current students as members.

Some recent research activity that I have been involved in within DRAMA include (i) developing interval estimators for functions of quantiles as robust measures of spread and inequality, (ii) measuring heterogeneity in meta-analyses and (iii) robustness considerations for dimension reduction methods.

I also collaborate with researchers from various disciplines with an emphasis on improving human health by providing biostatistical expertise such as analysis of clinical trial data.

These areas include endocrinology, physiotherapy and psychology and specific examples of statistical methods used include analysis of longitudinal data, model checking and validation, missing data imputation and quantile modelling.

Keywords: meta-analysis, robust statistics, dimension reduction

3.3.1 MATHEMATICS AND STATISTICS DISCIPLINES



DR AMANDA SHAKER

Senior Lecturer, Statistics

I am a Teaching Focussed Senior Lecturer in the Department of Mathematical and Physical Sciences. My research is mainly focussed on the Scholarship of Teaching and Learning (SoTL).

As a statistics lecturer, my research interests include statistics anxiety, assessment, Generative AI in statistics education, incentivised engagement, and game-based learning.

I mainly teach at the undergraduate level, including a large, first-year introductory statistics subject, which is the context of much of my SoTL research.

Keywords: education research, scholarship of teaching and learning, statistics education, statistics anxiety, assessment, generative AI, incentivised engagement, game-based learning



DR PETER VAN DER KAMP

Senior Lecturer, Mathematics

I primarily study infectious diseases, dynamic processes on random networks, and the spread of infectious diseases in random networks.

My recent research has focused on COVID-19 mitigation in many different contexts. I have also been focused on how heterogeneities in the structure of a population affects the spread of infection. Infectious disease modelling is a highly interdisciplinary subject.

I describe myself as an applied mathematician who uses a wide array of techniques from physics and computer science to study biological questions with impact on public health. My major contributions are the text "Mathematics of Epidemics on Networks" with Istvan Kiss and Peter Simon and the software package "Epidemics on Networks".

Keywords: infectious disease modelling network theory

3.3.2 PHYSICS DISCIPLINE



DISTINGUISHED PROFESSOR BRIAN ABBEY

Physics. NHMRC Leadership Fellow and Co-Founder of AlleSense

My research spans the fields of optics, x-ray science, and nanofabrication. Specifically, I develop novel nanotechnology-based optical sensors for both life and materials sciences applications.

The platform technologies developed by my group utilise near-field interactions between light, nanostructures, and the sample to reveal local variations in the dielectric properties. To be able to characterise our devices and samples at the nanoscale we employ a variety of x-ray microscopy and x-ray diffraction techniques including femtosecond x-ray scattering experiments conducted at x-ray Free Electron Lasers.

Working with our international research and industry partners my group has a strong focus on research translation and commercialisation and supports research projects in fundamental science all the way through to prototyping and clinical validation.

Keywords: optics, x-ray science, photonics



ASSOCIATE PROFESSOR NARELLE BRACK

Physics. Head of Department, Mathematical and Physical Sciences

I am the Head, Department of Mathematical and Physical Sciences. My research focuses on creating, understanding, and controlling surface and interfacial properties of materials at the nanometer scale.

I have a strong focus on the application of specialised spectroscopy methods to investigate the chemical and molecular properties that influence surface and interface phenomena. I have designed and developed surface modification strategies for material systems including next-generation aircraft materials, carbon and boron nanomaterials and electrospun nanofibres.

I have made significant and innovative contributions in areas such as micropatterning of fluoropolymer surfaces, growth and manipulation of carbon nanotubes for advanced composite materials and surface modification of carbon and boron nanomaterials for applications in low density hierarchical multifunctional composite materials, energy storage and inkjet printing. As a member of the Centre for Materials and Surface Science, I have contributed to many research and industrial projects investigating semiconductors, polymers, metals, minerals, textiles, and biomaterials.

Keywords: physical chemistry of materials, surface analysis, functional materials



PROFESSOR KATE KITAGAWA

Professor of Practice in Space Research and Education

My expertise lies in space education, with a focus on advanced researchers and students. A central theme of my work is space medicine in microgravity environments. The application of experimental techniques, alongside the dissemination of knowledge, is an urgent priority to enable researchers to engage effectively in space-related investigations.

In parallel, I focus on trajectory design and tracking methodologies using mathematical modelling. As low Earth orbit becomes increasingly congested with debris and active satellites, accurate tracking is critical, not only for future missions but also for mitigating orbital risks.

Alongside technical research, I engage with space law, policy, and defence strategy to address the broader conditions shaping space activities.

Keywords: space education, microgravity, space policy

3.3.2 PHYSICS DISCIPLINE



**PROFESSOR
PAUL PIGRAM**

**Physics. Director of the La Trobe
University Centre for Materials
and Surface Science (CMSS)**

I am the Director of the La Trobe University Centre for Materials and Surface Science (CMSS).

I have previously held appointments as Head of the Department of Physics, Associate Dean (Research) and Associate Dean (Commercialisation and Industry).

My research interests include understanding interactions at surfaces (elemental, chemical and molecular), bio-surface characterisation, nano-particle drug delivery, high throughput materials discovery and the surface science of industrially relevant systems.

My work in surface science supported by the application of innovative machine learning approaches for classifying, discriminating and understanding large scale materials libraries and data sets in one, two and three dimensions.

CMSS is an Activity Hub of the Australian National Fabrication Facility Victoria and hosts XPS, ToF-SIMS and scanning auger nanoprobe flagship instrumentation.

Keywords: biomaterials, functional materials, nanomaterials, physical chemistry of materials, surface science, thin film technology



DR ALEX SCHENK

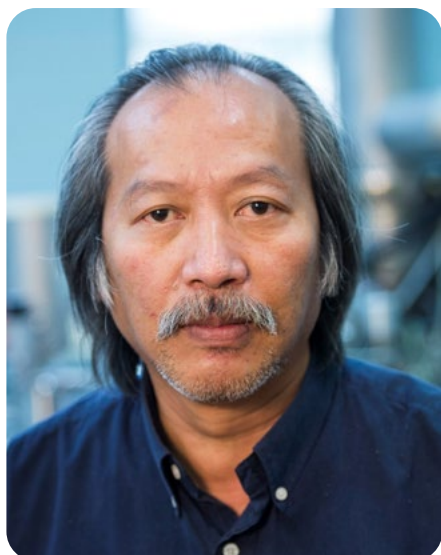
Lecturer, Physics

My research is centred around the targeted atomic-scale chemical modification and manipulation of semiconductor surfaces and 2D materials for next-generation technologies.

