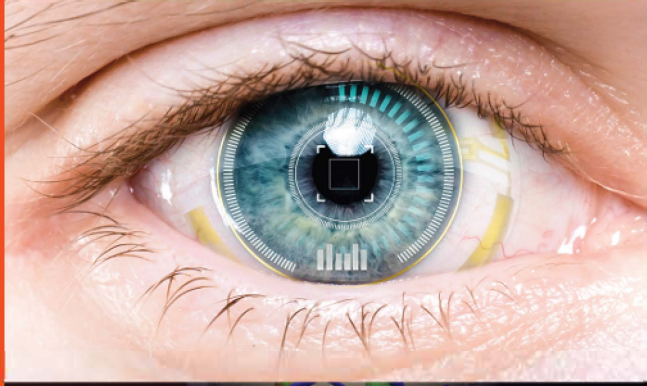
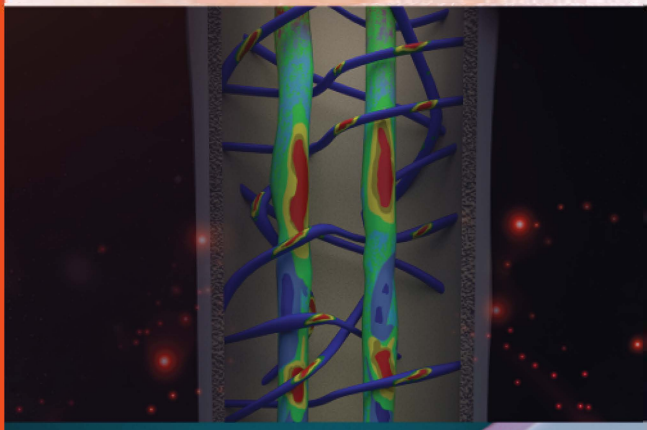
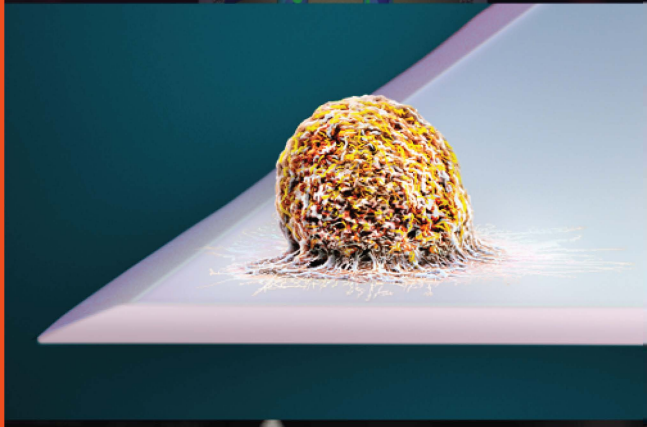
THE UNIVERSITY OF SYDNEY

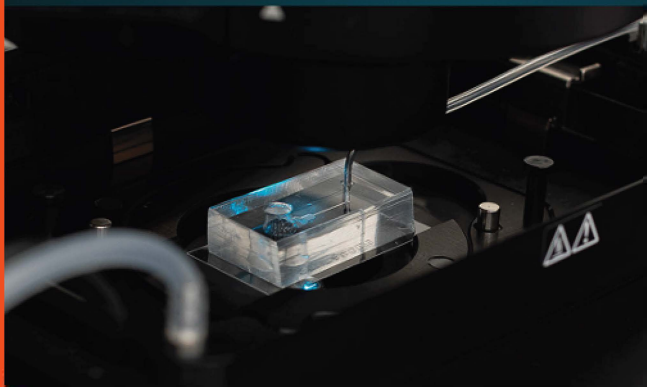
Advancing Health Through Innovation

School of Biomedical Engineering









We recognise and pay respect to the Elders and communities – past, present, and emerging – of the lands that the University of Sydney's campuses stand on. For thousands of years they have shared and exchanged knowledges across innumerable generations for the benefit of all.

Cover image: Various biomedical activities in the school of Biomedical Engineering

Advancing Health Through Innovation
School of Biomedical Engineering

Table of Contents

Driving Innovation
In Biomedical Engineering

The School of Biomedical Engineering at the University of Sydney is a leader in research that transforms lives. This brochure introduces our academic staff and their work, with a focus on commercialisation potential and industry engagement.

The School of Biomedical Engineering is a multidisciplinary powerhouse, uniting engineering, medicine, and science to address global health challenges. Our researchers are internationally recognised for their contributions to:

- Electronics and Bionics
- Computing and Digital Health
- Materials and Nanotechnology
- Mechanics and Microfluidics

We are committed to fostering a collaborative environment that supports both fundamental discovery and translational impact. Our students and researchers benefit from access to cutting-edge facilities, clinical networks, and a vibrant innovation ecosystem.

This brochure is designed to help external partners, whether from industry, government, or the investment community, identify opportunities for collaboration and innovation. Each academic profile includes:

- Key Research Interests
- Current Commercialisation Connections
- Potential Future Commercialisation Opportunities

We invite you to explore the profiles and reach out to our team to discuss how we can work together to bring new biomedical technologies to life.

Contact: bme.admin@sydney.edu.au

Prof. Wei Chen
Head of School

Key Research Interests
Professor Chen's research focuses on biomedical unobtrusive sensor systems and health informatics, including wearable sensor systems, ambient sensor systems, physiological and behavioural data sensing and analysis, multimodal approaches for health regulation, artificial intelligence for biomedical engineering, home health monitoring, neonatal monitoring, brain activity monitoring, cardiometabolic disease monitoring, smart rehabilitation and sleep monitoring.

Commercialisation Connections
Her current commercialisation connections are medical device industries and hospitals, like ResMed, Compumedics, Artinis, Philips, Royal Prince Alfred Hospital, Westmead, North Shore, Woolcock Institute of Medical Research, etc.

Future Commercialisation Connections
Future commercialisation options include wearable and ambient sensor systems for healthcare, home monitoring solutions, AI for health data analysis, AI-informed healthcare, health regulation and management. Potential partners will be medical device companies, AI healthcare industries, startup companies, hospitals and research institutes, etc.

Prof. Omid Kavehei

Professor & Deputy Head of School

Key Research Interests
Professor Omid Kavehei leads pioneering research at the intersection of micro- and nano-electronics, semiconductor technologies, biomedical engineering, and artificial intelligence. His work focuses on developing innovative medical devices and computational tools to improve solutions with impacts on diagnostics and treatment, particularly for neurological disorders.

