



THE UNIVERSITY OF
MELBOURNE

Melbourne
Dental School

Annual Research Report 2025

Advancing Research



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Cover image: Graduate Research Students (L to R): Krijma D’Costa, Ananya Padmakumar, Carolina Alves Freiria de Oliveira, Syed Ameer Hamza, and Negar Yazdani walking along Professors Walk at the University of Melbourne. Credit: Stephanie Anderson

Acknowledgements: Melbourne Dental School acknowledges the staff, researchers and contributors whose work is featured in this Annual Research Report. Special thanks to Ms Stephanie Anderson, editor and creator of this report.

We acknowledge Aboriginal and Torres Strait Islander people as the Traditional Owners of the unceded land on which we work, learn and live. We pay respect to Elders past, present and future, and acknowledge the importance of Indigenous knowledge in the Academy.





Graduate Research Students (L to R): Dr Rishi Ramani, Dr Satutya Wicaksono, and Dr Ayu Fresno (Credit: Peter Casamento)

Foreword

Head of School

I am delighted to present the 2025 Melbourne Dental School Annual Research Report — my first as Head of School. The Melbourne Dental School continues to strengthen its position as Australia’s leading dental school, an exciting and dynamic place to undertake research that delivers real-world impact.

A defining strength of our School is our ability to work seamlessly across discovery, applied and clinical science, translating new knowledge into improved patient care and wellbeing. Situated within the Biomedical Precinct, one of the world’s premier biomedical ecosystems, we collaborate closely with clinicians, epidemiologists and researchers across hospitals, institutes and the University to drive excellence and innovation.

Our research spans innovative dental materials for rare diseases, advanced implant solutions for patients with limited bone support, and personalised therapeutic approaches informed by modifiable lifestyle factors. We are advancing intra-oral biosensors, novel diagnostics and therapies for oral cancer, vaccines targeting periodontitis and systemic disease, digital tools supporting safe prescribing, and research improving access to care for Indigenous and remote communities.

Through trans-disciplinary collaboration, we translate discovery into meaningful clinical and societal impact. I invite you to explore this year’s achievements and join us in shaping the future of oral health.

Professor Petros Papagerakis



Director of Research

I look back on 2025 with immense pride at all that the Melbourne Dental School has achieved, and excitement about what lies ahead. 2025 saw the release of Advancing Research 2030, the research strategy of the University of Melbourne, and a renewed call and effort at our School to strive for excellence and impact.

The achievements in 2025 were plenty, from a remarkable presence at the 2025 International Association for Dental Research General Session in Barcelona to sustained achievements of our graduate researchers and increasing international and industry collaborations.

However, in the midst of these achievements, perhaps what matters most is the strong sense of community at our School. Through teamwork and collaboration, we work together to boldly transform our fields, our communities, and the world.

Associate Professor Mihiri Silva



About Us

Established in 1904, the Melbourne Dental School is one of Australia's leading oral health research centres. With over 60 researchers and research higher degree students, the School aims to be a world leader in the discovery and development of the next generation of preventives, therapeutics, vaccines and diagnostics for oral diseases.

The School boasts state-of-the-art facilities across three clinical and research laboratory buildings. Our research targets prevention and cures for infectious, inflammatory and immune diseases, with a strong focus on translational research that delivers positive impacts on global human health.

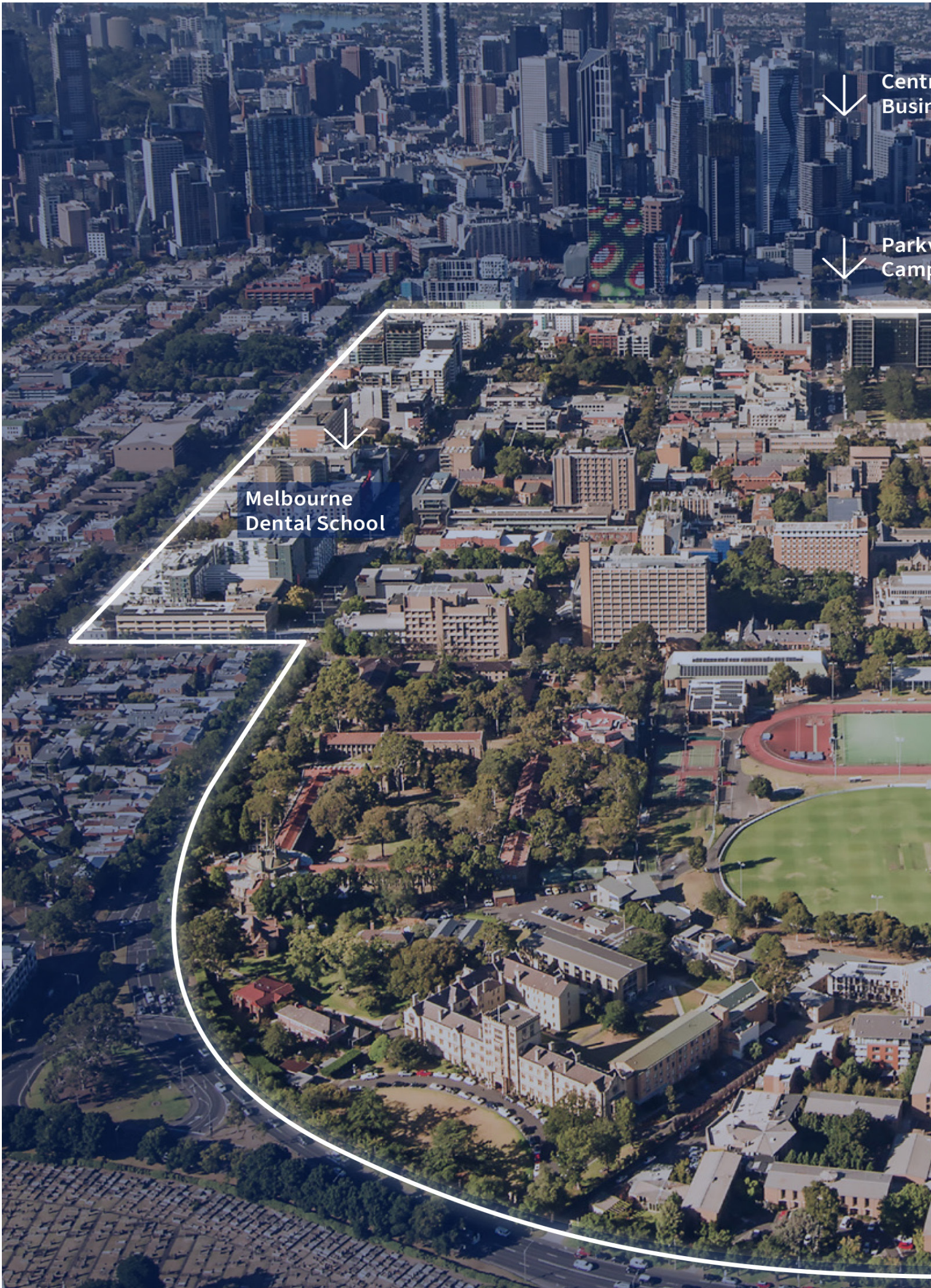
Located within the University of Melbourne's Parkville campus in the Melbourne Biomedical Research Precinct, the School collaborates with hospitals, research institutes and industry partners to translate discoveries into clinical care and policy.

The Melbourne Biomedical Research Precinct is one of Australia's — and the world's — leading biomedical precincts, comprising more than 40 hospitals, research, teaching and biotechnology institutes located just north of Melbourne's CBD. This environment provides the Melbourne Dental School with access to advanced research technologies and world-leading biomedical expertise.

We collaborate with research institutes, industry and government partners across the globe, enabling us to address major health challenges. Our vibrant research environment and strong partnerships support exceptional postgraduate research training and a proven track record of translating research into clinical practice and policy.



Graduate researchers outside the Royal Dental Hospital of Melbourne. Credit Stephanie Anderson



Central
Business
District

Park
Campus

Melbourne
Dental School



Our Research at a Glance



750+
students and staff



4

major themes

- Infection, Inflammation and Immunity
- Restoration, Repair and Regeneration
- Life Course
- Education



Publications for 2025

- 160+ research outputs published in 2025 with >58% international collaboration
- 45% of publications in top 10% journals
- 24,000+ citations (over ten years)
- Field-weighted citation impact of 1.46 (over five years)



\$22+ million
research income, 2020–2024

**2025 research income data not yet available due to University systems transition.*



Partnering

Engagement with industry partners for basic research, translation and commercialisation



Collaborations in 2025

- 10+ in Victoria state
- 30+ in Australia
- 100+ worldwide



Associate Professor Satish Alapati explaining where stem cells come from on a whiteboard. Credit: Peter Casamento

Our Research Structures and Impact

Discover more about our research groups here



Research at the Melbourne Dental School fits into three broad themes with each theme supporting interrelated and interconnected research groups.

Infection, Inflammation & Immunity

Investigating and transforming the complex interplay of the oral microbiome and host response with the aim of advancing strategies for prevention and treatment of oral and systemic disease.

Antimicrobials, Cancer Therapeutics and Vaccine Research Group

Periodontal Disease Therapeutics and Vaccines Research Group

Type IX Secretion System Group

Oral Microbes in Neurodegeneration and Inflammation Group

Periodontics

Restoration, Repair & Regeneration

Investigating and developing materials, technologies and applications intentioned for restoration, repair and regeneration of hard tissues and their roles in oral function and whole body health.

Tissue Engineering Group

Regenerative Endodontics

BioMaterial Science

Digital Design

Prosthodontics

Education

Explores and impacts design and implementation of learning activities, assessment approaches and feedback practices to advance learning and educational outcomes

Dental Education Research Group

Life Course

Investigating the trajectories of oral health and disease from before birth to advanced age, to understand and impact biological, social, and environmental influences to improve health equity and outcomes across all life stages and populations.

Forensic Odontology

Orofacial Anthropology

Cariology Research Group

Orthodontics and Craniofacial Research Group

Access and Equity Research Group

Population Oral Health Group

Rural, Remote, and Indigenous Oral Health Equity

Paediatric Oral Health Research Group

Dental Data and Artificial Intelligence Research Group

Oral Medicine and Oral Cancer Research Group

Dental Therapeutics

Precision Oral Systemic Health Group

Awards and Recognitions



Professor Alastair Sloan

Award: 2025 Alan Docking IADR Science Award. The highest IADR accolade, awarded to a Melbourne Dental School professor for the second time in 2 years.

In recognition of: exceptional impact in dental, oral and craniofacial research. Professor Sloan's pioneering work in tissue regeneration, stem cell science and translational oral health research has positioned him as a global leader in advancing regenerative dentistry.

go.unimelb.edu.au/s8j2

Dr Denice Loo

Award: 2025 Athanasios E. Athanasiou Master's Thesis Award at the World Federation of Orthodontists. This prestigious award comes to the Orthodontics team of the University of Melbourne for the fourth time in 3 years.