I rely on combining a range of experimental characterisation methods, primarily synchrotron-based photoelectron spectroscopies and scanning tunnelling microscopy, to evaluate the surface chemistry and electronic structure evolving from exposing surfaces to various molecules or atomic species under controlled conditions.

My primary interest is in the manipulation and modification of diamond surfaces, which are of direct utility in a wide variety of applications including low-dimensional quantum electronics, biosensing and cold electron emission.

Keywords: diamond surfaces, surface science, synchrotron-based spectroscopy.



DR CHANH TRAN

Senior Lecturer, Physics

My major research interests include interactions of x-rays with matter, complex atomic fine structures, optical coherence, x-ray imaging and synchrotron science.

I have received my PhD from the University of Melbourne in 2003 in the area of precision measurement of the imaginary component of the atomic form factor using the x-ray Extended Range Technique.

I won an Australian Synchrotron Research Fellowship in 2003 (~AUD300k) and an Australian Research Fellowship in a sole-CI ARC Discovery Project in 2006 (~AUD630k).

I have extensive synchrotron experience and have conducted my research at major facilities around the world including the Australian Synchrotron (AUS), the Photon Factory (Japan), the Advanced Photon Source (US), the Stanford Synchrotron Radiation Lightsource (US).

Keywords: x-ray science, synchrotron science x-ray imaging, optical coherence, atomic form factors



ASSOCIATE PROFESSOR GRANT VAN RIESSEN

Physics

My research interests lie in the areas of experimental condensed matter physics and coherent x-ray diffractive imaging development.

I lead a program of research that aims to develop soft x-ray coherent diffractive imaging and spectroscopy methods for in situ and in operando study of magnetic and functional materials.

This work is done in close collaboration with researchers at the Australian Synchrotron, where my group operates a dedicated soft x-ray imaging endstation. The group also uses modern methods of numerical simulation and nanofabrication to optimise and fabricate x-ray optics and novel synchrotron instrumentation.

I also study the dynamics of photoexcitation and decay using two-electron coincidence spectroscopy.

Keywords: nanofabrication, growth and self assembly synchrotron science; synchrotrons; accelerators; instruments and techniques; synthesis of materials



DANIEL ROBERTS

Research Officer, Quantum Technology

My research is in surface science, ultra-high vacuum systems and x-ray based spectroscopy. I am interested particularly in interactions between molecules and diamond surfaces.

My focus is on the modification of diamond surfaces using thermal, electron beam and x-ray-based techniques, to create reactive sites that molecules can interact with. I will study the formation of these sites using x-ray spectroscopy techniques and temperature programmed desorption.

My primary project is in collaboration with Quantum Brilliance, a start-up in the quantum technology industry. They aim to develop a quantum computer based on nitrogen-vacancy (NV) centres in diamond. To achieve this, we are developing methods to control NV centre formation at the atomic level. Our approach is to create reactive sites in a spatially controlled manner, bind nitrogen atoms to these sites, and then overgrow the nitrogen through chemical vapour deposition of a diamond capping layer. In this way, a scalable quantum computing architecture based on NV centres will be achieved.

Keywords: surface science, nanofabrication, diamonds, ultra-high vacuum, temperature programmed desorption, x-ray spectroscopy



**PROFESSOR
ANIRUDDHA (ANI) DESAI**
**Associate Pro Vice-Chancellor
Research (India), Director Centre
for Technology Infusion (CTI)**

I am currently a Research Professor and Director of La Trobe University's Centre for Technology Infusion, an Award-Winning Research and Innovation Centre specialising in delivering technology-based commercial innovations to industry and government clients.

I have successfully led many multi-million-dollar R&D programs in socially relevant, high impact application areas such as transportation, energy management, logistics/supply chain, health care and precision agriculture. My work has resulted in several innovative designs and patent applications which have underpinned a number of start-up companies.

I hold a Bachelor's degree in Industrial Electronics, a Master's degree in Micro-electronics and PhD in Computer Science specialising in micro-computer architecture.

Keywords: microelectronics and integrated circuits wireless communications, artificial intelligence data communications, sensor networks



MR AIDIN BERVAN
Research Fellow

I specialize in hardware development and sensor-based systems.

I have been affiliated with La Trobe since 2014, contributing to various interdisciplinary projects that integrate engineering, agriculture, and intelligent transport technologies.

I have played a key role as the hardware development lead in Victoria's first autonomous vehicle trial, known as the Autonobus project.

This initiative focused on enhancing first- and last-mile transport solutions by integrating autonomous vehicles into existing public transport systems at La Trobe's Bundoora campus.

My research portfolio includes work on wearable sensor technologies for livestock monitoring. I co-authored a study that utilized tri-axial accelerometers to predict lambing times in ewes, aiming to reduce lamb mortality in extensive farming systems.

Keywords: autonomous vehicles



DR SHANMUGA SUNDAR DHANABALAN

Deputy Director, CTI

I bring a wealth of knowledge in soft electronics, wearable sensors, optics, and photonics.

My research focuses on translational research with industry partners, specialising in design, development, and product commercialisation. Selected industry collaborations include smart bedding sensors (Sleeptite), dry eye disease management wearables (nthalmic), surgical monitoring devices (Anura Medical), smart cannulation devices (VeinTech), and smart bandages (Vlepis).

Additionally, I lead the 'Wearable and Connected Sensors' theme as a team leader, overseeing a core group dedicated to materials, soft electronics, sensors, wearables, optics, and photonics within the Functional Materials and Microsystems (FMM) Research Group at RMIT University, Melbourne.

I have developed wearables, wireless battery-free patches, biosensors, and Bluetooth-enabled devices for continuous and remote monitoring, demonstrating extensive expertise in this field.

Keywords: smart bedding sensors



ASSOCIATE PROFESSOR HIEN NGUYEN

La Trobe-Kyushu Associate Professor of Applied Statistics, Deputy Director CTI

I am a computational and mathematical statistician specializing in modeling complex, heterogeneous processes.

My approach centers on using finite mixtures and regression models to analyze multi-population data, defining sub-populations within larger datasets. This technique finds extensive applications, and I've collaborated with professionals across diverse fields, including neural and cell biology, satellite and brain imaging, fisheries and agricultural sciences, and economics.

My expertise extends to optimization theory for statistical and probabilistic methods, concentrating on Majorization-Minimization algorithms, and their stochastic and mini-batch variants for handling large or streaming datasets. Another focus of my work is studying the mathematical properties of mixture models to understand their capabilities and limitations in statistical analysis. This guides my efforts in model selection, where I develop methods to systematically choose the most appropriate statistical models.