Commercialisation Connections
Professor Omid Kavehei has established significant commercialisation connections through his leadership in two pioneering ventures: DeteQt Pty Ltd and BrainConnect Pty Ltd. As co-founder and Chief Scientific Officer of DeteQt, a University of Sydney spin-out, Professor Kavehei is advancing diamond-on-silicon quantum sensing technologies, and at BrainConnect, he is developing a continuous brain sensing solution.

Future Commercialisation Connections
He is focused on existing, emerging, and future medical devices in general and puts a major emphasis on medical and biomedical devices tailored for suitable, long-term, reliable, and dependable use. He is also developing solutions in the consumer domain for the future of human communications and interactions relating to overall health, security, and productivity.

Dr. Young No

Senior Lecturer in Biomedical Engineering & A/HOS (Education)

Key Research Interests
Dr. Young's key research interest lies in the development and characterisation of novel synthetic injectable biomaterials. He focuses on engineering bioactive cements, composite hydrogels, and synthetic tendon scaffolds with enhanced mechanical, biological, and radiographic properties. Young's work aims to bridge material innovation with clinical translation, leading to patented biomaterials that support tissue regeneration. Young is also actively looking to collaborate with international partners across the US, Europe, and Asia to drive cross-disciplinary advances in biomaterials science.

Young is looking for teaching and curriculum related collaborations with the School of Biomedical Engineering to enhance the teaching and learning experience of the next generation of biomedical engineers.

Future Commercialisation Connections
The unique combination of properties in the newly engineered and characterised synthetic injectable materials that simultaneously meet biological, mechanical, and degradation requirements would serve as a platform for future patent and commercialisation opportunities to augment or replace existing synthetic injectable materials used for minimally-invasive grafting procedures for orthopaedic applications.

Dr. Yogambha Ramaswamy

Senior Lecturer in Biomedical Engineering & A/HoS (Research Education)

Key Research Interests
Dr. Yogambha Ramaswamy has expertise in biomaterials, tissue engineering, nanobiotechnology and cell biology. She is the recipient of prestigious Vice-Chancellor's and NHMRC fellowships and her research is focused on developing innovative functional biomaterials for various tissue engineering applications (e.g. bone and ocular tissues). These biomaterial platforms are also integrated with advanced analytical tools to explore tissue mechanics and cellular responses to mechanical cues, enhancing our understanding and design of next-generation biomedical materials and therapies.

Future Commercialisation Connections
Dr. Ramaswamy's research has led to the development of novel biomaterials for musculoskeletal and corneal applications. The clinical relevance of these materials has led to patented innovations with commercial potential as next-generation implantable materials and stem cell therapy platforms. Dr. Ramaswamy has patented novel methodology for exploring tissue mechanics using advanced analytical tools to enable unique diagnostic solutions that have led to collaboration with clinicians, researchers, and industry for potential translational and commercial outcomes.

Dr. Daniele Vigolo

Senior Lecturer in Biomedical Engineering & A/HoS (Research)

Key Research Interests
Dr. Vigolo's research focuses on soft matter, microfluidics, and thermophoresis, with applications in lab-on-a-chip systems, biofluid dynamics, disease modelling, and point-of-care devices. Recent work includes a Vein-on-a-Chip model to investigate mechanisms of deep vein thrombosis under dynamic flow. His research explores transport phenomena in complex fluids and uses microfluidic platforms to replicate physiological environments.

Commercialisation Connections
Dr. Vigolo is currently developing a point-of-care diagnostic device in collaboration with a commercialisation partner, aiming to translate his microfluidic research into clinically impactful technology.

Future Commercialisation Connections
Dr. Vigolo’s research presents strong future commercialisation potential, particularly in point-of-care diagnostics, where his work on microfluidic platforms could enable rapid, low-cost disease detection. His Vein-on-a-Chip model offers translational value for drug screening and personalised medicine. His work on a neuromorphic imaging flow cytometer introduces a novel approach to rare cell detection, with significant clinical and commercial relevance.

Dr. Daria Anderson

Lecturer in Biomedical Engineering & Director (Outreach)

Key Research Interests
Dr. Daria Anderson's research group focuses on finding biomarkers and developing strategies to improve neuromodulation for treatment-resistant epilepsy and other neurological disorders. She analyses seizure patterns, applies machine learning to uncover new biomarkers and automate seizure detection, and leads prospective preclinical studies aimed at using neuromodulation to restore brain networks in a disease-modifying way.

Commercialisation Connections
Her work has uncovered key insights into how neural stimulation activates brain circuits, directly informing how deep brain stimulation devices from Medtronic, Boston Scientific, and Abbott are programmed. She has also made paradigm-shifting contributions to stimulation timing strategies for closed-loop neurostimulation in epilepsy using the NeuroPace system.

Future Commercialisation Connections
Her expertise in functional and structural brain connectivity has led to a collaboration with MR Solutions to map how brain networks reorganise in response to stimulation - laying the groundwork for future translation of neurostimulation stimulation strategies. Her team is also developing accessible software designed to support neuroscientists and clinicians in advancing research with neuroimaging and electrophysiology recordings in epilepsy.

Prof. Wenlong Cheng

Professor in Biomedical Engineering & Director (Research Strategy)

Key Research Interests
Professor Cheng specialises in nanomaterials and nanotechnology-enabled biomedical devices, including electronic skins, wearable and implantable sensors, and remote diagnostics. His work focuses on developing intelligent, soft, self-powered sensors and integrated platforms that support disruptive, nano-enabled manufacturing. These technologies aim to shift healthcare from hospital-centred to human-centred models, with applications in cardiovascular, foetal, and epilepsy monitoring, and broader uses in sports, human augmentation, and accurate robotic perception such as tactile sensing skins.

Future Commercialisation Connections
- Co-Development with Industry Partners
- Jointly develop soft system-on-skin platforms with companies for the early-stage pilot projects
- Deploy soft wearable sensors for precision agriculture, animal tracking, or industrial safety
- Launch new ventures targeting sectors such as aged care, sports tech, digital health, agritech, and conservation tech
- IP licensing for integration into existing health and consumer electronics pipelines
- Regulatory Pathway Development & Preclinical Platforms
- Establish translational frameworks for health diagnostics aligned with TGA/FDA requirements

Prof. Philip de Chazal

ResMed Chair in Biomedical Engineering & Director (Postgraduate Coursework)

Key Research Interests
Professor De Chazal develops signal processing and machine learning algorithms to analyse signals, such as heart rate, blood oxygen and chest movements, to monitor chronic conditions such as cardiovascular diseases and sleep disorders.