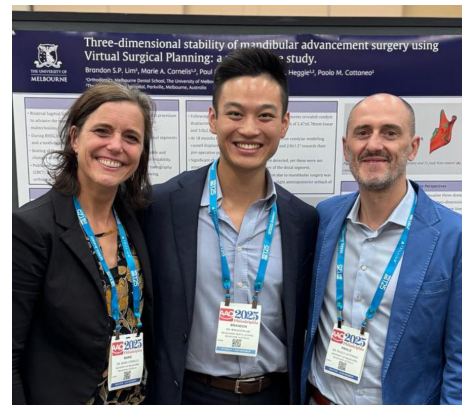
In recognition of: a pilot case-control study of bone- and tooth-borne maxillary protraction with miniscrews and Class III elastics.

go.unimelb.edu.au/7jqp

Dr Dhana Gorasia

Award: 2025 IADR Oral Biology Award

In recognition of: excellence in oral biology research. Her work investigates the Type IX Secretion System in *Porphyromonas gingivalis*, seeking to elucidate its role in bacterial virulence and identify novel therapeutic targets for periodontal disease.



Dr Brandon Lim

Award: 2025 Dr William R. Proffit Resident Scholar Award – first prize for the Clinical research stream at the American Association of Orthodontists (AAO) Annual Session

In recognition of: research into the three-dimensional stability of mandibular advancement surgery using virtual surgical planning.

go.unimelb.edu.au/4jqp



Professor Paolo Cattaneo

Award: P Raymond Begg Research Reward at the Australian Society of Orthodontics

In recognition of: his outstanding contributions to orthodontic research and for elevating the global profile of the Melbourne Dental School's Orthodontics group.

go.unimelb.edu.au/4e82

Innovation Booster Award

Award: 2025 Innovation Booster Award Melbourne Dental School

Recipients: PhD candidates Dr Tarek Abasseri, Dr Negar Yadnazi, and Dr Raj Gaurav

In recognition of: outstanding innovation in research translation and impact. The award supports the development of novel approaches that accelerate discovery, strengthen clinical application, and enhance research capability across the Melbourne Dental School.

go.unimelb.edu.au/ipn2



Dr Nadia Kaunein

Award: 2025 IADR Clinical and Translational Study Network Outstanding Award — first prize at the 103rd General Session and Exhibition IADR PAn European Regional Congress

In recognition of: research into rapid, non-invasive microRNA sampling flags areas of high-risk oral mucosae

go.unimelb.edu.au/m8j2

Dr Raksha Baskar

Award: 2025 IADR Travel Award at the Australian Academy of Paediatric Dentistry

In recognition of: her research on screening for sleep-disordered breathing in children. As a paediatric dentistry Doctor of Clinical Dentistry student, her work investigates the use of a simple caregiver questionnaire to identify at-risk children and facilitate earlier diagnosis and clinical management.



Dr Negar Yazdani

Award: 2025 Best Oral Presentation at the International Meeting of Antimicrobial Peptides

In recognition of: her PhD research on developing novel antimicrobial biomaterials to combat periodontitis and peri-implantitis. Her work advances peptide-based therapeutics and innovative strategies to address antimicrobial resistance, contributing to progress toward clinical translation.



Dr Stephanie Shields

Award: 2025 IADR Paediatric Oral Health Research Young Investigator Award — highly commended at the 103rd General Session and Exhibition IADR Pan European Regional Congress

In recognition of: research into inflammation and molar incisor hypomineralisation, a population-based cohort study.

go.unimelb.edu.au/m8j2

Dr Rishi Ramani

Award: IADR ANZ Colgate Hatton Poster Competition (Senior Category) — runner-up

In recognition of: research exploring how artificial intelligence models, specifically convolutional neural networks, can detect early signs of oral cancer from digital biopsy images captured directly in the patient's mouth.

Rowden White Scholars

Award: 2025 Rowden White Scholarship

Recipients: PhD candidates Dr Tarek Abasseri, Dr Raj Singh, Dr Elahe Amiri, Ms Heba Elboroloy, Dr Giovanni Battista, and Dr Simra Azher

In recognition of: outstanding doctoral research. Established through a donation from Sir Alfred Edward Rowden White, the scholarship supports graduate researchers undertaking advanced research across several faculties at the University of Melbourne.



The following research features were originally published in Melbourne Dental School's DentAL magazine (2025 edition).

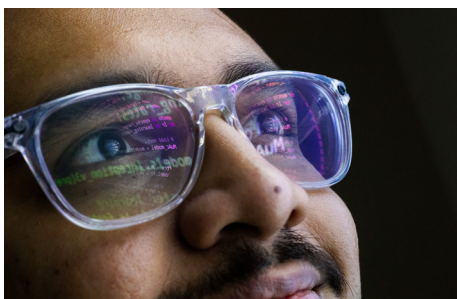


Could gum disease cause dementia?

By Bianca Nogrady

The human mouth is home to an estimated six million bacteria from more than 700 species. Amid this teeming morass of bacterial diversity, one species has caught the attention of molecular microbiologist Associate Professor Catherine Butler, Principal Research Fellow at the Melbourne Dental School – *Porphyromonas gingivalis*.

Most people working in the dental field know this bacterium for its key role in gum disease, but Associate Professor Butler's research suggests *P. gingivalis* plays a far more sinister role as a possible contributor to the development of Alzheimer's disease.



From clinic to code: how one award-winning PhD researcher is making cancer detection faster with AI

By Jane Metlikovec

"Say you're a patient, and you've noticed something is a little different in your mouth," Dr Rishi Ramani says.

"And so, you wait for a week or two, then you go to a dentist. The dentist might then decide you need to go to a specialist, but there are only 50 of those specialists in the entire country. So, you wait for, say, six months. That is many months of stress and anxiety, and in that time, it might be nothing, or you might have a condition that's progressing."

"Imagine if that first dentist you see could do a simple non-invasive image-based screening, right there in the chair, and put those images straight into an AI system that can provide an accurate diagnostic result immediately, right then and there."

That's the goal that Dr Ramani — who trained as a dentist earlier in his native India — has been working towards through his PhD at Melbourne Dental School, with his work recently published in Nature Portfolio, and winning the Global Oral Cancer Forum poster competition in Kuala Lumpur, 2024.



From supervised toothbrushing to sugar taxes: global lessons for a fairer, smarter Australian dental system

By Associate Professor Roisin McGrath

Australia's dental care system delivers world-class outcomes — if you can afford it. But, for too many people, basic dental care is out of reach. The good news is we don't need to start from scratch to get better results. We can learn from what works globally and adapt it to our local context to build a more sustainable, inclusive framework for dental care.

The earlier we reach children with preventive care, the more likely they are to avoid costly and complex dental issues later in life.



Game-changing dental implants to be advanced at new university MedTech centre

By Jane Metlikovec

It's a familiar sight to dentists worldwide — an elderly patient suffering with missing teeth or loose dentures, and without enough bone left in their jaw to support a traditional dental implant.

They're in frequent pain, it's a struggle to eat, and their health and wellbeing takes a hit.

Sure, many could go through a bone graft, where bone is taken from their chin or elsewhere in their jaw or hip to build up the bone in their mouth, in a process known as autogenous grafting.

There are other graft solutions, too. But the process can be painful and protracted over weeks or months and carries its own risks. For some, especially older patients, it's a bridge they're not willing to cross, and for others, it's sometimes too risky for them to even be given the choice.

"Let's say you're 65 years old and missing your back teeth for 20 years," says Professor Roy Judge, a Professor in Prosthodontics.

"You've been wearing a denture that keeps moving and every time you bite, it digs into soft tissue. The quality of life and dignity for these older patients is reduced. This is the group we're trying to help."

Flipping the script on dental implants

By 'help', Associate Professor Judge means dedicating the past 12 years — and the foreseeable future — to working with a strong team of researchers, clinicians and scientists across multiple disciplines to create an innovative new dental implant.

Developed by Dr Tim Gazelakis, Associate Professor Judge and Associate Professor Joseph Palamara, the Rectangular Block Implant (RBI) flips the current approach — quite literally — from using a vertical implant to a horizontal one and is the first solution of its kind to be designed and prototyped in Australia.

"We decided to make an implant that fits into the available bone," explains Associate Professor Judge.

"These patients often need extensive grafting to build up bone, but we realised that if you use the bone that's already there in the horizontal trajectory, you don't need to use extensive grafts. Traditional implants are vertically oriented and need height, but we turned the implant around to use the horizontal space, where patients typically still have good bone.

"So, instead of a cylindrical implant tapped vertically into bone, we created a press fit rectangular implant with the same surface area, just oriented horizontally."

From lab to next-gen commercialisation

While Professor Judge says the concept is simple, the process to product creation and completion is long. Over recent years, the team has made promising progress, moving from animal studies to human clinical trials and now on to independent testing — all on a pathway towards commercialisation.

It's this final step that now has Professor Judge and his team on the move. They're one of the first projects headed to the new Aikenhead Centre for Medical Discovery (ACMD) based at St Vincent's Hospital.

The purpose of the ACMD is to accelerate the translation and commercialisation of research. This includes the delivery of much-needed, cutting-edge medical and healthcare solutions with a focus on MedTech, biotech and digital health.

For Professor Judge, taking the RBI project into the ACMD is an exciting step forward for Melbourne Dental School. Cross-disciplinary collaboration, state-of-the-art labs, and access to expertise beyond dentistry mean breakthroughs can reach patients sooner.

"The fun bit of research is actually not being in your silo, it's getting out of your comfort zone and talking to other people about evidence-based and innovative practice. That's what the Aikenhead Centre for Medical Discovery is really about," he says.

Commercially too, there is opportunity. In 2023, the global dental implants market was estimated at \$5.6 billion.



Professor Roy Judge holding the Rectangular Block Implant, a new dental implant.



Associate Professor Tami Yap \$764K grant to improve access to oral cancer screening

The initiative will use digital tools to upskill rural health teams and remove geographical barriers to mouth cancer screening, bridging the 'city to country' divide.



UniMelb News

Melbourne Dental School visits Delhi: University of Melbourne opens first global centre

The University of Melbourne has launched its first global centre in Delhi, marking a significant milestone in strengthening long-term partnerships across India.

As part of the visit, representatives from Melbourne Dental School met with key stakeholders to better understand the priorities shaping dental education and professional development in India.