Additionally, I explore Bayesian approaches, focusing on approximate inference techniques for complex data-generating processes that require accurate approximations.

Keywords: computational statistics, machine learning, optimization theory



MR ERIK VAN VULPEN

Deputy Director, CTI

At CTI I lead large, high-visibility innovation programs that accelerate the adoption of emerging technologies.

These projects range from feasibility studies, to proof-of-concept developments, to large scale tests and evaluation in real world circumstances.

Prior to joining CTI, I have worked for companies like Samsung, Heineken, Nike and Millicom as well as for several (tech) start-ups across Europe and Asia. This puts me in a unique position to connect the dots between commercial/policy objectives, emerging tech opportunities and end user needs.

My aim, whether a project is small or very large, is to make a difference and leave an impact. I have been fortunate to contribute to various fields, including automated vehicles, accessibility of public transport, safety (C-ITS), agri-tech and med-tech.

Keywords: C-ITS/C-V2X; transport accessibility; digital ticketing; human-centred design and co-design; AI/ML for mobility; trials-to-deployment leadership



**DISTINGUISHED
PROFESSOR WEI XIANG**
**Cisco Research Chair of AI
and IoT Director & Chief
Scientist of Australian Centre
for AI in Medical Innovation
(ACAMI), Director of Cisco-La
Trobe Centre for AI and IoT**

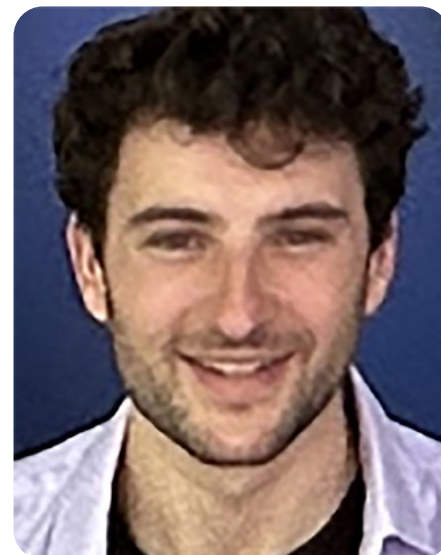
Distinguished Professor Xiang is also Director of the Cisco-La Trobe Centre for AI and IoT, and Director and Chief Scientist of the Australian Centre for AI in Medical Innovation.

I am currently the Cisco Chair of AI and Internet of Things, the Director and Chief Scientist of ACAMI and Founding Director of the La Trobe CISCO Centre for AI and Internet of Things. I am also Director of Higher Degree Research Program at SmartSat CRC.

Prior to joining in La Trobe, I was Foundation Chair and Head of Discipline of Internet of Things Engineering at James Cook University, Cairns, Australia. Due to my instrumental leadership in establishing Australia's first accredited Internet of Things Engineering degree program, I was selected into Percy Foundation's Hall of Fame in October 2018. I am an elected Fellow of the IET in UK and Engineers Australia. I received the TNQ Innovation Award in 2016, and Pearcey Entrepreneurship Award in 2017, and Engineers Australia Cairns Engineer of the Year in 2017.

I have been awarded several prestigious fellowship titles, including a Queensland International Fellowship, an Endeavour Research Fellowship, a Smart Futures Fellow, and a JSPS Invitational Fellow. I am the Vice Chair of the IEEE Northern Australia Section.

Keywords: artificial intelligence and image processing, computer vision



LILIAN LAGARRIGUE
Research Officer, ACAMI

I am working on a collaborative project between ACAMI at La Trobe University and The Florey Institute of Neuroscience and Mental Health in Melbourne.

The aim of the project is to develop novel AI-driven methods for designing therapeutic mRNA sequences in the biomedical field.

As the project's lead technical contributor, I am developing an AI model to optimize specific mRNA molecules that can be administered to patients in order to treat Niemann-Pick disease type C1 (NPC-1), a form of childhood dementia.

This partnership integrates expertise in AI, computer science, biophysics, biomedical science, and mathematical modelling to tackle this complex neurodegenerative condition.

Keywords: biomedical, machine learning (AI), childhood dementia, brain disorder



DR PHU THANH LAI
Research Fellow, ACAMI

Dr Lai is also working in the LTU CISCO Centre for AI and IOT.

My research interests lie in the broad areas of software engineering, cloud computing, internet of things, wireless communications, and artificial intelligence.

Specifically, my work predominantly surrounds resource management in large-scale distributed systems such as mobile edge computing and telecommunications systems, using mathematical optimisation (convex/non-convex optimisation, game theory, Lyapunov framework).

Also, as part of La Trobe University City of the Future initiative, I have worked on several Cisco-supported projects, namely Smart Campus Living Lab, real-time air quality monitoring, and 3D Campus Digital Twin, which involves web development, IoT, and computer vision.

Currently, an emergent theme to my interests is RNA structure prediction using Generative AI.

Keywords: cloud computing, wireless communications, optimisation



ASSOCIATE PROFESSOR SUDANTHI WIJEWICKREMA
Principal Research Fellow, ACAMI

I have a background in Computer Engineering with a PhD in Artificial Intelligence.

I have over 20 years of research experience in diverse domains in industry, government, and academia. Over the past 13 years my work has focused on applying Artificial Intelligence to medical image and biomedical signal processing, as well as simulation-based surgical training.

I have led pioneering projects in temporal bone surgery simulation, pre-operative planning and intra-operative guidance, and contributes extensively to interdisciplinary collaborations in computational medicine.

Keywords: medical image processing, biomedical signal processing, artificial intelligence, simulation-based medical education



DR LU YU
Research Fellow, ACAMI

My current research is primarily focused on generative AI and large language models (LLMs), with an emphasis on improving their interpretability, transparency, and efficiency.

I specialize in identifying limitations in existing AI systems and developing innovative methods to enhance explainability while maintaining high performance.

Recent projects include research on model compression techniques, and the optimization of generative models to reduce computational requirements while preserving accuracy.

My work aims to create computationally efficient and interpretable AI models, particularly in high-stakes fields like healthcare, where trust and reliability are crucial.

These efforts aim to create interpretable and computationally efficient models, particularly in high-stakes fields such as healthcare, where trust and reliability are essential.

Keywords: generative AI, model interpretability, model efficiency



**DISTINGUISHED
PROFESSOR WEI XIANG**
CISCO Research Chair
of AI and IOT

Distinguished Professor Xiang is also Director of the Cisco–La Trobe Centre for AI and IoT, and Director and Chief Scientist of the Australian Centre for AI in Medical Innovation (ACAMI).