He has a special interest in developing technologies to diagnose and monitor sleep disorders, including the creation of tools for detecting sleep apnoea and other disrupted sleep patterns.

Future Commercialisation Connections
Professor De Chazal's work on devices for monitoring vital signs has strong commercial potential in the health tech industry. These devices could be developed for use in both clinical and home care settings to monitor patients with chronic conditions in real-time.

His technologies for diagnosing and monitoring sleep disorders could be commercialised for at-home monitoring. This technology could be of interest to companies specialising in sleep health or diagnostic devices.

Dr. Sandhya Clement

Lecturer in Biomedical Engineering & Director (Student Life/Academic Integrity)

Key Research Interests
Dr Clement's discipline research spans nanomedicine formulation for radiodynamic therapy (RDT), biomedical device development, and AI and deep learning model development for biomedical applications. In addition, she leads education research with a special focus on student engagement and retention in university education, curriculum enhancement, empowering women in engineering, academic integrity, and overcoming challenges in project-based learning.

Future Commercialisation Connections
Dr. Clement's work on nanoparticle-based formulations for RDT could lead to next-generation cancer therapeutics with enhanced precision and reduced side effects, paving the way for clinical translation and biotech partnerships. The development of AI driven biomedical devices offers scalable solutions for diagnostics and patient monitoring, with applications in both hospital and home care settings. Additionally, her data driven education research could be translated into digital platforms that support student engagement and retention.

A/Prof. Andre Kyme

A/Prof in Biomedical Engineering & Director (Culture & Community)

Key Research Interests
A/Prof Kyme's lab develops enabling technologies for biomedical imaging, with a focus on algorithm and instrumentation design for motion-compensated brain imaging in animals and humans. In collaboration with the Brain and Mind Centre, Dr. Kyme pioneered anaesthesia-free rodent imaging to better understand brain function and behaviour-technology now being adapted for paediatric neuroimaging in neurodiverse cohorts.

Commercialisation Connections
TeleMedVet, Perth - Partnering to develop multi-modal models for monitoring and predicting equine athlete health and performance, enhancing traditional diagnostic methods.
Cerebral Palsy Alliance - Collaborating to create and validate an anaesthesia-free neuroimaging protocol for neurodiverse children aged 1–10, enabling high-quality brain imaging without sedation.
Bruker - Working to commercialise awake animal imaging, bridging a key gap in the current market.

Future Commercialisation Connections
Siemens Healthineers – Siemens will play an important role in supporting the implementation of awake neuroimaging capability for paediatrics, in partnership with the Cerebral Palsy Alliance.

Dr. Ann-Na Cho

Sydney Horizon Fellow & Director (Industry and Hospital Engagement)

Key Research Interests
- Organoids/microphysiology systems (MPS): Dr. Cho's research aims to generate reliable human organ models, organoids/MPS, with a particular focus on brain and central nervous system.
- Tissue Engineering/additive manufacturing: Dr. Cho's work focuses on developing engineered tissues grown in the laboratory that can model unique features of native tissues in the human body, particularly using biomaterials and synthetic scaffolds that allow complicated microenvironment modeling.

Commercialisation Connections
Cartago, AXT, Stemcell Technologies, Evident

Future Commercialisation Connections
- Personalised stem cells have the potential to be commercialised in the field to serve as an in vitro bio-model containing a person's genes and phenotype, focusing on the central nervous system. This count enable the discovery of option diagnostic tools.
- Model to test new drug candidate or drug-repurposing to validate therapeutic efficacy in an individualised manner. By testing drug library with various condition as pre-clinical trial.
- A tissue-engineered brain could successfully serve as a humanised test model for biomedical devices to enhance the development and safety evaluations for improving treatment/monitoring outcomes and minimising the risk for patients.

Dr. Gurvinder Singh

Senior Lecturer in Biomedical Engineering & Director (Research Education Operations)

Key Research Interests
Dr. Singh's research focuses on designing magnetic, lipid, and polymeric nanoparticles for cancer therapy, MRI contrast, and targeted drug delivery. He addresses key industry challenges in scalability, reproducibility, and high-throughput characterisation/screening of nanoparticles-based formulation. His work includes engineering nanopatterned surfaces using plasma polymerisation and metal sputtering to study biomolecular interactions and cellular behaviour, advancing biomaterial applications in medicine.

Future Commercialisation Connections
Dr. Singh has patented an advanced manufacturing technique for producing ultra-high-performance magnetic nanoparticles with excellent scalability and reproducibility. He is currently leveraging these materials to develop next-generation rare-earth-free permanent magnets for decarbonisation technologies as well as therapeutic/diagnostic applications.

Dr. Singh has established microfluidics based high throughput platforms for fabricating lipid and polymeric based therapeutic nanoparticles for efficient delivery of RNA, DNA, and other nucleic acids to cancer, cardiovascular, and corneal applications.

Prof. Renae Ryan

Professor in Biomedical Engineering & A/Dean (Culture and Community)

Key Research Interests
Prof. Ryan is a Professor of Biochemical Pharmacology and an Australian Research Council Future Fellow. Her research team investigates the molecular mechanisms of membrane transport proteins, using a combination of biophysical techniques including electrophysiology, structural biology, and computational biology. Her research aims to uncover the molecular architecture and choreography of membrane transport proteins from a range of organisms, with a focus on human neurotransmitter transporters and their link to neurological diseases such as episodic ataxia.

Future Commercialisation Connections
Drug discovery and therapeutic development of small molecules and biologics that target membrane transport proteins.

Dr. Tonima Ali
Research Focused Academic

Key Research Interests
Dr. Tonima Ali is a Magnetic Resonance Imaging (MRI) researcher focused on neuroimaging analysis. Her research focuses on the development and implementation of advanced MRI methods to investigate the microstructural properties of white matter, cortex, and subcortical structures. She developed SydSGM parcellation, an advanced atlas of human subcortex delineating 56 nuclei, sub-nuclei, and specialised sub-regions. Her research identified extensive brain network alterations in Parkinson's disease. She is pursuing normative modelling of human subcortex for Australian population to assess healthy ageing and predict neurodegenerative disorders, development of subcortical atlas for adolescent brain, and subtype classification of Parkinson's Disease using structural connectivity.