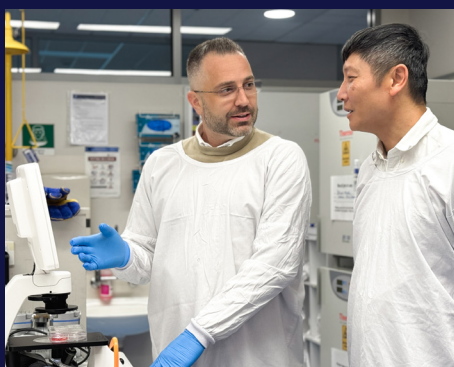
MDS News

Dr Shazia Naser-ud-Din Innovative Bruxism Solution Secures International Patent

Dr Shazia Naser-ud-Din has achieved international recognition with the recent award of a PCT (Patent Cooperation Treaty) for her groundbreaking invention to treat bruxism.



Graeme Clark Institute News



Associate Professor Antonio Celentano

Could chewing gum stop a sexually transmitted infection? University of Melbourne researchers think so

A world-first 2D laboratory model developed at the University of Melbourne is helping researchers understand how oral gonorrhoea infects the mouth and why treatments fail. The breakthrough could enable targeted antibiotics and simple prevention strategies, including medicated chewing gum.



MDHS Faculty News

Melbourne Dental School leaders appointed to IADR ANZ executive

Professor Alastair Sloan has been appointed President of the IADR ANZ Division, with Associate Professor Mihiri Silva named Vice-President. Their appointments reflect Melbourne Dental School's leadership in advancing dental research, collaboration and innovation across Australia and New Zealand.

Our researchers recognised globally

- Professor Paolo Cattaneo named in Stanford University's World's Top 2% Scientists list for the fourth consecutive year.
- Professor Rodrigo Mariño recognised in Stanford's World's Top 2% Scientists list for the fifth consecutive year.
- Associate Professor Antonio Celentano's article on coffee compounds and oral cancer prevention ranked among the top-viewed papers in Wiley's Journal of Oral Pathology & Medicine.

Our Graduate Researchers in action

Our graduate researchers took centre stage across a series of engaging research competitions, demonstrating creativity, clarity and impact beyond the lab:

- **No-Bell Prize** — Ananya Padmakumar and Brian Ngokwe reached the finals of the MDHS No-Bell Prize Competition, a one-minute research presentation challenge, with Brian winning the People's Choice Award.
- **Three Minute Thesis (3MT)** — Stephanie Shields, Ananya Padmakumar, Brian Ngokwe and Huda Al-Azzawi competed in the Melbourne Dental School round, with Stephanie Shields progressing to represent the School at Faculty level.
- **Green Impact Sustainability Award** — Huda Al-Azzawi was awarded 1st place and invited to speak at the event, and also received 1st Runner-Up at the BIOMED LINK Conference.

Translation & Commercialisation

Leveraging the successes seen in 2024, various teams across the School made substantial progress in translating their projects and expanding collaborations to seed new opportunities in research translation.

Through these efforts, the School continues to strengthen partnerships with industry, clinicians and researchers, creating new pathways for research to move from discovery to clinical practice and real-world impact.



Professor Roy Judge and the RBI team worked closely with the engineering team from Signature Orthopaedics to transfer the RBI towards manufacture as a Good Manufacturing Practice (GMP)-compliant implant and surgical kit. Substantial efforts have been made to ensure key manufacturing considerations are addressed so that the final devices meet required specifications.

Connections have also been established with international research groups who have expressed interest in future clinical studies of the RBI.

Similarly, the cohort of three PhD students working with SDI Ltd are now well into their first year of candidature and have had an immersive learning experience. The on-site days at SDI have been particularly valuable for the students, providing exposure to industry practices and product development processes.

Discussions for new collaborative projects between the Melbourne Dental School and SDI remain active and ongoing.



This year saw the first combined cohort of academics from the Melbourne Dental School — Dr Bree Jones and Dr Rishi Ramani — participate in the Research Innovation & Commercialisation (RIC) Innovation By Design (IBD) program.

The six-session program, delivered over 12 weeks, supports teams in preparing major grant applications within 12-18 months of participation. The MDS team collaborated with academics from the Department of General Practice and Primary Care (Professor Dougie Boyle and Dr Barbara Hunter) to develop a vision for integrating patient data across Primary Care and other specialty areas, including Dental and Optometry, to support translational research aimed at improving patient outcomes, particularly in chronic disease.



MIMS Australia has entered into a partnership with the Australian Dental Association (ADA) to provide exclusive benefits for ADA members to access Drugs4dent®, commencing in early 2026.

This agreement represents a significant milestone in the ongoing commercialisation of Drugs4dent® and its growing adoption by dental practitioners.

go.unimelb.edu.au/m682



Associate Professor Tami Yap, together with Enterprise Fellow Dr Marcus Watson from the Graeme Clark Institute, hosted an interdisciplinary workshop bringing together academics from across the Faculty, as well as from the Faculty of Engineering and Information Technology and the Faculty of Science.

The workshop explored ideas that could seed new research collaborations and funding opportunities at the intersection of dental clinical needs and emerging technologies.

International Engagement

Over 2025 the international team engaged and progressed relationships with a strong emphasis on the Asia Pacific region.

Key activities included the signing of the John Moody scholars' program, hosting key collaborators at the Melbourne University Global Centre in Delhi, attending the second Pan Pacific meeting in Otago, presenting at the World Expo in Osaka City and visiting globally renowned universities at Manipal, Osaka and Science Tokyo.



Delhi Global Centre visit

The Melbourne Dental School hosted several leading universities, industry partners and alumni from across India at the University of Melbourne Delhi Global Centre in September 2025.

The wide-ranging discussions and sharing of ideas highlighted the tremendous depth and breadth in expertise across India. This reflects the importance of progressing key relationships with our strategic partners.



Manipal College visit

Associate Professor Samantha Byrne, Associate Professor Satish Alapati and Professor Roy Judge went on to visit the wonderfully appointed campus and Dental School at Manipal College of Dental Sciences.

Each of the Melbourne academics gave lectures and seminars with their peer groups. The visit culminated with a meeting with the Head of School (Professor Gopalakrishnan Dharmarajan) and his senior leadership team setting the scene for research, teaching and student visit between these like-minded dental schools.



John Moody scholar's program

In August 2025 Associate Professor Rita Hardiman and Professor Vikram Matthews signed the John Moody scholars' program between the Melbourne Dental School and Christian Medical College Vellore.

This agreement underpins the research collaboration between these two departments with a view to enhance community-based dental care.

Learn more about our International collaborations



Osaka University visit

Professor Petros Papagerakis and the Dean of the Dental School, Professor Kazuhiko Nakano, at Osaka University, who also specialises in Paediatric Dentistry, both expressed strong interest in developing joint research workshops, with plans to utilise existing university funding schemes to support future collaboration.



Pan Pacific Symposium

In October 2025, the University of Otago hosted the second Pan Pacific Symposium bringing together leading institutions: the Institute of Science Tokyo, Peking University, Seoul National University, the University of Otago, and the University of Melbourne.

Our new Head of School, Professor Petros Papagerakis, formally signed the Memorandum of Understanding.



Institute of Science Tokyo visit

At the end of busy October, Professor Petros Papagerakis, Professor Roy Judge, Associate Professor Satish Alapati, Associate Professor Rita Hardiman and Dr Andre Tan met with senior academics at Science Tokyo to explore new opportunities for student and staff exchanges, online teaching initiatives, and collaborative research projects, paving the way for a strong future partnership with one of the world's leading global universities.



World Expo, Osaka

Advancing the sister city relationship between Melbourne and Osaka, a collaborative research and education program has been established involving Dental Predictions, Institute of Science Tokyo, Tokyo Dental College, and Melbourne Dental School.

Associate Professor Satish Alapati presented their joint research at the World Expo 2025 in Osaka. The presentation has opened doors for expanded research and teaching.

Our Global Collaborations



Australasia

40+

collaborations in Australia and New Zealand

Asia

10+

collaborations

Africa

3

collaborations

Europe

50+

collaborations

North America

30+

collaborations



South America

3

collaborations



Professor Roy Judge
Director of International

“The Melbourne Dental School is a highly collaborative and outward-looking Dental School with established global, regional, and national networks with both academic and industry partners.

We are undertaking several new international initiatives with a view to increasing our engagement and research collaborations across the Asia Pacific region.

Our aim is to work with our partners to support the communities that we serve by providing evidence-based focus on improved oral and patient-centred outcomes. We are supporting and engaging with the current and future leaders across Indonesia, India, Malaysia, Japan, South Korea, China, Jordan, and New Zealand.”

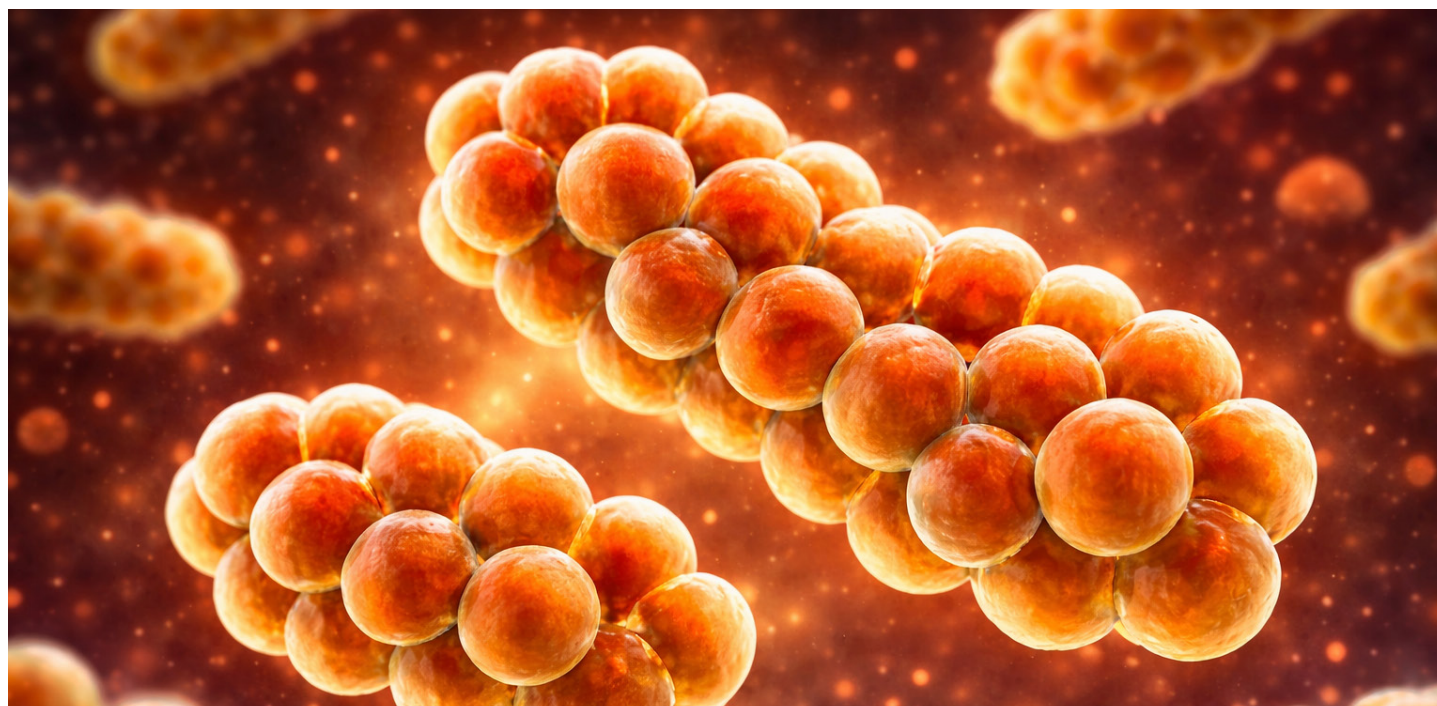


Research Groups in Focus

Antimicrobials, Cancer Therapeutics and Vaccine Research

Infection, Inflammation & Immunity

Scan to learn more about ACTV Group here



The Antimicrobials, Cancer Therapeutics and Vaccine (ACTV) research group is focused on designing and synthesising peptide-based nanomaterials that have anti-bacterial or anti-cancer properties or can be used in the fabrication of vaccines or therapeutics that target bacteria or cancer cells.