I am currently the Cisco Chair of AI and Internet of Things, the Director and Chief Scientist of ACAMI and Founding Director of the La Trobe CISCO Centre for AI and Internet of Things. I am also Director of Higher Degree Research Program at SmartSat CRC.

Prior to joining in La Trobe, I was Foundation Chair and Head of Discipline of Internet of Things Engineering at James Cook University, Cairns, Australia. Due to my instrumental leadership in establishing Australia's first accredited Internet of Things Engineering degree program, I was selected into Percy Foundation's Hall of Fame in October 2018. I am an elected Fellow of the IET in UK and Engineers Australia. I received the TNQ Innovation Award in 2016, and Percy Entrepreneurship Award in 2017, and Engineers Australia Cairns Engineer of the Year in 2017.

I have been awarded several prestigious fellowship titles, including a Queensland International Fellowship, an Endeavour Research Fellowship, a Smart Futures Fellow, and a JSPS Invitational Fellow. I am the Vice Chair of the IEEE Northern Australia Section.

Keywords: artificial intelligence and image processing, computer vision



DR KANG HAN
Postdoc Research Fellow,
CISCO Centre AI and IOT

My research interests focus on reconstructing high-fidelity 3D representations from multiple oriented 2D images using artificial intelligence-based algorithms to enable photo-realistic view rendering.

This work involves designing novel 3D representations to accurately capture intricate geometric structures and complex view-dependent effects. To achieve these goals, I employ techniques from computer vision, computer graphics, and deep learning to develop advanced learning-based 3D representations.

Additionally, my research encompasses 3D reconstruction and rendering from images captured in challenging environments, such as underwater settings with variable lighting conditions and high turbidity.

The AI-based 3D representations I study also offer innovative approaches to numerous downstream computer vision tasks, including 3D object classification and segmentation.

Keywords: 3D reconstruction, computer vision, deep learning



KAMYAR KARIMI
Research Engineer, CISCO
Centre AI and IOT

I am an Internet of Things engineer with a solid track record in delivering complex solutions, and an experienced tutor in computer science and programming.

I lead an IoT systems research with a focus on developing innovative solutions for Australian agriculture. My expertise spans designing and implementing end-to-end IoT architectures, from sensor networks to data analytics platforms. I specialise in optimizing network infrastructure and creating robust software applications that solve real-world agricultural challenges.

My work involves researching and analysing system requirements for IoT, web and mobile applications to address agricultural monitoring needs. I develop complex system architectures that overcome technology limitations in existing IoT implementations.

I also provide technical guidance on software design activities and maintains comprehensive documentation for IoT networks and systems.

My approach combines rigorous testing methodologies with performance optimization to ensure reliable and scalable IoT deployments.

Keywords: IoT systems, Australian agriculture



DR PHU THANH LAI
Research Fellow,
CISCO Centre AI and IOT

Dr Lai is also working in the LTU CISCO Centre for AI and IOT. Dr Lai is also working in ACAMI.

My research interests lie in the broad areas of software engineering, cloud computing, internet of things, wireless communications, and artificial intelligence.

Specifically, my work predominantly surrounds resource management in large-scale distributed systems such as mobile edge computing and telecommunications systems, using mathematical optimisation (convex/non-convex optimisation, game theory, Lyapunov framework).

Also, as part of La Trobe University City of the Future initiative, I have worked on several Cisco-supported projects, namely Smart Campus Living Lab, real-time air quality monitoring, and 3D Campus Digital Twin, which involves web development, IoT, and computer vision.

Currently, an emergent theme to my interests is RNA structure prediction using Generative AI.

Keywords: cloud computing, wireless communications, optimisation



ARAVINDAN MADASAMY
Research Engineer,
CISCO Centre AI and IOT

I am an Internet of Things engineer. My research focuses on developing automated solutions for irrigation systems in sugarcane agriculture in Queensland.

I am working on optimizing the irrigation process to reduce manual labour and enhance efficiency. This involves designing a solution that accurately determines water presence in each irrigation field using various sensors, thereby optimizing electricity usage by water pumps.

Additionally, I'm also involved in developing a new end device to control valve operations and log data from existing sensors. This new device leverages advanced IoT technologies and uses the LoRaWAN communication protocol to ensure reliable and long-range data transmission.

My interests revolve around automating tasks to simplify and improve everyday life, with a particular emphasis on integrating cutting-edge technology to create sustainable and efficient solutions for agricultural challenges.

Keywords: IoT, irrigation automation, smart agriculture.



DR RICK SARIC
Research Associate,
ARC Industrial Transformation
Hub for Protected Cropping

I am currently working as a Research Associate with Distinguished Professor Wei Xiang in computer vision and ML at the ARC Industrial Transformation Hub for Protected Cropping at La Trobe University.

I completed my PhD in applied artificial intelligence for sustainable agriculture at La Trobe University. During my studies, I also gained valuable teaching experience by assisting with subjects such as Ideas to Innovation and Advanced Engineering Innovation.

During my PhD studies, I participated in and presented my research findings at world-class conferences and symposia in Australia and overseas.

My ongoing research focuses on image-based plant phenotyping, where I analyse plant growth using cutting-edge equipment with different imaging modalities and state-of-the-art models. I have extensive experience in analysing large volumes of data.

I am also a graduate member of the IEEE, through which I have demonstrated significant volunteering experience in Australia and overseas.

Keywords: computer vision, artificial intelligence, engineering innovation



DR DI WU
Senior Lecturer and Deputy
Director La Trobe-CISCO
Centre for AI and IOT

My research area focuses on federated learning, AI security and privacy, and trustworthy AI, with the goal of building robust, secure, and reliable AI systems for real-world deployment.

In addition, I have recently a deep interest in emerging directions including Machine Unlearning, Artificial General Intelligence (AGI), Quantum AI (QAI), AI for Science (AI4Science), and AI for Social Good (AI4SG), and I strive to explore how these paradigms can shape the future of safe and beneficial AI.

I have published research in high-quality refereed books, conferences, and journals, including top-tier venues such as ICLR, KDD, USENIX Security, IJCAI, WWW, TDSC, TKDE, and ToN.

I also serve as a reviewer for leading AI and systems conferences and journals, including NeurIPS, ICLR, ICCV, KDD, AAAI, ACM MM, CoRL, TMC, TNNLS, TETCI, PR, and others.