Future Commercialisation Connections
Detailed subcortical mapping and characterisation of human brain could aid in the assessment of brain development and the healthy ageing process. Network connectivity alterations in Parkinson's disease could aid in subtype classification of the disease and placement of electrodes for Deep Brain Stimulation. Her research outputs could also be further developed for characterising other neurodegenerative disorders.

Dr. Georgios Angelis
Senior Research Fellow

Key Research Interests
Dr. Georgios' research interests lie at the intersection of medical imaging, biomedical engineering, and medical physics, with a particular focus on Total Body PET imaging. He specialises in image reconstruction, kinetic modelling, and the quantitative analysis of dynamic imaging data. His work includes developing and optimising protocols for low-dose and dynamic PET imaging, evaluating new radiotracers, and applying advanced computational techniques such as machine learning to improve image quality and extract physiological and metabolic information.

Future Commercialisation Connections
Future commercialisation efforts involve collaborations with pharmaceutical and theranostic companies to support drug development using advanced PET imaging. These partnerships would enable detailed pharmacokinetic analysis and biodistribution assessment of novel agents, accelerating clinical translation and supporting personalised therapy through Total Body PET technologies.

Dr. Deepu Ashok

Research Associate and PERIscope entrepreneur lead

Key Research Interests
Dr. Ashok's research focuses on the surface properties of microfluidic biosensors and organs-on-chips to improve performance, reduce cost, and reduce the environmental footprint.

He also explores the interaction between gaseous plasma and biomaterials for developing next-generation biomedical devices and implants.

Commercialisation Connections
Dr. Ashok was recently granted the PERIscope commercialisation award. As part of the award, he is doing a residency at the Sydney Knowledge Hub, working as an entrepreneur lead for his patented microfluidic technology. He is en route to successfully validating the market for his invention and is developing a roadmap for its commercialisation.

Future Commercialisation Connections
Dr. Ashok's research on microfluidic organs-on-chips and biosensors has commercial potential.

Companies in the medical device industry could license his IP to develop microfluidic organs-on-chips or biosensors that offer improved performance and production turnout while simultaneously lowering costs, reducing the risks associated with the manufacturing process, and minimising environmental impact.

Dr. Mahroo Baharfar

Postdoctoral Researcher

Key Research Interests
Dr. Mahroo Baharfar is a Research Fellow at the University of Sydney, working with Prof. Antonio Tricoli on electrocatalysts and (bio)sensors. She previously held a postdoctoral position at UNSW, collaborating on nanosensor manufacturing for coal mine safety. Dr. Baharfar earned her PhD in Chemical Engineering at UNSW under Prof. Kourosh Kalantar-Zadeh. Her expertise includes nanotechnology, materials science, electrochemistry, and fabrication. She has published over 50 papers, with 1,700+ citations in the past five years.

Commercialisation Connections
Working on an Australian Renewable Energy Agency (ARENA)–funded project focused on the commercialisation of large-scale production and direct integration of nanocatalysts for electrocatalytic hydrogen production.

Future Commercialisation Connections
Nanosensing interface manufacturing; integrated and disposable devices for point-of-care testing and gas sensing; electrocatalyst development; and waste refinement

Prof. Marcela Bilek
Professor in Biomedical Engineering

Key Research Interests
Professor Bilek specialises in the use of plasma technologies to modify the surface properties of materials, enhancing their functionality for biomedical applications.

Her research focuses on developing surfaces that incorporate bioinstructive cues and robustly immobilised functional biomolecules to control cell and tissue behaviours, such as cell fate and tissue integration, enabling a new generation of cell culture platforms, medical devices and biosensing / diagnostic systems.

Commercialisation Connections
Professor Bilek's wide range of plasma surface modifications are currently being commercialised in advanced cell culture platforms, bone defect implants and for biofunctionalisation and hydrogel integration in 3D bioprinting.

Future Commercialisation Connections
These technologies could be further developed and commercialised for use in a wide range of biomedical implants and devices, as well as microfluidic, cell processing and sensing devices, opening doors for collaborations with companies producing advanced biomaterials and regenerative medicine solutions.

Prof. Fernando Calamante
Professor in Biomedical Engineering

Key Research Interests
Dr. Fernando's research focuses on developing advanced MRI techniques to map brain structure and function, particularly through diffusion MRI. His work uses diffusion MRI and fMRI to study how brain areas are connected, helping to identify abnormalities in brain networks His research is instrumental in understanding neurological diseases, such as stroke, epilepsy, and neurodegenerative disorders, by improving brain imaging techniques for diagnosis and monitoring.

Commercialisation Connections
Professor Calamante's research work has involved industry collaborations. This has included diffusion MRI and perfusion MRI methods with Siemens Healthineers, as well as machine learning imaging methods with Sydney Neuroimaging Analysis Centre and GeodAIsics.

Future Commercialisation Connections
Advanced MRI Techniques for Clinical Diagnostics: His diffusion MRI methods have significant potential for commercialisation in clinical diagnostics. These techniques could be used to improve early diagnosis and monitoring of neurological conditions.
His work on brain connectivity could be transformed into software tools that aid clinicians in diagnosing and planning treatments for neurological disorders. Such tools could be licensed to medical imaging companies or healthcare providers looking to enhance their diagnostic capabilities.

Dr. Hongjun Chen
Postdoctoral Researcher

Key Research Interests
- Using flame spray pyrolysis technique to fabricate highly efficient and earth-abundant electrochemical catalysts.
- Evaluating their electrochemical performance for water electrolysis under larger current density.
- Optimisation of the experimental conditions to increase the long-term stability.
- Investigating the underlying mechanism to further improve the performance to satisfy the milestones of the research project.

Commercialisation Connections
The current project is an ARENA project including two research partners, ENTX Global Pty Lty and Hysata Pty Ltd.

Shaopeng Chi
Postdoctoral Research Associate

Key Research Interests
Dr. Chi focuses on nanotechnology-based drug delivery systems for treating neurodegenerative and cardiovascular diseases. He engineers nanoparticles that precisely deliver therapeutic agents to diseased tissues, aiming to enhance treatment efficacy and reduce side effects. He also investigates mechanosensitive ion channels involved in proprioception and motion sensing, with applications in neurology and neuroengineering.

Commercialisation Connections
Dr. Chi is actively exploring commercial partnerships to translate his research into clinical applications.