Antimicrobial materials in combatting multidrug resistant bacteria ‘superbugs’

We have a multi-disciplined and inclusive approach to research focusing on applying an evidence-based iterative approach to understanding how the materials we make interact with the bacteria and cells they come into contact with. From this we are able to design and redesign materials to produce peptides and nanomaterials that can be translated to clinical use.

Our strategy is a chemical biology approach and employ a range of organic/peptide synthetic, immunological, and microbial approaches to achieve the goals of the team to produce antimicrobials.

Research highlights

Dr Bansari Shah published her work in npj Vaccines on how peptides can be used as vaccine candidates in cancer-based research, targeted at cancer, immunology and nanoengineering researchers developing peptide nanoparticle-based cancer vaccines. doi.org/10.1038/s41541-025-01118-9

Dr Sara Hadjigol’s work on lipid-SNAPP-stars found they killed multidrug-resistant bacteria within minutes, published in ACS Applied Materials & Interfaces. doi.org/10.1021/acsami.5c03839

During her PhD, Dr Bansari Shah found calcium phosphate nanoparticles were able to deliver antigen to phagocytic cells, with different forms inducing different immune responses.

During her PhD, Dr Saharnaz Rafiee found survivin directly binds to caspase-9, and that modified survivin peptides were inhibitors of Caspase-9.

The Australian Periodontology Research Foundation awarded a grant to Dr Yazdani, Dr Hadjigol and Prof O’Brien-Simpson on developing a disease responsive antimicrobial hydrogel for periodontal infections. Dr Yazdani received First Place at IMAP, and Professor O’Brien-Simpson was an invited speaker at Pacificchem 2025, Hawaii.



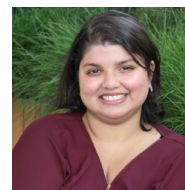
Professor
Neil O'Brien-Simpson



Dr
Sara Hadjigol



Dr
Negar Yazdani



Ms
Krijma D'Costa

Periodontal Disease Therapeutics and Vaccines Research Group

Infection, Inflammation & Immunity

Scan to learn more about the group



Periodontitis is a highly prevalent chronic inflammatory disease, and growing evidence links it to serious systemic conditions such as Alzheimer's disease, representing an important emerging global health concern.

The Periodontal Disease Therapeutics and Vaccines Research Group investigates the microbiological and immunological drivers of periodontitis and periodontal disease-associated conditions such as Alzheimer's disease. The team brings together clinicians, microbiologists, biochemists, immunologists, structural biologists and bioinformaticians to develop new preventive and therapeutic strategies, including vaccines, to reduce the burden of periodontitis and its associated systemic complications.

Our research investigates how periodontal pathogens drive inflammation and systemic disease, with the aim of developing preventive and therapeutic strategies including vaccines to reduce the global burden of periodontitis and its associated complications.

Periodontitis-associated Alzheimer's disease

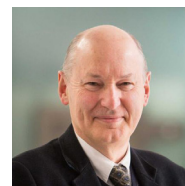
The group has continued development of an in vivo mouse model of periodontitis-associated Alzheimer's disease induced by infection with *Porphyromonas gingivalis*. New data reveal the accumulation of proteins and pathologies indicative of Alzheimer's disease in mouse brains, including amyloid- β accumulation, tau phosphorylation and neuroinflammation. These findings support a mechanistic link between chronic periodontitis and Alzheimer's disease pathology.

This work was presented at the 2025 IADR/PER General Session & Exhibition in Barcelona, and contributed to knowledge translation linking periodontal infection to neurodegenerative disease.

In recognition of the growing national and international visibility of this research program, the team was invited to produce an editorial highlighting the translational significance of oral-systemic disease interactions.

Research opportunities

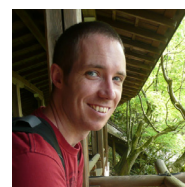
Research projects are available for PhD, Master by Research and Honours students. Please contact the research group leader to discuss potential opportunities.



Laureate Professor
Eric Reynolds AO



Dr
Ali Mohammed



Dr
James Holden



Dr
Lianyi Zhang



Mr
Williams Singleton



Ms
Yan Tan



Associate Professor
Geoff Adams



Dr
Christine Seers

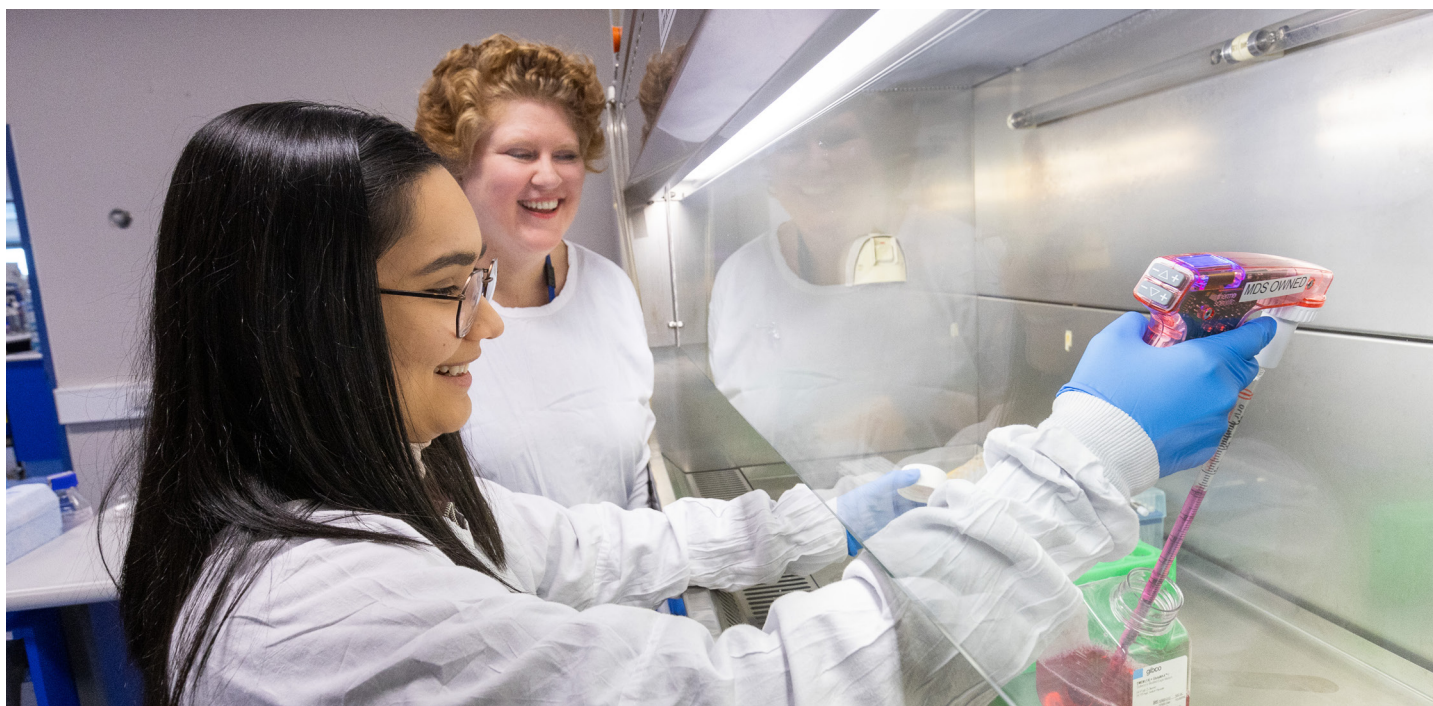


Credit: Katerynakon_Depsifl_Photos

Oral Microbes in Neurodegeneration and Inflammation Group

Infection, Inflammation & Immunity

Scan to
learn more
about OMNI
Group here



The Oral Microbes in Neurodegeneration and Inflammation (OMNI) Group investigates how oral bacteria and their products contribute to neuroinflammation and neurodegenerative brain pathology.

Our research focuses on membrane vesicles, subcellular nanoparticles secreted by oral bacteria that cause periodontitis.

Our group has demonstrated that these vesicles can escape the oral cavity and enter the bloodstream. Once in circulation, they are carried towards the brain where they are able to cross the blood–brain barrier and enter brain tissue. Follow-up studies also confirmed that injection of oral vesicles into the mouse bloodstream resulted in vesicles entering the brain.

Our research shows that membrane vesicles produced by oral bacteria during periodontitis can travel through the bloodstream, cross the blood–brain barrier and trigger neuroinflammation and neuropathology typically seen in Alzheimer’s disease brains.

Highlights

The discovery that brain neuropathology occurs in the absence of whole bacterial cells, and is instead the result of bacterial membrane vesicles produced in the oral cavity during periodontitis, has major ramifications for prevention, biomarker discovery and treatment of this debilitating disease.

This paradigm-shifting research was recognised with a National Health and Medical Research Council Ideas Grant of \$1.73 million (2025–2028).

In the first year of the grant, our team has investigated the biological effect of purified bacterial vesicles on different neural cell types using in vitro culture models.



Associate Professor
Catherine Butler



Dr
Joe Ciccotosto



Dr
Bansari Shah



Professor
Stuart Dashper

Tissue Engineering Group

Restoration, Repair & Regeneration

Scan to learn more about Tissue Engineering



The Tissue Engineering Group investigates a broad range of aspects of tissue repair and regeneration — from hard dental tissues such as dentine and bone biology, to associated soft tissue wound healing including oral mucosa and dermal tissues.

Our research focuses on developing novel 3D biological models and bioactive compounds to enhance the repair and regeneration of both soft and hard tissues.