Keywords: trustworthy AI/
ML, AI/ML privacy and security,
federated learning, AI4Science



DR ALI ZIA
Research Fellow,
Digital Agriculture and
Machine Learning

I am a Computer Scientist with over fifteen years of expertise in Artificial Intelligence (AI), HyperSpectral Imaging (HSI), and Higher-order Representation Learning.

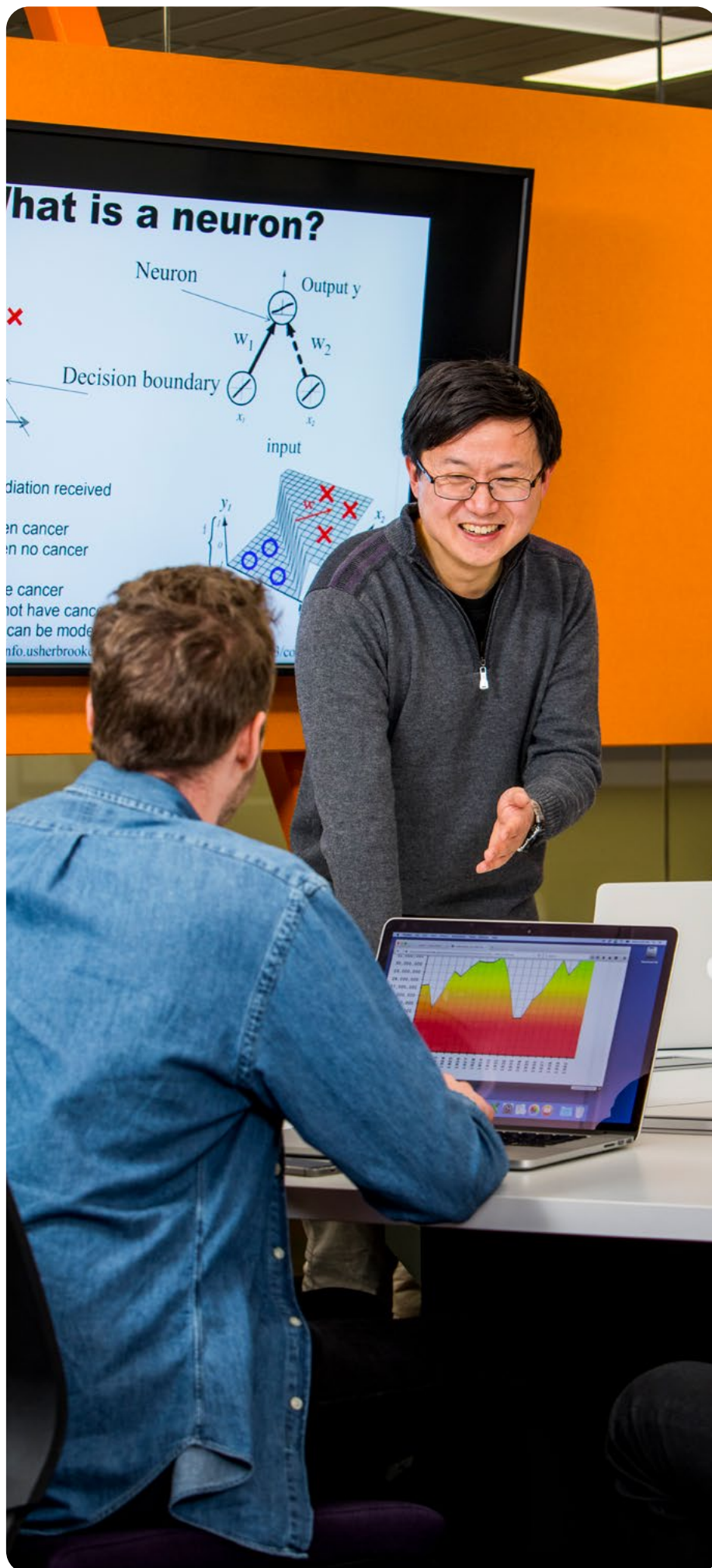
Proven track record in leading interdisciplinary research and developing innovative AI-driven solutions across academia and industry.

Extensive experience in machine learning applications, precision agriculture, healthcare AI, and intelligent systems. Adept at curriculum development, student mentorship, and advancing educational frameworks.

Recognised for pioneering research in hyperspectral imaging for 3D computer vision, AI-driven disease detection, and smart home automation.

Committed to pushing the boundaries of AI and contributing to technological advancements with significant real-world applications.

Keywords: artificial intelligence, machine learning applications, precision agriculture, healthcare AI, and intelligent systems



3.7 CENTRE FOR MATERIALS AND SURFACE SCIENCE (CMSS)



PROFESSOR PAUL PIGRAM

Physics. Director of the La Trobe University Centre for Materials and Surface Science (CMSS)

I am the Director of the La Trobe University Centre for Materials and Surface Science (CMSS).

I have previously held appointments as Head of the Department of Physics, Associate Dean (Research) and Associate Dean (Commercialisation and Industry).

My research interests include understanding interactions at surfaces (elemental, chemical and molecular), bio-surface characterisation, nano-particle drug delivery, high throughput materials discovery and the surface science of industrially relevant systems.

My work in surface science supported by the application of innovative machine learning approaches for classifying, discriminating and understanding large scale materials libraries and data sets in one, two and three dimensions.

CMSS is an Activity Hub of the Australian National Fabrication Facility Victoria and hosts XPS, ToF-SIMS and scanning auger nanoprobe flagship instrumentation.

Keywords: biomaterials, functional materials, nanomaterials, physical chemistry of materials, surface science, thin film technology



DR SARAH BAMFORD

Research Officer, Centre for Materials and Surface Science (CMSS)

My research aims to combine surface analysis and machine learning. I primarily use time of flight secondary ion mass spectrometry (ToF-SIMS) to collect large hyperspectral data sets.

The ToF-SIMS provides surface sensitive data by collecting a full mass spectrum at every pixel within an image. My goal is to then use unsupervised machine learning in the form of self-organising maps to interrogate the data, analysing complex materials systems at the molecular level.

My research spans a broad range of applications including, polymers, glass, perovskite, diamond, nanomaterials, minerals, inks, cells, cancer, lipid droplets, extracellular vesicles and more.

My main interest is exploring the chemistry of complex systems and discovering something new.

Keywords: surface analysis, ToF-SIMS, machine learning.



DR WIL GARDNER
**Research Fellow, Centre
for Materials and Surface
Science (CMSS)**

I completed my PhD in physics in 2022, which focused on applying machine learning (ML) for the analysis time-of-flight secondary ion mass spectrometry (ToF-SIMS) data.