Future Commercialisation Connections
Dr. Chi's nanoparticle platforms hold strong potential in pharmaceutical development, particularly for targeted drug delivery. His research on ion channels could support future commercial applications in brain-computer interfaces, bionic sensors, and neurotherapeutics, offering innovative tools to address unmet clinical needs.

Dr. Thomas Close

National Imaging Facility Informatics Fellow

Key Research Interests
Dr. Close's research focuses on neuroimaging informatics, with an emphasis on data interoperability, standardisation, and scalable workflow automation. He develops open-source tools to enable reproducible imaging analysis and privacy-preserving infrastructure for sharing sensitive medical data. His work also applies machine learning and natural language processing to metadata curation and de-identification.

Commercialisation Connections
He is a Chief Investigator on the AIS-SHIELDS MRFF project, contributing to national-scale infrastructure for imaging data analytics and sharing. The project supports clinical research and system-wide impact, with clear translational potential. Dr. Close also advises health networks on data governance and the secure migration of clinical imaging data to research infrastructure.

Future Commercialisation Connections
He is exploring commercial pathways in cloud-native imaging workflows for clinical trials and precision medicine. His interests include consultancy or SaaS-style offerings to support data compliance, interoperability, and scalable deployment, and is looking to engage with healthcare partners to assess needs for integrated analysis platforms.

Dr. Shaikh Faisal

Postdoctoral Research Fellow

Key Research Interests
Dr. Shaikh Nayeem Faisal is developing 3D microarray electrodes for wearable sensors, a non-invasive EEG-based platform for brain-controlled robotics and active implants for photobiomodulation and photodynamic therapy. Two of his patents are licensed by Sicona Battery Technology and the Australian Army. Recently, he was awarded the Sydney Nano Living Lab Award ($50,000) to showcase direct CO_2-captured, 3D-printed concrete planters on the University of Sydney campus.

Commercialisation Connections
He is engaged with Cochlear Ltd through an ARC Linkage Program, with Luyten 3D and the Sustainable Building Research Centre (Woolongong) for the Living Lab project, and with the Kolling Institute implantable medical device research.

Future Commercialisation Connections
His latest invention-an active implantable photonic device-has attracted significant interest from clinicians, neuroscientists, and therapeutic companies. The technology is currently under review in the patent application process. If successfully implemented, this innovation has the potential to make a substantial impact in treating neurological disorders, managing chronic pain, and offering a cost-effective, safer alternative to chemotherapy for cancer treatment.

Dr. Hamish Fernando
Lecturer in Biomedical Engineering

Key Research Interests
- Education Research: Dr. Fernando's research involves the development of frameworks for AI-enabled project-based learning and data-driven approaches to student engagement. He also designs strategic models for embedding generative AI into engineering design thinking frameworks.

- Medical Research: Dr. Fernando's research investigates metabolic syndrome and body composition, with a focus on energy-restricted diets, obesity interventions, lean mass preservation during weight loss, and the long-term outcomes for bone, muscle, and metabolic health.

Future Commercialisation Connections
Dr. Fernando aims to develop scalable AI-powered tools and frameworks that can transform efficiency in teaching administration, academic feedback, and assessment design. These tools will be positioned to enhance student productivity while enabling academics to design more multi-faceted and authentic learning experiences.

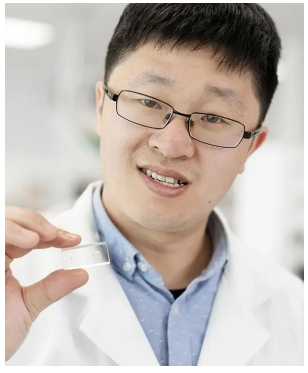
Dr. Aaron Gilmour
Postdoctoral Research Fellow

Key Research Interests
Bio-interfaces, bioinstructive materials and surfaces, and advanced cell culture platforms for drug discovery and personalised medicine

Commercialisation Connections
Dr. Gilmour's current work focuses on the development and commercialisation of advanced cell culture platforms utilising plasma surface modifications to improve outcomes in drug discovery and personalised medicine

Future Commercialisation Connections
The underlying platform technologies could be further developed and commercialised in range of biomedical and non-biomedical applications.

Prof. Arnold Lining Ju
Professor in Biomedical Engineering



Key Research Interests
Prof. Ju specialises in developing advanced biomechanical nanotools, including blood-clot-on-a-chip microfluidic devices and single-cell biomembrane force probes. His research focuses on understanding the mechanics behind blood clot formation, with profound implications for diagnosing and preventing heart attacks and strokes. He integrates AI and machine learning with advanced biomanufacturing for processing of biobank data and health monitoring.

Commercialisation Connections
Prof. Ju co-founded SmartClot platform, repurposing rapid antigen tests for AI-enabled blood coagulation monitoring, and secured $50,000 SITN funding. He has established partnerships with USYD PERIScope program for pharmaceutical applications of his microfluidic innovations. His technologies have attracted over $200,000 in seed funding through MRFF schemes, demonstrating strong industry engagement and commercial viability.

Future Commercialisation Connections
Future opportunities include point-of-care diagnostics for remote communities, personalized digital twins for stroke prevention, wearable cardiovascular monitors, and mechanomedicine therapeutics. Integration with telehealth and AI predictive analytics could revolutionize preventive cardiovascular care globally.

Dr. Orsolya Kekesi
Postdoctoral Research Associate

Key Research Interests
Dr. Orsolya's background lies in neurobiology and medical research. Her key research interests are within the field of neurostimulation with implantable medical devices. The long-term impacts of electrical stimulation on the neurons can change over time due to the foreign body response around the implanted electrode. This impacts the therapeutic outcome of the device. Understanding and manipulating the scar tissue formation around the electrodes would improve the therapeutic benefits of an implant.

Commercialisation Connections
Dr. Kekesi is involved in numerous research projects on developing implantable medical devices. She advances these developments by seeking new collaborations and advising current preclinical studies.

Future Commercialisation Connections
The development of novel implantable medical device components will lead to future partnerships with clinicians and medtech partners to establish a long-term and productive working relationship between academia and industry.