Our research group develops innovative 3D models for tissue repair and regeneration of both soft and hard tissues, with the aim of improving tissue healing through these models and novel bioactive compounds.

In addition, we investigate the functional roles of stem cells in mineralised tissue regeneration and develop 3D organotypic and synthetic biological model systems to better understand tissue injury and repair.

Research is conducted by an interdisciplinary group of tissue engineers, bioengineers, clinical dentists and dental specialists.

Focus publication: Comparative proteomic analysis of *Porphyromonas gingivalis*-challenged human dental pulp stem cells

Dental pulp stem cells (DPSCs) are increasingly recognised for their potential in regenerative medicine. However, the unique microbial environment of the oral cavity requires a better understanding of how bacterial challenges may influence DPSC function in order to optimise their reparative capacity and therapeutic use.

This study identified significant proteomic changes in human DPSCs in response to *Porphyromonas gingivalis* infection, particularly in pathways related to growth factor signalling, immune response and wound healing. These findings advance our understanding of DPSC-pathogen interactions and support the potential use of DPSCs in regenerative and immunomodulatory therapies for infection.

doi.org/10.1038/s41598-025-29191-z



Dr Rachael Moses



Professor Alastair Sloan



Professor Roy Judge



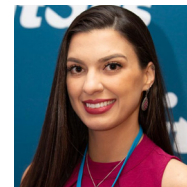
Associate Professor Mark Evans



Associate Professor Satish Alapati



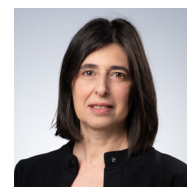
Associate Professor Leanne Teoh



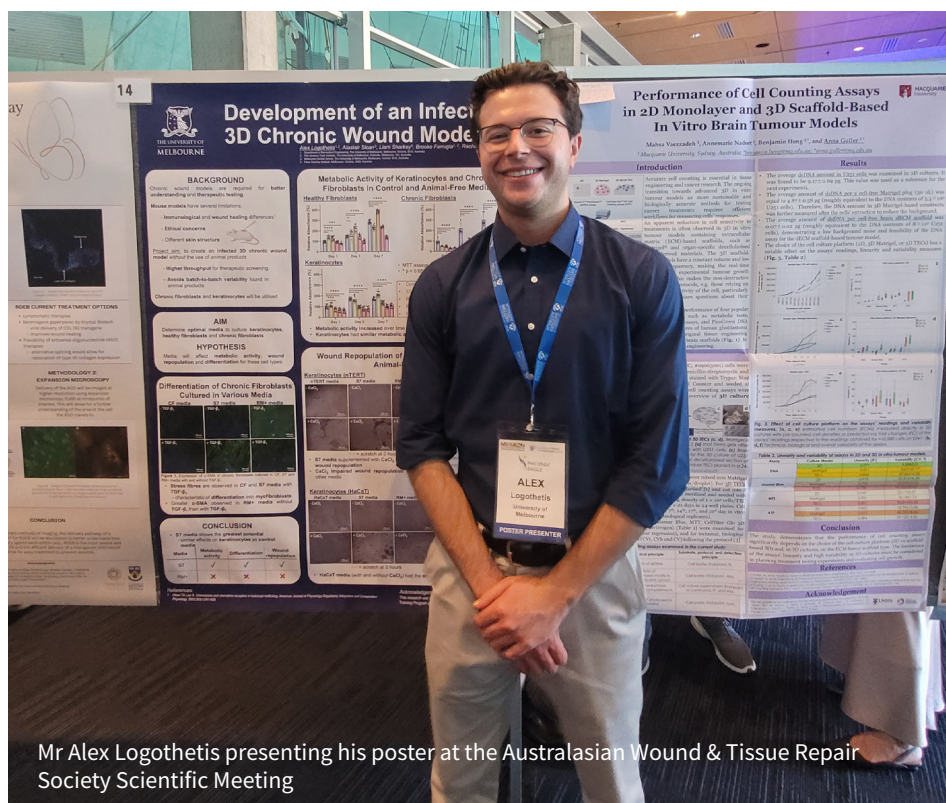
Dr Cristiane Maucoski



Ms Sze Wei Liu



Ms Rita Paolini

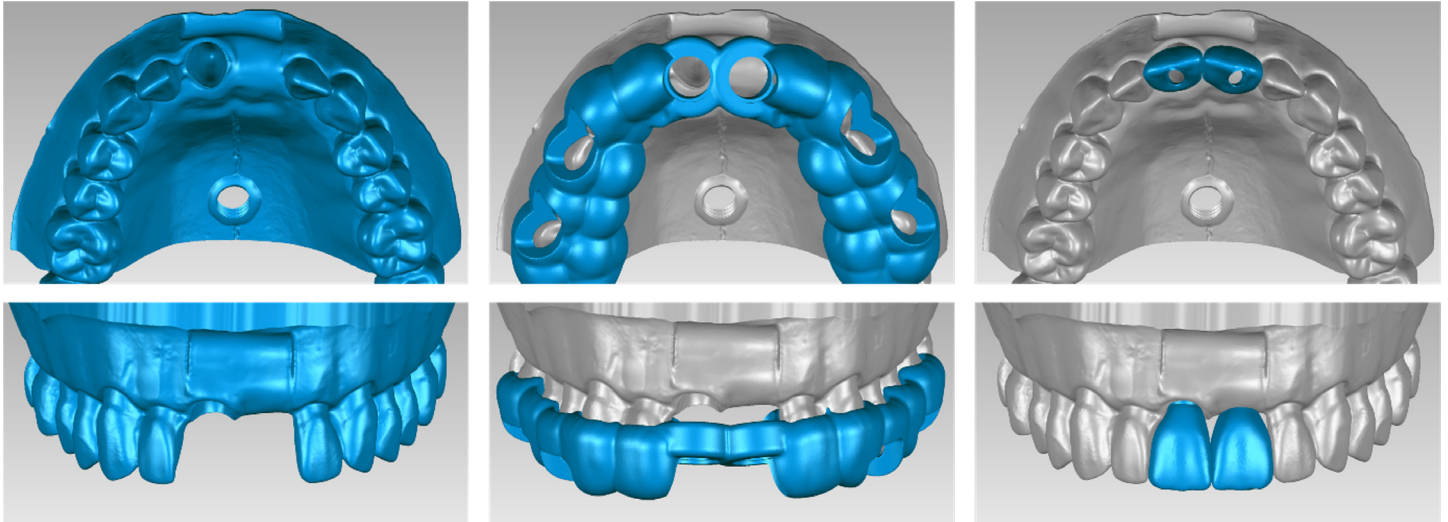


Mr Alex Logothetis presenting his poster at the Australasian Wound & Tissue Repair Society Scientific Meeting

Digital Design

Restoration, Repair & Regeneration

Scan to learn more about Digital Design



An ITI-funded project assessing the validity of pretreatment planning and prosthesis design, exploring abbreviated treatment workflows for implants and natural teeth.

The Digital Design Group employs digital technologies including intraoral and extraoral scanners, 3D dental imaging and modern planning and evaluation software to support diagnosis, treatment planning and treatment monitoring investigations.

Our research evaluates the outcomes and anticipated impacts of virtually simulated treatments. We also assess the educational value of incorporating digital design technologies into dental curricula.

Our goal is to support the application of digital tools and treatment workflows, and to continually evaluate their effectiveness in improving patient care and dental education.

Development and evaluation of an abbreviated digital denture workflow: A clinical crossover study

Commencing in 2025, this clinical study aims to develop and clinically validate a streamlined, abbreviated milled digital complete denture workflow. The project compares the clinical performance, patient-reported outcomes, and treatment efficiency of digital dentures with conventional analogue dentures.

The study is conducted by Dr Hamza Al Saliati, under the supervision of Associate Professor Jaafar Abduo and Dr Hadeel Ibrahim.

Funding

The project is funded through the Melbourne Dental School Collaborative Research Grant and is being undertaken in close collaboration with Ivoclar Australia.



Associate Professor Jaafar Abduo



Professor Paolo Cattaneo



Associate Professor Khaled Ahmed

Rural, Remote and Indigenous Oral Health Equity

Life Course



Our research works in partnership with communities to improve oral health equity for rural, remote and Indigenous populations through culturally safe care, workforce development and community-led solutions.

NEAL Oral Health Plan

Developed in collaboration with the Northern Territory Government, Miwatj Health Aboriginal Corporation, Laynhapuy and Marthakal Homelands Corporations in North East Arnhem Land, the NEAL Oral Health Plan outlines strategic partnerships and research to improve oral health in the region.

Chaired by Professor Julie Satur, the advisory committee oversees implementation of the plan and the integration of Melbourne Dental School students who contribute to clinical service delivery and oral health promotion for the Yolŋu people of NEAL. Ongoing work includes oral health promotion evaluation, co-design of dental services and tele-dentistry.

Researchers: Professor Julie Satur, Ms Claire Phelan, Ms Andrea Whyte

Community consultation on oral health for Aboriginal and Torres Strait Islander peoples

Access to culturally safe dental services remains a major challenge for Aboriginal communities. This research was developed in response to needs identified by two Indigenous communities and seeks to understand the priorities of Aboriginal and Torres Strait Islander peoples to inform culturally safe oral health care.

Using Indigenous methodologies and community engagement, yarns were conducted with Yolŋu and Yort Yorta communities to identify barriers and enablers to dental services. The findings will inform oral health promotion, service delivery and the educational preparation of dental practitioners.

Researchers: Ms Eliza Collins, Professor Julie Satur, Professor Shawana Andrews

RACGP & NACCHO National Guide to preventive healthcare

The National Guide is a practical resource for health professionals delivering primary healthcare to Aboriginal and Torres Strait Islander peoples. Our team reviewed the current evidence to develop the Oral Health chapter for the fourth edition published by RACGP and NACCHO.

Researchers: Professor Julie Satur, Professor Stuart Dashper, Professor Michael McCullough

 **Discover**

Find out more about the RACGP guidelines here





Scan to learn more about the group

Oral health for rural populations

In partnership with the National Centre for Farmers' Health at Deakin University, the team conducted a scoping review of oral health in rural populations to identify barriers, successful interventions and gaps in the evidence.

This collaboration has supported research on outreach oral cancer screening in farming communities and informs advocacy on rural oral health through the Victorian Oral Health Alliance and National Rural Health Alliance.

Researchers: Professor Julie Satur, Ms Caroline Koedyk, Dr Jackie Cotton, Dr Iksheta Verma

Rural workforce development

The oral health of rural residents is often affected by shortages of dental practitioners. Research evaluating dental student rural clinical placements is demonstrating the importance of positive social engagement with rural communities as an enabler for workforce recruitment.

This work informs the design and delivery of rural clinical placement programs at the Melbourne Dental School and beyond.