Currently, I am a Postdoctoral Research Officer in the Centre for Materials and Surface Science (CMSS) bringing together experts across physics, chemistry, materials science and electronic engineering with top class equipment.

I have developed and refined several ML-based workflows for analysing complex ToF-SIMS data, which I and the Centre for Materials and Surface Science (CMSS) at La Trobe currently use routinely for data analysis.

My latest research focus has been the adaptation of state-of-the-art deep learning-based computer vision algorithms to suit ToF-SIMS imaging data, enabling more insightful analyses and unlocking the predictive potential of the information-rich yet highly complex hyperspectral data.

Keywords: machine learning (ML), hyperspectral data



**DR HARRY
(XIAOCHUAN) WANG**
**Research Fellow-Software
Engineer, Centre for Materials
and Surface Science (CMSS)**

With a decade of experience as a leading data scientist and statistical modeller across biomedical research, public health, and industry, I have previously held senior roles at institutions including Metabolomics Australia (University of Melbourne Node), the Cancer Council Victoria, and the Department of Health of the Victorian State Government.

My work focuses on statistical machine learning, high-performance cloud computing, reproducible analytics, and FAIR data governance principles, with applications spanning national screening programs, clinical and population health modelling, and translational research.

I offer profound technical expertise and demonstrate a strong commitment to tangible scientific impact.

Keywords: statistical machine learning, cloud computing, reproducible analytics, data governance



DR SEE YOONG WONG
**Research Officer, Centre
for Materials and Surface
Science (CMSS)**

My research concentrates on the application of material characterization techniques to a wide range of materials, including electronics, polymers, fibres, coatings, and alloys. To efficiently and objectively analyse large datasets, such as hyperspectral images or microarray spectra, I also focus on applying statistical and machine learning models within the field of material science.

Currently, my work involves the use and optimization of Self-Organizing Maps, a type of artificial neural network, on various high dimensional datasets including ToF-SIMS, PEEM, and PL. An emerging theme in my research is correlative spectroscopy imaging, which integrates the strengths of different spectroscopy techniques to provide a more comprehensive understanding of material properties and behaviours.

Keywords: statistical and machine learning models

3.8 RESEARCH GROUP: OPTUS DIGITAL HEALTH TEAM



PROFESSOR NILMINI WICKRAMASINGHE

Optus Chair in Digital Health

I am the Optus Chair in Digital Health. My research is in Digital Health with a particular focus around the design, development and deployment of intelligent, responsible, user friendly yet high fidelity technology solutions to provide superior patient centred, high value clinical outcomes. I was awarded the prestigious Alexander von Humboldt award for my outstanding contribution to digital health.

I am particularly interested in the application of innovative artificial intelligent solutions such as digital twins, private blockchains and liquid neural networks to support superior and safe clinical decision making that enables everyone to stay stronger for longer.

A priority today is the application of digital solutions to uplift and upskill the healthcare workforce, enable more efficient, effective and efficacious care to ensue and at all times support a healthcare value proposition of superior quality for all, superior access for all and ensure that the care provided subscribes to a value-enhancing paradigm.

Keywords: digital health, digital twins, artificial intelligence



DR MUHAMMAD (NADEEM) SHUAKAT

Research Fellow, Optus Digital Health

My research interests are in technology-driven solutions, operational efficiency and digital health and compliance and regulatory affairs. My background in data, technology, materials, and business augmented with research interests in digital health, technology integration, and governance helped me work across a variety of fields and especially in AI, IoT, and blockchain in healthcare, with a particular emphasis on compliance, interoperability, and improving patient outcomes.

I bring a multidisciplinary perspective that integrates material science and sensor technologies to advance healthcare monitoring and intervention. My broader research interests include sustainable innovation, composite materials and healthcare, and the role of digital platforms in enabling efficient and compliant care delivery.

Keywords: digital health, technology integration in healthcare, AI/ML, evidence-based healthcare, sensors, composite materials

3. STAFF RESEARCH



**DR ABEYKOON
(NALIKA) ULAPANE**

**Research Officer,
Optus Digital Health**

I apply design science research principles to tackle complex challenges in healthcare.

My work focuses on developing Digital Twins (DTs) of patients, healthcare processes, and infrastructure by translating multimodal healthcare data into dynamic, high-dimensional representations.

I explore how these virtual models can support precision and personalized medicine, especially in oncology. In my recent research, I applied DT principles to model patients with Triple-Negative Breast Cancer, integrating demographic and tumour cell data. I proposed algorithms to uncover complex biological patterns with the goal of enhancing the planning of targeted cancer therapies. By predicting patient-specific responses, this approach supports more effective and individualized treatment strategies.

My work aims to bridge the gap between biological complexity and clinical care, offering new pathways for integrating computational insights into decision-making. I continue to push the boundaries of digital health innovation, paving the way for AI-assisted, data-driven improvements in healthcare delivery.

Keywords: digital twins; personalized health; multimodal data





**DISTINGUISHED PROFESSOR
BRIAN ABBEY**

**NHMRC Leadership Fellow
and Co-Founder of AlleSense**

My research spans the fields of optics, x-ray science, and nanofabrication. Specifically, I develop novel nanotechnology-based optical sensors for both life and materials sciences applications.

The platform technologies developed by my group utilise near-field interactions between light, nanostructures, and the sample to reveal local variations in the dielectric properties.

To be able to characterise our devices and samples at the nanoscale we employ a variety of x-ray microscopy and x-ray diffraction techniques including femtosecond x-ray scattering experiments conducted at x-ray Free Electron Lasers.

Working with our international research and industry partners my group has a strong focus on research translation and commercialisation and supports research projects in fundamental science all the way through to prototyping and clinical validation.

Keywords: optics, x-ray science, photonics



DR AMOS AKANDE

**Research Officer
Nanotech and Nanofabrication**

I am an Applied Physicist and member of nanotechnology and nanofabrication team of Professor Brian Abbey's group, working on R&D and manufacturing of optical biosensor and bioimaging devices for disease diagnosis, with the role of managing biosensor devices from development to manufacturing and packaging.

Prior to joining La Trobe University, I worked at the University of Sydney in the Sydney Nano Institute cleanroom on project involving fabrication of high-quality SOI based photonic and plasmonic slot waveguides sensor chip for selective detection of molecules and metabolites. My research journey started at the CSIR South Africa where I extensively contributed to solving the longstanding challenge of gas and biosensor devices' selectivity through fundamental science. Among which an in-situ Raman spectroscopy setup showed selective detection to chemical molecules based on phonon shift characteristics of metal oxide nanostructure and the device' operando analysis was well received by the sensor community.