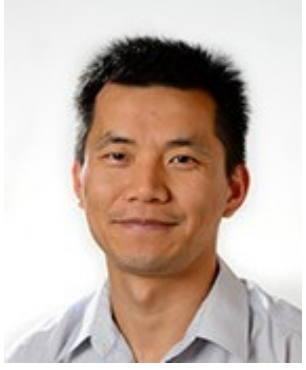
Dr. Jia Liu
Postdoctoral Research Associate

Key Research Interests
Dr. Jia Liu's research integrates cognitive neuroscience, AI, and human-machine interaction, with a focus on brain dynamics, physiological signal analysis, and mobile brain/body imaging (MoBI). She explores how cognitive states-such as attention, workload, and spatial learning-can be decoded and enhanced through EEG, virtual reality, and multimodal sensing.

Commercialisation Connections
Dr. Jia Liu collaborates with academic, clinical, and industry partners to translate cognitive neurotechnology into real-world solutions. She works with healthcare and neurotech teams on sleep monitoring, cognitive workload detection, and adaptive training systems. Her collaborations include early-stage industry discussions involving physiological signal platforms and VR-based cognitive tools.

Future Commercialisation Connections
Dr. Jia Liu's research is positioned to drive commercial innovation in cognitive augmentation, neuroadaptive interfaces, and digital health. Future opportunities include wearable systems for real-time cognitive state tracking, AI-driven training tools for high-performance and clinical settings, and smart environments for sleep and mental health monitoring.

A/Prof. Zufu Lu
Principal Research Fellow



Key Research Interests
A/Prof Zufu's research focuses on understanding the complex tissue microenvironments essential for repair and regeneration, with the goal of recreating these environments for advanced tissue engineering applications. His work has led to the development of novel and innovative strategies, including the use of smart biomaterials and pharmaceutical molecules to improve tissue regeneration. More recently, his research has expanded into the field of anti-ageing, where he explores how regenerative medicine can help counteract age-related functional decline.

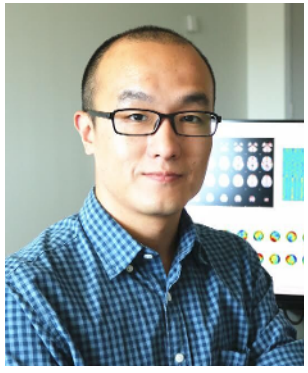
Commercialisation Connections
EZZ Life Science Holdings Limited (ASX:EZZ) to develop products for bone growth and regeneration.

Future Commercialisation Connections
- Developing stem cell-based treatments for conditions like osteoporosis and osteoarthritis.

- Developing anti-ageing products, spanning from cosmetic interventions to deep biological rejuvenation strategies.

Dr. Jinglei Lv

Senior Lecturer in Biomedical Engineering



Key Research Interests
Dr. Lv explores brain structural and functional architecture in health and disease using neuroimaging techniques. His research integrates machine learning approaches, including deep learning, to develop image biomarkers for mental disorders. His work contributes to advancing computational neuroimaging and neurotherapeutic innovations

Commercialisation Connections
Dr. Jinglei Lv is currently working with the Sydney Neuroimaging Analysis Centre for clinical neuroimaging tools. He is also working in a close relationship with the University of Melbourne and Queensland Neurostimulation Centre to develop personalised solutions for intervention of brain conditions.

Future Commercialisation Connections
Dr. Jinglei Lv's research has potential commercial applications, particularly in biomedical imaging, neuroimaging, and AI-driven medical diagnostics. His work on image biomarkers for mental disorders and personalised brain stimulation treatments could lead to clinical tools for early diagnosis and precision medicine. Additionally, his expertise in machine learning and neurotherapeutic innovations may contribute to commercial AI-driven healthcare solutions.

Dr. Christina Maher

Postdoctoral Research Fellow

Key Research Interests
Dr. Christina Maher is leading frontier research at the intersection of biomedical engineering and neuroscience. Her work is focused on building innovative AI and computational models to enhance wearable solutions for a range of health and security applications. Neural engineering, wearable brain-computer interfaces, and multimodal biomedical data analysis for neurodegenerative disease detection and prediction.

Commercialisation Connections
Dr. Maher is an advisor to several health tech startups with products ranging from wearable-based wellness biomarkers to AI-powered genomic profiling, and improving health literacy.

Future Commercialisation Connections
Dr. Maher is focused on advancing frontier neurotechnology that can be harnessed to improve human communication, health and security.

Dr. David Martinez Martin

Senior Lecturer in Biomedical Engineering

Key Research Interests
Dr. David Martinez Martin is a globally recognised physicist and innovator who has successfully created multiple technologies all the way to commercialisation. He is an expert in sensing technologies (including mass sensing and single-cell techniques), microscopy, and bio and nanotechnologies. David holds 19 granted patents as principal and co-principal inventor, 17 of which have been licensed or assigned to industry.

Commercialisation Connections
Dr. Martinez Martin has led a partnership between the University of Sydney and Bruker since it's inception. Supported by this partnership, David has strengthened Australia's nanobiotechnology capabilities by creating and establishing a cutting-edge nanobiotechnology research facility that is the first of its kind in Australia. David is also renowned for the invention of a commercial technology called PicoBalance, available through the Swiss company Nanosurf.

Future Commercialisation Connections
The development of stronger ecosystems and effective collaborations is another passion of Dr. Martinez Martin, who is available to explore the creation of collaborations and partnerships to foster technology developments with applications in biotech, materials science, and quantum technologies among other fields.

Prof. Alistair McEwan

Cerebral Palsy Alliance Chair of Technology and Engineering

Key Research Interests
Professor McEwan focuses on disability and rehabilitation engineering and on the integration of electronics with biological systems, developing advanced devices for real-time physiological monitoring and diagnostics. His research includes application of artificial intelligence to healthcare, creating diagnostic tools and systems that enhance the accuracy of disease detection and patient monitoring. Professor McEwan works on developing non-invasive technologies that provide continuous monitoring of health parameters such as cardiovascular and neurological functions, without the need for invasive procedures.

Commercialisation Connections
He works with biomedical engineering companies of all sizes - from start-ups to global firms - in cardiovascular, neurological, disability and aged-care industries.

Future Commercialisation Connections
- Deep technology applied to disability in mobility, communication, cognition including AI, mixed reality.
- Technology enabled toys, multi-view behaviour recognition, soft robotics for mobility.
- Early Intervention Technologies for Children with Cerebral Palsy.
- Determining body fat via infrared energy.
- Needle insertion method and system.
- Electrical impedance tomography.

Dr. Andrea Samore
Postdoctoral Research Associate

Key Research Interests
Dr. Samore has varied research interests, spanning from robotics and electronics to imaging and AI.