Researchers: Mr Jing Wen Lee, Ms Caroline Koedyk, Professor Julie Satur

Rural workforce capacity development

Access to dental services remains a challenge across many rural and public dental services. Expanding the restorative scope of practice for dental and oral health therapists can help extend the capacity of existing services.

Research evaluating educational preparation for this expanded scope is demonstrating how online learning combined with clinical residency can support service delivery in rural and remote communities.

Researchers: Ms Brenda Ryan, Professor Julie Satur, Dr Jennifer Gray



Professor Julie Satur



Professor Stuart Dashper



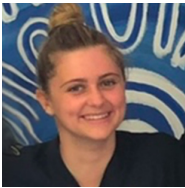
Ms Brenda Ryan



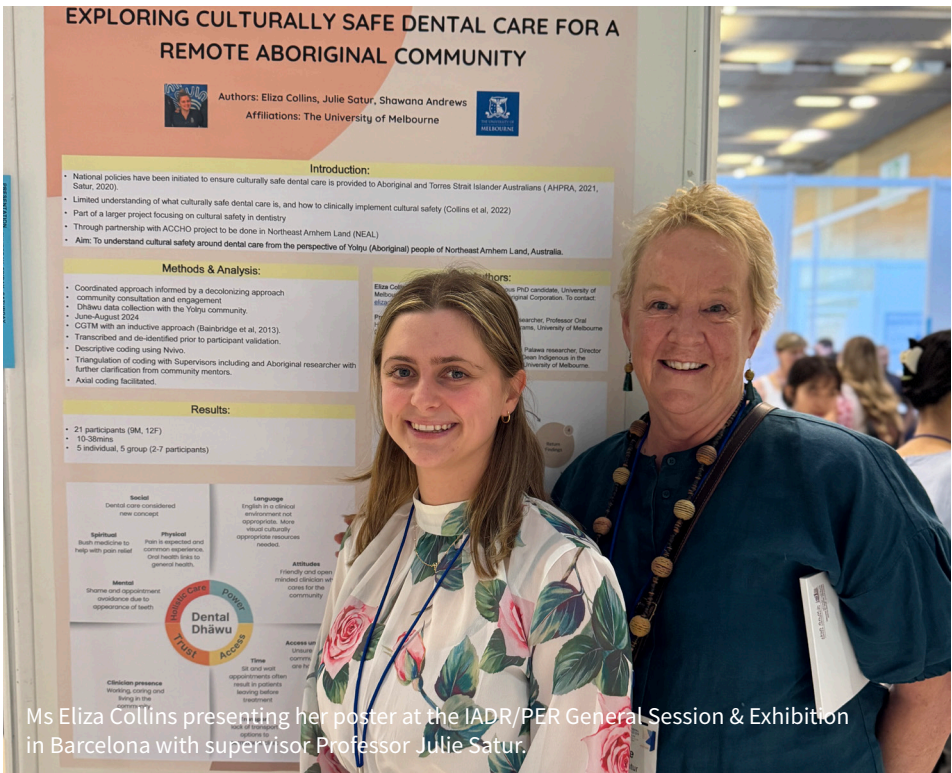
Ms Caroline Koedyk



Professor Michael McCullough



Ms Eliza Collins



Ms Eliza Collins presenting her poster at the IADR/PER General Session & Exhibition in Barcelona with supervisor Professor Julie Satur.

Paediatric Oral Health Research Group

Life Course

Scan to learn more about the group



In partnership with the Murdoch Children's Research Institute, our multidisciplinary team of clinicians and scientists works to understand and improve oral health and disease across the life course.

Collaborating across the Melbourne Dental School and the Melbourne Children's Campus, we undertake longitudinal and interventional research designed to improve the health and wellbeing of children and their families — particularly those from priority populations.

Our research is driven by strong partnerships with family collaborators and an extensive network of interdisciplinary colleagues.

iMIH: A global alliance to investigate Molar Incisor Hypomineralisation

Molar Incisor Hypomineralisation (MIH) is a common and burdensome condition that weakens tooth structure, leading to dental caries and tooth destruction. Although relatively recently described, it continues to puzzle scientists and clinicians worldwide. Its

cause remains unknown, making prevention impossible, and treatment is challenging, as local anaesthesia and traditional restorative materials are often ineffective. Emerging links with other dental anomalies have raised questions about a shared aetiology, including hypodontia.

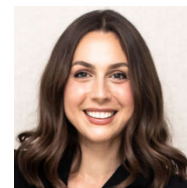
Members of the Paediatric Oral Health Research Group — Associate Professor Mihiri Silva, Associate Professor Felicity Crombie and PhD candidate Dr Stephanie Shields — collaborated with researchers from 14 countries in a 17-month study of 1,279 children attending specialist paediatric clinics. The findings, published in the *Journal of Dentistry* (2025), showed that children with MIH have higher rates of other dental anomalies, including hypodontia.

Using Australian data, Dr Stephanie Shields further examined the impact of MIH on oral health-related quality of life. Published in the *European Archives of Paediatric Dentistry* and presented at the International Association of Paediatric Dentistry General Session, the study demonstrated significant impacts reported by both children and their parents or caregivers.

The group is now building on this work to further investigate the impact, aetiology and management of MIH.



Associate Professor Mihiri Silva



Dr Rachele Welti



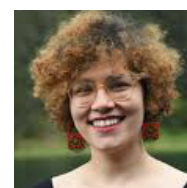
Ms Nileshni Fernando



Dr Dharini Ravindra



Dr Stephanie Shields



Ms Yeganeh Khazaei



Associate Professor Felicity Crombie

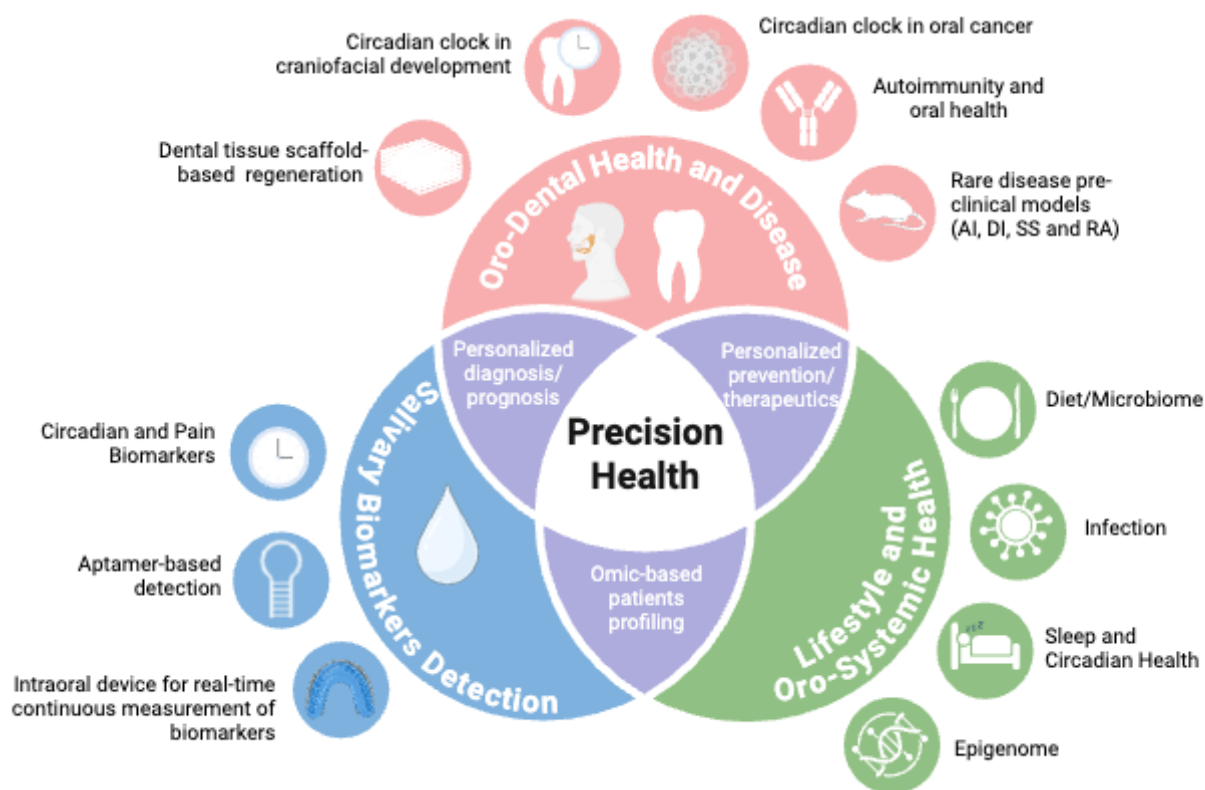


Dr Stephanie Shields at the MDHS 3MT competition finals on her presentation: Birthmarks that Bite

Precision Oral Systemic Health Group

Life Course

Scan to learn more about the group



The Precision Oral Systemic Health Group focuses on understanding fundamental mechanisms linking the circadian clock, immune function, microbiome, lifestyle traits, and chronic disease. Our interdisciplinary research integrates circadian biology, immunology, epigenetics, and precision health approaches to address major oro-systemic health challenges in Australia and worldwide.

Our work advances regenerative approaches for enamel and mineralised tissue repair, characterises rare oro-dental genetic disorders, and develops salivary biomarkers and aptamer-based sensors for real-time, non-invasive monitoring.

Core focus areas

- Circadian medicine & oral cancer
- Autoimmune diseases: Sjögren's syndrome, rheumatoid arthritis & related conditions
- Dental materials, enamel & mineralised tissue regeneration

- Circadian regulation of pain & sleep
- Rare oro-dental genetic disorders
- Salivary biomarker discovery in oral health, sleep & circadian rhythms
- Aptamer-based sensor design for real-time monitoring

Study & collaboration opportunities

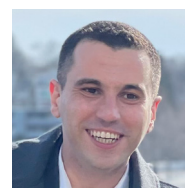
We welcome graduate students, postdoctoral fellows and collaborative researchers interested in circadian biology, immunology, dental tissue engineering, precision health and translational research. Research opportunities span fundamental mechanistic studies through to clinical applications in circadian rhythm disorders, pain management, autoimmune disease and cancer therapy.

Training Focus

- Advanced circadian and immunological methodologies
- Translational research and clinical trial design
- Biomarker discovery and validation
- Interdisciplinary team-based science



Professor Petros Papagerakis



Dr Raed Said



Dr Meenakshi Pundir

Dental Therapeutics

Life Course

Scan to learn more about the group



The research conducted by the Therapeutics Group is devoted to the improvement of dental prescribing, with a focus on antibiotic prescribing.

Our research projects in this field will collectively transform how drugs are used in dentistry, allowing for safer prescribing, improved patient management and enabling dentists to play their part in tackling the global public health problem of antibiotic resistance.

