THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

COR3

Global leaders in orofacial regeneration, reconstruction and rehabilitation

As a proud member of The University of Queensland (UQ) dentistry alumni, and now with the opportunity to lead our next generation of dentistry professionals and researchers as Head of School for the School of Dentistry, I am excited to launch the new Centre for Orofacial Regeneration, Reconstruction and Rehabilitation (COR3).

Research and training within **COR3** will focus on several themes, spanning fields from biomaterial science and tissue engineering through to technologies applied in clinical practice and dental education. The Centre will act as a vehicle to facilitate interaction between researchers, clinicians, patients and industry partners. The launch of **COR3** builds upon the School of Dentistry's long-standing history producing high quality oral health research, with the aim of contributing to the advancement of evidence based knowledge both locally and internationally.

We have a strong focus on translational research, emphasising the importance of research impact on patient outcomes, as well as healthcare policy and practice. This would not have been made possible without the generosity of our supporters who have laid the foundation and supported the School of Dentistry throughout the years. It is thanks to the generosity of these individuals, our industry partners and health partners that we are able to deliver life-changing programs that benefit the most vulnerable members of our community, support our students through their learning, and teach future dental professionals compassion and empathy.

Thank you!

Professor Saso Ivanovski

Director, Centre for Orofacial Regeneration, Reconstruction and Rehabilitation (COR3)

Head of School, School of Dentistry

Introducing COR3

Our vision

Global knowledge leader for orofacial regeneration, reconstruction and rehabilitation.

Our mission

Our purpose is to be a centre of excellence that advances orofacial regeneration, reconstruction and rehabilitation to improve patient outcomes through the highest quality research and education. We engage with society, industry and the profession to drive learning, innovation and discovery.

Our values

- Pursuit of excellence
- Creativity and independent thinking
- Honesty and accountability
- Mutual respect and diversity
- Supporting our people.

Leadership

Professor Bruce Abernethy AO

Executive Dean

Faculty of Health and Behavioural Sciences

The University of Queensland

Professor Louise Hickson

Associate Dean (External Engagement)

Faculty of Health and Behavioural Sciences

The University of Queensland

How we have **impact**

Research

We are at the forefront of innovation in regenerative dentistry, craniofacial reconstruction and orofacial rehabilitation through the application of novel materials and manufacturing technologies to tissue engineering.

Education and training

Embedded within one of Australia's leading dental schools, COR3's research activities are intrinsically linked to the education and training of our current and future health professionals. Using the best technologies, facilities and human talent, COR3 is merging scientific and clinical knowledge to improve quality of life.

Translation

We use the knowledge gained from our research to address unmet oro-dental and craniofacial clinical needs. From device manufacturing to testing to clinical application, we have "bench to bedside" capability all in one centre. Our advancements will be cost-effective and scalable, ensuring clinical translation via our network of clinicians and collaborations with public and private sector health delivery services, as well as industry.

Collaboration

COR3 researchers collaborate actively in both clinical and research settings, with ongoing projects with internal (UQ CCR, UQ QBI, UQ Medicine, TRI, AIBN), external (QUT, Griffith, Deakin, Adelaide), and international universities, along with prominent industry partners (Geistlich Pharma/Biomaterials, Straumann Group, Colgate Palmolive). As partners with Metro North Hospital and Health Service in the Oral Health Alliance and the Herston Biofabrication Institute, we are building a unique hub of expertise in Brisbane.

A new generation in **dental research**

3D printing custom scaffolds to rebuild human teeth, bones and soft tissues.

Diagnosing and treating disease via nano-scaled particles in saliva.

Using nanotechnology to alter the surfaces of metal implants, allowing better cell growth and drug delivery.

These are just some of the remarkable research approaches we are undertaking at COR3, led by a new generation of international dentistry researchers, clinicians and students. Our current research groups include:

GATORs

Dr Karan Gulati's group hopes to revolutionize dental implant technology via nano-engineering the implant surface.

Epigenetic nanodiagnostics and therapeutics

Led by Dr Pingping Han, the group is using nano-scale biological materials called extracellular vesicles (EVs), to diagnose and treat periodontal disease.

Xu Group: Nanomaterials for biomedical applications

The vision of Dr Chun Xu's group is to use nanoscale materials to address important medical and dental problems, including drug delivery and dental stem cell therapy.

Ali3B: Ali group for biodegradable and biofunctional biomaterials

Led by Dr Abdalla Ali, the group designs new smart biomaterials for clinical application to improve regenerative medicine, restore function and facilitate healing.

Biomanufacturing and regenerative dentistry

Dr Cedryck Vaquette's group is exploring the regeneration of tissues, creating additively manufactured multiphasic scaffolds via techniques such as 3D-printing/bioprinting and melt electrospinning writing.

iTEAM

Professor Saso Ivanovski's group works at the forefront of innovation in regenerative medicine, restoring native oro-dental tissue form and function through the application of novel materials and manufacturing technologies to tissue engineering.

PROCOR3

Professor Ove Peters' regenerative opportunities group aims to improve oral health through endodontic therapies that maintain and rebuild healthy tissue compartments.

Clinical Research Units

Led by Dr Ryan Lee, these units promote and facilitate clinical research activities in the School of Dentistry and Oral Health Centre, through interdisciplinary cooperation and collaboration to promote evidence based dental clinical research, and translation of 'cutting edge' pre-clinical research for clinical application.

Wide ranging impact

Our work has applications for the entire orofacial region, as well as systemic diseases that have a bi-directional relationship with oral health.

The materials, devices, procedures, skills and knowledge we are developing at COR3 have application across a wide spectrum of health fields, from cancer and heart disease to diabetes and osteoporosis.

We are conducting a wide range of translational research in tissue engineering, stem cells and molecular biology, aiming to replace, engineer or regenerate damaged tissues or organs, restoring normal functionality.

Our focus is on bioengineering solutions to regenerate and reconstruct oral and maxillofacial tissues, exploring novel advances in biomaterial science and innovations in biomanufacturing, including 3D printing.

Real outcomes for patients

COR3 is located at the Oral Health Centre, which is part of the Herston Health precinct. As part of the Oral Health Alliance between UQ and Metro North Hospital and Health Service, it is founded on the shared belief that future world-class clinical service, teaching and research is dependent on a commitment to integration.

By combining our expertise, knowledge and resources, we bring together complementary strengths to create a truly world class centre of excellence, leading the way in oral health.

Groundbreaking technology

Using **additive manufacturing** technology to apply novel biomaterials to the tissue engineering of bone, vascular systems, and complex soft tissues requires COR3's combined expertise of clinicians, engineers and scientists. Our clinicians and researchers can print biodegradable implants to improve long-term patient health and wellbeing.

Nanomaterials possess unique physical, chemical and biological properties due to their nanosize effects and offer various advantages for biomedical applications. Our research encompasses both fundamental research about nanomaterials and nano-bio interactions, and translational medical/dental applications. Specifically, our research includes the design and synthesis of functional nanomaterials, revealing their interaction with biological systems, and explores their biomedical applications including drug delivery, gene therapy, bone and dental tissue regeneration.

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Partner with us

Whether as a student, researcher, potential research partner or donor, there are many ways you can be a part of COR3's future and help us create change.

dentistry.uq.edu.au/research/cor3