These groundbreaking research contributions had led to patents, technology developments and many articles in high impact peer-reviewed journals. I have also received grants and awards in the field including talent award in nanotechnology and MedTech skill set category leading to the Australian permanent residency.

Keywords: nanofabrication, gas sensor, biosensor, medtech, nanostructures, metal oxide



DR EUGENIU BALAUR

Senior Research Fellow, Physics

The main goals of my research are development of bio-platforms based on novel nanofabricated materials for advanced sample imaging and sensing.

In particular, my interests include fabrication of metamaterial coatings on glass surfaces using advanced lithographic tools and use them for label-free cellular and tissue histopathological imaging at the point-of-care.

I am also interested in developing new class of sample staining that aims at altering sample's dielectric constant in order to improve feature differentiation in biological samples.

Understanding the pathways of dielectric changes as function of the states of the biological features and how to improve the feature differentiation in brightfield and fluorescent imaging are other topics I am highly interested.

An increasing focus within my research interests is the integration of metamaterials with electrochemical sensing platforms.

Keywords: nanomaterials, bio-integration, label-free Imaging/Sensing



DR CONNIE DARMANIN

Senior Research Fellow, Physics

My research encompasses experimental and theoretical physicists, x-ray crystallography and optical imaging techniques in the areas of biology and chemistry, to help develop new bioimaging technology.

Current activities in my group involve x-ray method development at synchrotrons and x-ray Free Electron Laser (XFEL) facilities.

As well as optical microscopy imaging in respect to cancer tissues and cells, I have a particular interest in understanding of cubic phase lipid crystallisation process and ionic liquid interactions with protein to help solve protein structures.

Keywords: x-ray crystallography, biophysics and experimental physics, synchrotrons, XFEL



ROSEMARY GUARINO

Technical Officer

I am a Technical Officer in Professor Brian Abbey's laboratory, where I contribute to research and development initiatives focused on optimizing our biosensor technology that is being used to diagnose early-stage breast cancer.

Leveraging my background in biochemistry and histology, I collaborate with a range of Researchers and Industry partners to explore and evaluate potential applications of these biosensor in the Medical field.

Keywords: biosensors, cancer, histology

4. STAFF INDEX BY CTI RESEARCH FOCUS AREAS

The School launched a research consolidation strategy in 2022 to integrate all research strengths and expertise within the school and allocate them into research clusters that will align with industry collaboration opportunities. There are 11 clusters, with each cluster led by a Discipline Lead.

4.1 APPLIED ROBOTICS

Robert Ross (Lead)	Associate Professor, Electronics Engineering
Tommy Huynh	Senior Lecturer in Electronics Engineering
Alex Stumpf	Senior Lecturer in Electronics Engineering
Vipul Patel	Associate Professor in Civil Engineering
Wei Xiang	La Trobe Distinguished Professor and Cisco Research Chair of AI and IoT Director & Chief Scientist of Australian Centre for AI in Medical Innovation (ACAMI) Director of Cisco-La Trobe Centre for AI and IoT
Simon Egerton	Associate Professor, Deputy Head of Department of Computer Science and Information Technology

4.2 MATHEMATICS, STATISTICS AND MODELLING

Marcel Jackson (Lead)	Professor and Associate Dean, Research and Industry Engagement
Rebecca Chisholm	Associate Professor, Mathematics and Statistics
Mumtaz Hussain	Associate Professor, Mathematics
Joel Miller	Associate Professor, Mathematics
Yuri Nikolayevsky	Associate Professor, Mathematics
Andriy Olenko	Associate Professor, Statistics
Luke Prendergast	Professor, School Deputy Dean and Associate Dean of Domestic Partnerships
Peter Van Der Kamp	Senior Lecturer, Mathematics and Statistics
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Prakash Veeraraghavan	Associate Professor and Head, Department of Computer Science and Information Technology
ASM Kayes	Senior Lecturer, Computer Science and Information Technology

4.3 BIG DATA MANAGEMENT, ANALYTICS AND SYSTEMS

Zhen He (Lead)	Associate Professor, Computer Science and Information Technology
Kiki Adhinugraha	Lecturer, Computer Science and Information Technology
Phoebe Chen	Professor, Computer Science and Information Technology
Peng Cheng	Associate Professor, Networking, Computer Science and Information Technology
Lianhua Chi	Lecturer, Computer Science and Information Technology
ASM Kayes	Senior Lecturer, Computer Science and Information Technology
Abdun Mahmood	Associate Professor, Computer Science and Information Technology
Eric Pardede	Professor and Associate Dean in Learning and Teaching
Wenny Rahayu	Dean of School and Professor in Computer Science
Nasser Sabar	Senior lecturer, Computer Science and Information Technology
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Gokhan Yilmaz	Senior Lecturer, Civil Engineering
Aniruddha (Ani) Desai	Associate Pro Vice-Chancellor Research (India), Director Centre for Technology Infusion (CTI)
Shuo Ding	Lecturer, Computer Science
David Farchione	Lecturer, Mathematics and Statistics
Mumtaz Hussain	Associate Professor, Mathematics and Statistics
Marcel Jackson	Professor and Associate Dean of Research and Industry Engagement
Joel Miller	Associate Professor, Mathematics
Jabed Morshed Chowdhury	Senior Lecturer, Computer Science and Information Technology
Andriy Olenko	Associate Professor, Statistics
Vipul Patel	Associate Professor, Civil Engineering
Luke Prendergast	Professor and School Deputy Dean and Associate Dean, Domestic Partnerships
Richard Skarbez	Senior Lecturer, Computer Science and Information Technology
Ben Soh	Associate Professor, Computer Science and Information Technology
Long Truong	Senior Lecturer, Civil Engineering
Prakash Veeraraghavan	Associate Professor and Head of the Department of Computer Science and Information Technology
Wei Xiang	La Trobe Distinguished Professor and Cisco Research Chair of AI and IoT Director & Chief Scientist of Australian Centre for AI in Medical Innovation (ACAMI) Director of Cisco-La Trobe Centre for AI and IoT
Di Wu	Senior Lecturer and Deputy Director LTU-CISCO Centre for AI and IOT

4.4 ADVANCED MATERIALS, MANUFACTURING AND MINING

Ing Kong (Lead)	Professor, Manufacturing Engineering
Vipul Patel	Associate Professor, Civil Engineering
Toen Castle	Lecturer, Mathematics and Statistics
Avinash Baji	Senior Lecturer, Manufacturing Engineering
Tommy Huynh	Senior Lecturer, Electronics Engineering