Antibiotic Resistance: A well-established global public health problem

While dental antibiotic prescribing accounts for a significant 10% of all prescribed antibiotics globally, around 55% of dental antibiotics in Australia are prescribed inappropriately.

Our group's work involves developing a digital medicines decision tool, titled Drugs4dent®, that provides dental-relevant drug information, dentist and patient education about appropriate use of antibiotics, as well as assists dentists with prescribing according to guidance.

Our pilot study demonstrating the feasibility of our antibiotic stewardship intervention: Drugs4dent® and targeted education, produced a 45% reduction in the number of inappropriate indications for prescribing, and a decrease of 41% in the total number of antibiotics.

Commercialisation of MIMSDrugs4dent®: A dental medicines decision tool

In collaboration with the drug compendia company MIMS Australia, we have commercialised Drugs4dent® to produce the first Australian dental medicines decision tool, MIMS Drugs4dent®. The platform has been available to dental practitioners across Australia and New Zealand since 1 August 2024. We trialled MIMS Drugs4dent® in Southeast Asia (Indonesia, Malaysia, Singapore and Thailand) to explore the feasibility, usability and suitability of the product for dental practitioners in these countries.

We are also undertaking a clinical trial of MIMS Drugs4dent® with Pacific Smiles Dental Group to assess the effect of this intervention on prescribing.

Funding

This project was awarded funding by the National Health and Medical Research Council Investigator E11 grant (Leanne Teoh), and Leanne also received a Dame Kate Campbell Fellowship.



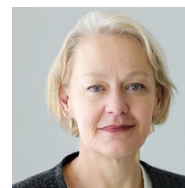
Associate Professor
Leanne Teoh



Professor
Michael McCullough



Dr
Nadia Kaunein



Dr
Marietta Taylor



Dr
Mathew Lim



Dr
Tejashree Kangutkar

Discover What MIMS Drugs4dent® Can Do for You



Dental-Specific Drug Information

Succinct, dental-relevant drug information is provided about your patient's medications to enable you to perform dental treatment safely with respect to medication use.

Population Oral Health Group

Life Course

Scan to learn more about Population Health Group



The Population Oral Health Group advances equitable, evidence-informed improvements in oral health across the life course, with a strong focus on prevention, health promotion, workforce development and health systems impact. The group works across the translational continuum — from population surveillance and epidemiology to intervention design, program evaluation and policy-relevant implementation science.

Our work integrates expertise in social and behavioural sciences, dental public health, epidemiology, health services and workforce research, implementation science, and digital and community-based models of care.

We focus on reducing oral health inequalities and improving access to care for priority populations.

Our research informs practice and oral health policy at local, national and international levels.

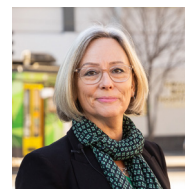
Current focus areas

- Oral health needs of people experiencing homelessness in Victoria
- Designing Victoria's early years oral health model
- Oral health education and care during pregnancy
- Eyes, Ears and Mouth: multidisciplinary kinder screening
- Mental health and wellbeing of dental practitioners
- Quality-of-life impacts of oral health conditions
- The Right to Smile: oral health and mental ill health

Highlights

Associate Professor Matt Hopcraft was highly active in oral health advocacy, with 20 media appearances across television, radio and print on access to dental care, practitioner wellbeing, water fluoridation and expanding Medicare to include dentistry.

A/Prof Roisin McGrath is Chief Investigator on a \$189k Medical Protection Society-funded project promoting dental practitioner wellbeing across Australia, New Zealand and Singapore — the first awarded to an Australian team.



Associate Professor
Roisin McGrath



Associate Professor
Matt Hopcraft



Dr
Mathew Lim

Dental Data and Artificial Intelligence Research Group

Life Course

Scan to learn more about D2AI Group



Dental data and artificial intelligence are rapidly evolving as dentistry becomes more data-driven and technology integrated. Our Dental Data and Artificial Intelligence (D2AI) Research Group focuses on data quality, annotation for AI development, multimodal data integration, record linkage, AI model benchmarking and interoperability.

Our work develops frameworks to combine and curate dental data to support research translation, clinical decision making, auditing and government policy.

Our research designs and implements digital and AI-enabled solutions that improve oral health care by enabling secure, interoperable and high quality dental data ecosystems.

In 2025, the group established collaborations with key dental data stakeholders including practitioners, patients, software vendors, insurers and government agencies. These partnerships aim to support the safe and effective integration of AI into patient care and policy development.

The D2AI Research Group also works closely with the World Health Organization (WHO), International Telecommunication Union (ITU) and World Intellectual Property Organization (WIPO) Global Initiative on AI for Health, contributing to the Topic Group on Oral Health to advance global dental AI research.

Our group is also a collaborator in the Data for Decisions (D4D) and PATRON research programs at the University of Melbourne.

Current projects

- Stakeholder engagement to inform the development of a national dental health data infrastructure
- Development of a dental data ecosystem using privacy-preserving, high-quality data extraction tools (proof-of-concept study)
- National attitudes towards dental AI among students and dentists
- Validation of intraoral scanners for dental caries detection
- Development of metrics for dental AI research

Opportunities

We welcome collaborative research and would be glad to discuss shared interests. Please contact the research group lead to explore potential opportunities.



Dr Bree Jones



Dr Rishi Ramani



Access and Equity Research Group

Life Course

Scan to learn more about Access and Equity Group



Credit: Paltushyamal, Deposit Photos

The work of the Access and Equity Research Group promotes equity and access in health care. Our research focuses on addressing inequities in health, particularly for marginalised populations and people who face barriers to accessing the care they need.

Our role is to identify and evaluate potential solutions and disseminate knowledge that supports health teams in overcoming barriers to equitable care.

Our research works to understand and address barriers to health care, with a focus on improving access and outcomes for marginalised communities and people with complex health needs.

Our research spans a range of projects, from examining the role of oral health educators working with people with intellectual disability to the PhD work of Dr Philcy Philip, conducted in collaboration with the Nossal Institute for Global Health,

exploring access to care for children with disabilities in rural India.

The group also investigates clinical dilemmas in dentistry, including an ongoing focus on patients at increased risk of bleeding following dental procedures, contributing new knowledge to support safer clinical care.

We continue to foster collaborations with research institutions, disability organisations, hospitals and people with lived experience to address complex challenges in health equity. In support of this work, the Access and Equity Research Group received an eViDent Foundation Booster Grant in 2025.

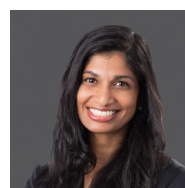
Publication highlight

Lopez Silva CP, Lim B, Sundaresan PD, Gu Y, Lim MAWT 2025. Frequency and severity of post-procedure bleeding events following dental extractions completed in patients on heparin therapy. *Special Care in Dentistry*.

doi.org/10.1111/scd.70109



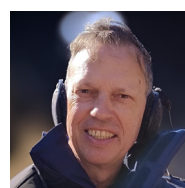
Dr Mathew Lim



Associate Professor Mihiri Silva



Dr Tejashree Kangutkar



Dr Andre Priede

Cariology Research Group

Life Course



Scan to learn
more about
the Cariology
Group

Our research explores biomimetic technologies that enhance remineralisation and antimicrobial activity to improve the prevention and management of dental caries.

Project: Enhancement of SnF₂ remineralisation and antimicrobial bioactivities by the saliva biomimetic CPP-ACP

This project investigated the effects of the saliva biomimetic CPP-ACP on the remineralisation and antimicrobial activity of SnF₂. Titration of SnF₂ into CPP-ACP produces Sn-CPP-ACFP nanocomplexes, where CPP encapsulates nanoclusters of tin, calcium, phosphate and fluoride ions to form highly soluble and stable nanocomplexes.

Enamel and dentine remineralisation were evaluated using an in situ model in which participants wore removable appliances containing human enamel and dentine blocks with subsurface lesions. Participants rinsed with either SnF₂ or CPP-ACP/SnF₂ solutions over a 14-day period.

Results showed significantly higher remineralisation and surface microhardness recovery in enamel and dentine following treatment with Sn-CPP-ACFP compared with SnF₂ alone. The biomimetic complex also demonstrated improved dentine tubule occlusion and enhanced antimicrobial activity against oral pathogens.

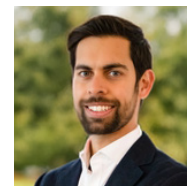
These findings highlight the potential of CPP-ACP biomimetic systems to enhance fluoride activity and support improved strategies for the prevention and management of dental caries.



Associate Professor
Peiyan Shen



Dr
Lianyi Zhang



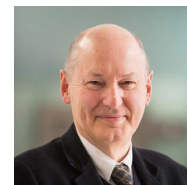
Dr
James Fernando



Dr
Yi Yuan



Associate Professor
Geoff Adams



Laureate Professor
Eric Reynolds AO



Ms
Coralie Reynolds

Oral Medicine and Oral Cancer Research Group

Life Course

Scan to learn more about OMOC



Our Oral Medicine and Oral Cancer Research (OMOC) Group leads innovation across the full translational pipeline, from molecular and cellular studies to preclinical modelling and clinical research. Our work focuses on the early detection, prevention and treatment of oral mucosal diseases, oral potentially malignant disorders (OPMDs) and oral squamous cell carcinoma (OSCC).

Our group brings together expertise in oral biology, organoid modelling, immunology, epidemiology, microbial pathogenesis, preclinical models and digital health to address urgent challenges in oral disease.

Our research aims to improve early detection and develop new preventive and therapeutic strategies for oral cancer by integrating laboratory discovery, clinical research and emerging digital technologies.

Current projects

- Development of AI-driven diagnostic tools using deep learning and in vivo confocal microscopy to detect dysplasia and oral cancer.

- Investigation of the effects of oral anticoagulants on the risk and progression of oral cancer.
- Targeting CASP8 signalling pathways using organoid models for novel oral cancer therapies.
- Creation of patient-derived organoid models to study oral dysplasia and test therapeutic responses.
- Exploration of *Candida albicans* diversity and virulence in oral cancer progression.
- Development of oral gonorrhoea models to study interactions with mucosal health and cancer risk.
- Application of machine learning to microRNA signatures for non-invasive early cancer diagnosis.
- Investigation of the anti-inflammatory potential of bioactive phytochemicals and their influence on canine intestinal health.
- Research on microRNA dysregulation in oral carcinogenesis and its link to oral cancer epidemiology.
- Fucoidans as anti-tumour and anti-inflammatory agents: mechanisms, models and translational potential.
- Enabling oral cancer screening in Australian agricultural communities.
- Barriers to early detection of oral cancer among dentists in Indonesia.
- Epidemiology of OSCC and OPMDs..
- Improving the quality of clinical research in oral health.