He is currently working on:
- soft robotics and exoskeletons as rehabilitative and assistive technologies for children, in collaboration with Cerebral Palsy Alliance.
- electrical imaging techniques such as electrical impedance tomography and image reconstruction algorithms based on deep learning.
- deep learning and large language models for atypical speech recognition and speech therapy.
- electrical monitoring of cardiac-ablation procedures.

Future Commercialisation Connections
A promising potential future commercialisation opportunity involves the soft exoskeleton device for children with cerebral palsy. The technology is in current development and testing. Soon it could potentially evolve into a commercalisation endeavour supported by the Remarkable accelerator and the Sydney Knowledge Hub.

Dr. Sabrina Schaly
Postdoctoral Research Associate

Key Research Interests
Assistive technology, AAC, gene therapy, rare diseases, disability advocacy.

Commercialisation Connections
- Collaboration with the Cerebral Palsy Alliance.
- TechToys, switch-adapted toys for children with disabilities, which is being developed with IP under USYD.
- Collaboration with USYD's business faculty for business development plans and commercialisation.
- Working with start-ups.

Future Commercialisation Connections
Trademarks, IP disclosures, with the potential for spin off start-ups.

Prof. Gregg Suaning
Professor in Biomedical Engineering

Key Research Interests
Bionic devices for neural and functional rehabilitation - including systems engineering, materials research, modelling, in vivo experimentation, advanced manufacturing, and stimulation strategies.

Commercialisation Connections
Gregg enjoys close relationships with medical device industry giants such as Cochlear whom we're working with to build the next generation of life-changing implants through an ARC Linkage Project.

Future Commercialisation Connections
Generous NHMRC funding and the prestigious Ramaciotti Biomedical Research Award have allowed us to pursue a device to treat facial paralysis to restore eye blinking.

Dr. Clara (Thao) Tran
Postdoctoral Research Associate

Key Research Interests
Dr. Tran's research uses innovative plasma techniques to address challenges at material-biological interfaces. By improving material biofunctionality, her work advances cell culture, diagnostics, and biosensing for more reliable experiments and better biomedical outcomes. Focusing on advanced materials, she develops solutions for stem cell research, microfluidics, 3D cell culture, and microelectrode arrays.

Commercialisation Connections
Dr. Tran has invented seven plasma-based technologies. Her dielectric barrier discharge IP is licensed to Chris O'Brien Lifehouse for 3D implant functionalisation, while another invention supports Culturon Pty Ltd's advanced cell culture and diagnostic plates. Through her ARC Mid-Career Industry Fellowship, she is advancing plasma technologies to functionalise biosensor chips with industry partners.

Future Commercialisation Connections
The plasma technologies show strong commercialisation potential, especially in glass-based platforms for cell culture, imaging, histology, immunohistochemistry, microarrays, and fluorescence in situ hybridisation. Dr Tran is also extending plasma surface treatments to enable new applications in microfluidic devices, transparent microelectrode arrays, and hormone-detecting biosensors.

Prof. Antonio Tricoli
Professor in Biomedical Engineering

Key Research Interests
Professor Antonio Tricoli specialises in multi-scale molecular engineering of materials for biomedical, surface science, and renewable energy applications. He has developed scalable methods for producing functional nanomaterials and integrating them into devices. His work includes high-performance nanoscale transducers for highly selective and sensitive detection of biological and chemical molecules, advancing wearable diagnostics, precision medicine, and threat detection.

Commercialisation Connections
Antonio collaborates with world leading optical companies on the development of PFAS-free dirt-repellent easy-clean coatings, and with multi-national electrolyser manufacturers on the development of next generation alkaline water splitting technologies. He serves as honorary CSO for a start-up company working on environmental friendly coatings and he has initiated various start-up initiatives with his alumni.

Future Commercialisation Connections
Antonio's work on surface coatings and three-dimensional design of scaffold for tissue engineering has demonstrated the potential to significantly improve the performance and biocompatibility of biomedical implants, while significantly decreasing the risk of bacterial infection. Metasorb, Syenta.

Prof. Ken-Tye Yong
Professor in Biomedical Engineering

Key Research Interests
Prof. Yong's research integrates nanomaterials, microfluidics, and device engineering to develop diagnostic sensors, biophotonics tools, and soft robotic systems. His group advances scalable technologies for healthcare, agriculture, defense, and environmental monitoring, including photonic, electrochemical, and piezoresistive biosensors, as well as wearable devices, portable detectors, bioimaging platforms, and smart drug delivery systems.

Commercialisation Connections
Ken-Tye co-founded two spin-offs: one delivering IoT-enabled water sensors deployed globally, and another focused on nanocoatings for thermal dissipation in buildings. He has led collaborations with Rio Tinto, Mitsubishi Heavy Industries, Orlar, Histopath, Thales, Continental AG, Kimberly-Clark, and A*STAR, with several technologies licensed or in production trials.

Future Commercialisation Connections
Emerging directions include implantable biosensors, soft medical robotics, organoid-on-a-chip systems, and AI platforms for drug discovery. His nanomaterial, sensor, and photonics technologies are positioned for deployment across medtech, defense, and clean-tech sectors through global commercial partnerships.

Dr. Jayraj Vaghasiya

Postdoctoral Research Associate

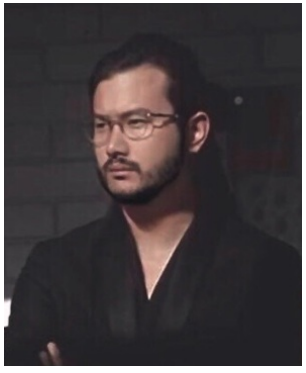
Key Research Interests
Dr. Jayraj's research focuses on developing substrate-free, ultrathin epidermal electronic tattoos for real-time monitoring of plant health. These devices are applied directly to leaf surfaces to detect biotic and abiotic stress signals using electrochemical techniques. By integrating materials science, bioelectronics, and plant physiology, his interdisciplinary approach advances precision agriculture and plant-based biosensing technologies.

Commercialisation Connections
He is exploring the transition from lab-scale research to commercial applications through collaborations with agri-tech companies and university innovation programs, with a focus on scalable manufacturing and field deployment of the tattoo sensors.

Future Commercialisation Connections
Future commercialisation may involve licensing the technology for use in smart farming, integrating the sensors with wireless platforms for large-scale crop monitoring, and developing consumer-ready kits for researchers and growers to assess plant health with minimal infrastructure.