4.5 CYBERSECURITY AND BLOCKCHAIN

Naveen Chilamkurti (Lead)	Professor and Associate Dean in International Partnerships
Tommy Huynh	Senior Lecturer, Electronics Engineering
ASM Kayes	Senior Lecturer, Computer Science and Information Technology
Abdun Mahmood	Associate Professor, Computer Science and Information Technology
Jabed Morshed Chowdhury	Senior Lecturer, Computer Science and Information Technology
Tran Khoa Phan	Senior Lecturer, Computer Science and Information Technology
Ben Soh	Associate Professor, Computer Science and Information Technology
Prakash Veeraraghavan	Associate Professor and Head of Department of Computer Science and Information Technology
Marcel Jackson	Professor and Associate Dean, Research and Industry Engagement
Joel Miller	Associate Professor, Mathematics and Statistics
Wenny Rahayu	Dean of School and Professor of Computer Science
Wei Xiang	La Trobe Distinguished Professor and Cisco Research Chair of AI and IoT Director & Chief Scientist of Australian Centre for AI in Medical Innovation (ACAMI) Director of Cisco–La Trobe Centre for AI and IoT
Di Wu	Senior Lecturer and Deputy Director LTU–CISCO Centre for AI and IOT

4.6 TECHNOLOGY ADOPTION

Erik van Vulpen (Lead)	Deputy Director for the Centre for Technology Infusion
Aniruddha (Ani) Desai	Associate Pro Vice-Chancellor Research (India), Director Centre for Technology Infusion (CTI)
Shuo Ding	Lecturer, IT
Aidin Bervan	Hardware Development Lead and Research Fellow, Centre for Technology Infusion

4.7 AI AND MACHINE LEARNING

Wei Xiang (Lead)	La Trobe Distinguished Professor and Cisco Research Chair of AI and IoT Director & Chief Scientist of Australian Centre for AI in Medical Innovation (ACAMI) Director of Cisco-La Trobe Centre for AI and IoT
Phoebe Chen	Professor, Computer Science and Information Technology
Lianhua Chi	Senior Lecturer, Computer Science and Information Technology
Lydia Cui	Lecturer, Computer Science and Information Technology
Zhen He	Associate Professor, Computer Science and Information Technology
Abdun Mahmood	Associate Professor, Computer Science and Information Technology
Tran Khoa Phan	Senior Lecturer, Computer Science and Information Technology
Nasser Saber	Lecturer, Computer Science and Information Technology Science and Information Technology
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Naveen Chilamkurti	Professor and Associate Dean, International Partnerships at SCEMS
Aniruddha (Ani) Desai	Associate Pro Vice-Chancellor Research (India), Director Centre for Technology Infusion (CTI)
Shuo Ding	Lecturer, Computer Science
Marcel Jackson	Professor and Associate Dean Research and Industry Engagement
ASM Kayes	Senior Lecturer, Computer Science and Information Technology
Joel Miller	Associate Professor, Mathematics and Statistics
Wenny Rahayu	Dean of School and Professor in Computer Science
Ben Soh	Associate Professor in Computer Science and Information Technology
Gokhan Yilmaz	Senior Lecturer in Civil Engineering
Di Wu	Senior Lecturer and Deputy Director LTU-CISCO Centre for AI and IOT
Sudanthi Wijewickrema	Principal Research Fellow, ACAMI

4.8 INFRASTRUCTURE AND ENVIRONMENT

Thuc Vo (Lead)	Associate Professor, Civil Engineering
Hossam Aboel-Naga	Professor and Head of Department, Engineering
Vipul Patel	Associate Professor, Civil Engineering
Long Truong	Senior Lecturer, Civil Engineering
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Gokhan Yilmaz	Senior Lecturer, Civil Engineering
Naveen Chilamkurti	Professor and Associate Dean, International Partnerships
ASM Kayes	Senior Lecturer, Computer Science and Information Technology
Ing Kong	Professor, Manufacturing Engineering

4.9 HCI, VISUALISATION AND USER EXPERIENCE

Richard Skarbez (Lead)	Senior Lecturer, Computer Science and Information Technology
Huawei Tu	Lecturer, Computer Science and Information Technology
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Kiki Adhinugraha	Lecturer, Computer Science and Information Technology
Phoebe Chen	Professor, Computer Science and Information Technology
Lydia Cui	Lecturer, Computer Science and Information Technology
Aniruddha (Ani) Desai	Associate Pro Vice-Chancellor Research (India), Director Centre for Technology Infusion (CTI)

4.10 DIGITAL COMMUNICATION SYSTEMS AND EMERGING NETWORKS

Aniruddha (Ani) Desai (Lead)	Associate Pro Vice-Chancellor Research (India), Director Centre for Technology Infusion (CTI)
Cheng Peng	Senior Lecturer Networking, Computer Science and Information Technology
Naveen Chilamkurti	Professor and Associate Dean International Partnerships
Shuo Ding	Lecturer, Computer Science
Tran Khoa Phan	Senior Lecturer, Computer Science and Information Technology
Ben Soh	Associate Professor, Computer Science and Information Technology
Erik van Vulpen	Deputy Director, Centre for Technology Infusion
Prakash Veeraraghavan	Associate Professor and Head of the Department of Computer Science and Information Technology
Wei Xiang	La Trobe Distinguished Professor and Cisco Research Chair of AI and IoT Director & Chief Scientist of Australian Centre for AI in Medical Innovation (ACAMI) Director of Cisco-La Trobe Centre for AI and IoT
Kiki Adhinugraha	Lecturer, Computer Science and Information Technology
Phoebe Chen	Professor, Computer Science and Information Technology
Mumtaz Hussain	Associate Professor, Mathematics and Statistics
ASM Kayes	Senior Lecturer, Computer Science and Information Technology
Abdun Mahmood	Associate Professor, Computer Science and Information Technology
Joel Miller	Associate Professor, Mathematics
Jabed Morshed Chowdhury	Senior Lecturer, Computer Science and Information Technology
Andriy Olenko	Associate Professor, Statistics
Robert Ross	Associate Professor, Electronics Engineering
Alex Stumpf	Senior Lecturer, Electronics Engineering

4.11 MICRO-NANO SYSTEMS

Aniruddha (Ani) Desai (Lead)	Professor and Director, Centre for Technology Infusion
Ing Kong	Professor, Manufacturing Engineering





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