Associate Professor
Antonio Celentano



Associate Professor
Tami Yap



Professor
Michael McCullough



Professor
Nicola Cirillo



Dr
Nik Saha



Ms
Caroline Moore



Ms
Rita Paolini



Orthodontics and Craniofacial Research Group

Life Course



Scan to learn more about the group

Solid clinical research is essential to the future of Orthodontics, as many important clinical issues still lack consensus on treatment approaches.

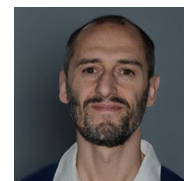
The Orthodontics and Craniofacial Research Group focuses on 3D analysis of orthodontic treatment outcomes, including short- and long-term stability following orthodontic treatment, orthopaedic treatment of Class III malocclusion, clear aligner therapy, digital workflows, sleep-disordered breathing, and facial morphology. Through randomised controlled clinical trials and large retrospective studies, the group aims to generate evidence that informs best-practice clinical guidelines in Orthodontics.

Our research uses advanced 3D analysis to evaluate orthodontic and craniofacial treatment outcomes, helping to inform evidence-based clinical practice and improve long-term patient care.

The group works closely with the Australian Association of Orthodontists and collaborates with the Materials Characterisation and Fabrication Platform at the University of Melbourne and The Royal Children's Hospital Melbourne. International collaborations include Aarhus University (Denmark), the University of Oslo (Norway), Boston University (USA), Sapienza University of Rome (Italy), and the University of São Paulo (Brazil).

Key achievements

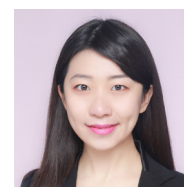
- Professor Paolo Cattaneo was awarded the P Raymond Begg Research Award by the Australian Society of Orthodontists in recognition of his outstanding contributions to orthodontic research and for elevating the global profile of the Melbourne Dental School Orthodontics group.
- Dr Brandon Lim received First Prize in the Clinical Research Stream at the 2025 Dr William R. Proffit Resident Scholar Award at the American Association of Orthodontists Annual Session for research investigating the three-dimensional stability of mandibular advancement surgery using virtual surgical planning.
- Dr Denice Loo received the 2025 Athanasios E. Athanasiou Master's Thesis Award from the World Federation of Orthodontists for a pilot case-control study of bone- and tooth-borne maxillary protraction with miniscrews and Class III elastics. This marks the fourth time in three years that the award has been received by the University of Melbourne Orthodontics team.
- Dr Brandon Chow received the 2025 Australian Society of Orthodontists Student Poster Award.



Professor Paolo Cattaneo



Professor Mari Cornelis



Dr Yi Fan

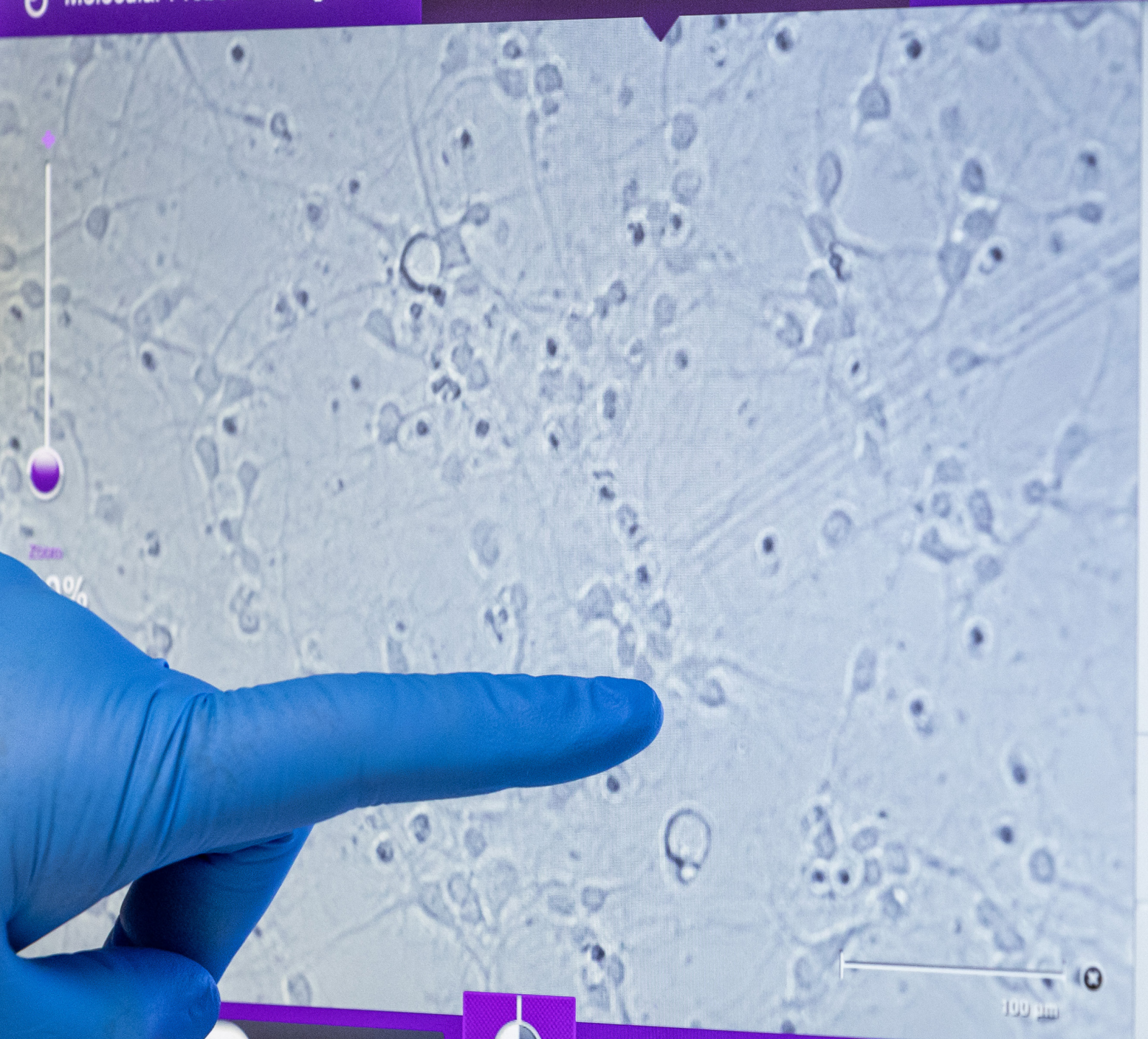


Members of the Orthodontics Research Group at the Australian Society of Orthodontists Foundation for Research and Education Meeting 2025.

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Image Acquisition

Image



Focus Assist 6

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Microscopic image of mouse cortical neurons growing in primary brain cell cultures on a computer display. Credit: Peter Casamento



Study With Us

Honours & Masters by Coursework

The Melbourne Dental School offers undergraduate students the opportunity to undertake a research-based Honours degree within:

- Bachelor of Biomedicine
- Bachelor of Science
- Bachelor of Oral Health

Postgraduate research pathways include:

- Master of Biomedical Science
- Master of Philosophy
- Doctor of Philosophy (PhD)

Research spans a wide range of disciplines, including microbiology, immunology, cancer biology, biochemistry, molecular biology, chemistry, anatomy, cell biology, dental therapy, public health and materials engineering.

Our research extends beyond oral health to areas such as wound healing, drug delivery, bone health and microbiomics.

Students conduct their research in state-of-the-art laboratories at the Melbourne Dental School and the Bio21 Institute, equipped with the latest technologies.

 **Discover**

Learn more about our Honours and Masters by Coursework pathways.





Doctor of Clinical Dentistry

The Melbourne Dental School offers degree programs which enable general dental practitioners to develop their knowledge and skills in a chosen clinical specialty area, enabling them to register and practice as specialist practitioners.

The degree provides the opportunity to advance professional knowledge and skills in one of the key dental areas to an expert level.

Specialty areas include:

- Endodontics
- Oral medicine
- Orthodontics
- Paediatric dentistry
- Periodontics
- Prosthodontics
- Special needs dentistry

Learn more about this course:
go.unimelb.edu.au/e2y6

Doctor of Philosophy (Medicine, Dentistry & Health Sciences)

The Doctor of Philosophy (PhD) in Medicine, Dentistry and Health Sciences is the University of Melbourne's flagship research degree, preparing graduates for leadership in research, academia and clinical innovation.

PhD candidates undertake a substantial program of independent research under expert supervision, culminating in the submission of a thesis that makes an original contribution to knowledge. Through this process, students develop advanced analytical, critical thinking and research skills while building deep expertise in their chosen field.

Learn more about this course:
go.unimelb.edu.au/pks2

Find out more about our research groups:
go.unimelb.edu.au/qg9i

For further information about program eligibility, supervisor selection, applications and scholarships, please contact:
mds-researchsupport@unimelb.edu.au

Continuing Professional Development Program

The Melbourne Dental School's Continuing Professional Development (CPD) program offers dynamic, evidence-based courses designed to keep dental practitioners at the forefront of clinical excellence. Delivered by leading academics, researchers and industry experts, these programs combine advanced practical, hands-on training tailored to clinical practice.

Whether you are looking to advance your clinical skills or meet professional registration requirements, the School's CPD offerings provide engaging, high-quality learning experiences that support every stage of your professional growth.

Learn more about our 2026 CPD course offerings and enrol today:
go.unimelb.edu.au/8ks2



Opportunities at the Melbourne Dental School

Study with us via our Study Abroad and Exchange Program

The University of Melbourne offers students from overseas institutions the opportunity to undertake a period of research as part of their home degree through the Study Abroad or Exchange Research Program.

Students can conduct research at Melbourne for a minimum of three months and up to twelve months, with the possibility of extension in some cases. During this time, students work with an academic supervisor while gaining valuable research experience in a world-leading research environment.

Prospective students and visiting researchers are encouraged to explore our research groups and Find an Expert directory to identify potential supervisors.

Learn more: go.unimelb.edu.au/9o8x

Explore our research groups: go.unimelb.edu.au/qg9i

Find an Expert: go.unimelb.edu.au/az98

Staff interested in visiting Melbourne Dental School for Honorary or Visiting appointments, please contact: mds-international@unimelb.edu.au



Work with us

The Melbourne Dental School is seeking clinicians, academics and researchers to join our internationally recognised community of dental and oral health professionals.

Discover our current opportunities: go.unimelb.edu.au/fge2

Explore our research groups: go.unimelb.edu.au/qg9i

Staff interested in visiting Melbourne Dental School for Honorary or Visiting appointments, please contact: mds-international@unimelb.edu.au





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Our researchers are at the forefront of international scholarship in fields as diverse as human rights law, climate change, telecommunications, and medical research. We're here to help you find researchers and collaborators.

Get in touch with us at:

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