Dr. Michael Wong

Associate Lecturer in Biomedical Engineering



Key Research Interests
Michael Wong is an education-focused lecturer and engineer specialising in real-time wearable biosensors for neurobiological biomarkers. His work spans clinical point-of-care diagnostics and remote health monitoring. He integrates biomedical engineering with neuroscience to address public health challenges, particularly in high-risk or hard-to-monitor groups in the community.

Commercialisation Connections
Michael supports the School of Biomedical Engineering's External Engagement strategy, fostering partnerships with industry, government, and non-profits. He collaborates with clinical, aerospace, and disability-tech partners to translate biosensing research into deployable solutions. His current collaborations include NSW Health and the Sydney Brain and Mind Centre.

Future Commercialisation Connections
Future opportunities include commercialising biosensor platforms for early detection of neurological injury, stress, and hormonal changes. Potential markets include patient monitoring, critical care, well-being, defence, sports performance, and disability support. Michael is exploring pathways for integration into wearable health platforms and clinical decision-support systems, with scope for co-development models.

Dr. Chia Lun (Mike) Wu
Senior Postdoctoral Fellow

Key Research Interests
Dr. Chia Lun (Mike) Wu's research focuses on red blood cells (RBCs) as active contributors to thrombosis in cardiovascular and metabolic diseases. He investigates RBC mechanosensing and membrane remodeling in diabetes-associated vascular complications, develops patient-specific microfluidic models to study thrombus formation, and leads the creation of SmartClot+, an AI-powered point-of-care diagnostic for RBC deformability and haemolysis. His work also explores novel RBC-targeted therapeutics to prevent thrombosis in high-risk CVD and diabetic populations.

Commercialisation Connections
Dr. Chia Lun (Mike) Wu and his team are performing commerclisation activities (e.g., clinical validation and market analysis) for their rapid blood clotting testing platform, SmartClot.

Future Commercialisation Connections
- AI-Enhanced Point-of-Care Diagnostics
- RBC-Targeted Therapeutic Discovery

Dr. Mingxin Xu
Postdoctoral Research Associate

Key Research Interests
Dr. Mingxin Xu's research integrates acoustofluidics, mechanobiology, and sensing technologies to address challenges in cancer treatment, health monitoring, and point-of-care diagnostics. He focuses on harnessing acoustic forces to manipulate cells, enhance detection, and deliver non-invasive therapies.

Commercialisation Connections
Dr. Xu is collaborating with hospitals to translate acoustic-based diagnostic and therapeutic tools into clinical practice. These projects aim to enable early diagnosis, real-time monitoring, and user-friendly solutions suitable for bedside and point-of-care use.

Future Commercialisation Connections
Dr. Xu's work has strong potential for portable, non-invasive systems that support continuous monitoring and personalised care. These technologies are particularly suited to improving healthcare delivery in remote or resource-limited settings, where timely, accessible solutions are critical.

Dr. William Yap
Postdoctoral Research Fellow

Key Research Interests
Dr. Yap specialises in developing soft and stretchable sensing technologies focusing on applications in healthcare monitoring. His work centres on designing highly sensitive, biocompatible sensors for early disease detection, seizure monitoring, cardiac feedback, and soft robotic control. Dr. Yap aims to develop systems that support non-invasive and continuous health monitoring, integrating these sensors into wearable platforms with real-time wireless communication and machine learning capabilities.

Future Commercialisation Connections
The wearable healthcare monitoring patches developed by Dr. Yap have significant potential for commercialisation through integration into consumer health and point-of-care diagnostics. Dr. Yap's work positions him at the forefront of soft bioelectronics innovation, contributing not only to academic advancement but also to the future of personalised, non-invasive healthcare technologies. Engagement with the Sydney Knowledge Hub and active IP management ensures a clear route toward industry collaboration and venture development.

Dr. Haimei Zhao
Postdoctoral Research Associate

Key Research Interests
Dr. Helen Haimei Zhao focuses on multimodal machine learning and generative AI for digital health applications, particularly in biomedical signal/image analysis, biosensing, and low-cost diagnostic systems. Her work aims to enable human-centred, interpretable, and scalable healthcare technologies.

Commercialisation Connections
Dr. Zhao collaborates through the Ju–Snow Lab with SnowMedical and BioFabrix to translate AI-powered diagnostics into practice.

Future Commercialisation Connections
Her ongoing projects, including SmartClot-AI (AI-enabled blood coagulation testing platform with provisional patent) and a Generative AI Digital Twin system for thrombosis and stroke prediction, hold strong commercial potential. These innovations could support collaborations with medtech companies developing point-of-care diagnostics, biosensors, and personalised medicine platforms.

Dr. Mackenzie Zhuang
Postdoctoral Research Associate

Key Research Interests
One focus is on droplet-based microfluidic platforms for single-cell analysis. Specifically, he is working on high-precision screening and sorting of double emulsion (DE) droplets using flow cytometry (FC) and fluorescence-activated cell sorting (FACS). Another main focus is a microfluidic-based platform for cell manipulation and detection of cellular activities for clinical applications.

Commercialisation Connections
MQ Health and Histopath Diagnostic Specialists.

Future Commercialisation Connections
Other point-of-care diagnostics applications.

Payne-Scott Prof. Hala Zreiqat
Professor in Biomedical Engineering

Key Research Interests
Professor Zreiqat is internationally renowned for her work in biomaterials and regenerative medicine, focusing on the development of synthetic materials for bone tissue repair. Her research integrates materials science, biology, and 3D printing to create customisable, load-bearing implants that promote biological integration. She also champions gender equity in STEM and leads BIOTech Futures to inspire the next generation of innovators.

Commercialisation Connections
Professor Zreiqat's next-generation biomaterials offer strong potential for commercialisation across a broad range of medical implants, particularly in orthopaedics and reconstructive surgery. Engineered for enhanced biocompatibility, load-bearing capacity, and regenerative function, these materials are well-suited for companies focused on improving implant integration and long-term clinical outcomes.

Future Commercialisation Connections
Professor Zreiqat's biomaterials have strong commercial potential in orthopaedics, regenerative medicine, and the longevity sector. Her patented, 3D-printed, patient-specific implants offer personalised solutions for complex bone and soft tissue repair.

For more information
Faculty of Engineering
Biomedical Engineering
bme.admin@sydney.edu.au
sydney.edu.au