



THE UNIVERSITY OF
MELBOURNE

FACULTY OF MEDICINE, DENTISTRY AND HEALTH SCIENCES
DEPARTMENT OF SURGERY

SURGERY @ MELBOURNE

2021
ANNUAL REPORT

The University of Melbourne acknowledges and pays respect to the Traditional Custodians of the lands on which our campuses are situated:

- Wurundjeri people and Boon Wurrung people (Parkville, Southbank, Werribee and Burnley campuses)
- Yorta Yorta people (Shepparton and Dookie campuses)
- Dja Dja Wurrung people (Creswick campus).

We also acknowledge and respect our Aboriginal and Torres Strait Islander students, staff, Elders and collaborators, and all Aboriginal and Torres Strait Islander people who visit our campuses from across Australia.

On this page: Retinal pigment epithelium cells derived from human pluripotent stem cells. Image by Jenna Hall (PhD candidate, MDHS).

Front cover: Scanning electron microscopy images of microvascular casts from an animal model of colorectal cancer liver metastases. This image demonstrates normal liver vasculature in the periphery with gradual transformation at the interface leading into large disordered vascular lakes within the tumour. Image generated by the late Cathy Malcontenti-Wilson and Vijayaragavan Muralidharan (2001, Austin Health).

Opposite panel: This image shows the immunostaining of a growth factor receptor in a 3D bioprinted trophoblast organoid. Trophoblast cells in the placenta have a crucial role in establishing a connection between the mother and baby during pregnancy. This model can be used to investigate pregnancy and serious diseases such as preeclampsia. Image by Claire Richards (courtesy of the Biological Optical Microscopy Platform).



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Message from the Head

It is my pleasure to present to you the activities of Surgery at Melbourne which brings together the exciting and innovative academic activities and research from the University of Melbourne Department of Surgery.

This year we welcome to the department Professor Christobel Saunders the James Stewart Chair of Surgery, Royal Melbourne Hospital, Professor Vijaya Muralidharan (Murali) Austin Hospital and Professor Shekhar Kumta Northern Hospital as the new Academic Surgical Heads. With these appointments we now have a full complement of surgical leaders who together with their precinct teams will help to propel us forward in the exciting times ahead.

While COVID-19 has taken its toll, the resilience of our department has been inspirational with ongoing productivity in research, publication, grant success and higher degree supervision. In addition, the department has continued to seek more ways to engage its paid and honorary staff through the wonderful and generous efforts of our executive committees.

What has been particularly satisfying is to see how the teams of academics at all levels from students to professors, including paid and honorary staff, have rallied together to form tightly connected groups that have supported each other in their endeavours through this testing time. For example:

- The Student Orthopaedic and Musculoskeletal Association (SOMA) was set up by medical students interested in orthopaedics and musculoskeletal research. They have since created a framework for collaborative research and early career mentorship.
- Pre-vocational surgical trainees at the Austin Hospital created the Victorian collaborative for Education, Research, Innovation, Training and Audit by Surgical trainees (VERITAS) to support and promote trainee and resident-led research in surgery.
- The St Vincent's Academy of Surgery established a bridge between the Department of Surgery and honorary surgical staff at St Vincent's to drive engagement with surgeons who are interested in teaching, training, research, leadership, entrepreneurship, career development and mentorship.

The Surgical Students' Society of Melbourne (SSSM) continues to build strong connections between the Department and medical students who have an interest in pursuing surgery as a career. With Professor Justin Yeung Western Health, a series of modules for primers in surgery have been developed to guide the surgical interest of students in the direction of future surgical careers.

The collaborative networks that have formed will bring an uplift of academic surgery at the University of Melbourne and cement its place as a leading academic surgical centre in Australia and globally. This will raise the bar not only in surgical research, but also the practice of surgery which would attract the best and brightest clinicians and researchers to this discipline.

With a greater focus on innovation and enterprise, the entire department of surgery is challenged to find new ways of making impact whether by commercialising ideas, making more sustainable social venture activities or by novel ways of teaching that enhance the experience for our students and researchers.

We continue to find ways to ensure that equity and diversity remain at the forefront of our strategies and we recognise the important work that must be done to close the gaps that exist even today. In this regard, I am constantly inspired by the wealth of passionate young and not-so-young members of the Department of Surgery community who work tirelessly to create a work environment that is respectful, safe and secure. We are also proud of the diversity amongst our leaders and the mentorship opportunities we have created to expand upon this into the future.

Finally, I wish to thank all our professional staff, teachers, researchers, higher degree students, surgeons, collaborators, patients, community and hospital partners for their support, cooperation, and hard work in making the last year so successful and our future so bright.

PROFESSOR PETER CHOONG AO

MBBS, MD FRACS, FAOrthA, FAAHMS
Sir Hugh Devine Chair of Surgery
Head, Department of Surgery
Melbourne Medical School





Surgery @ Melbourne

The Department of Surgery (DoS) is based across six precincts of the Melbourne Medical School (Eastern Hill, Parkville, Heidelberg, Northern, Western and Sunshine) and its affiliated hospitals including St Vincent's Hospital, Royal Victorian Eye and Ear Hospital, Royal Melbourne Hospital, Austin Hospital, Western/Sunshine Hospitals, Epworth Hospital and Northern Hospital.

DoS Honorary staff also include those from Peter MacCallum Cancer Centre, Royal Children's Hospital and the various Melbourne University affiliated research institutes. DoS is comprised of paid academic surgeons, scientists, professional staff and a large body of honorary academic (clinical and research) staff. An Executive Committee encompasses representation from all hospitals within the Department.

The Department forms the focus for academic activities in surgery for the University of Melbourne. Members of the Department are involved in research, teaching and training, undergraduate and postgraduate surgical education, wider community engagement and entrepreneurship. Policies established by DoS's governance structures underpin all activities within the Department including:

- Research
- Education and training
- Mentorship
- Innovation and enterprise
- Appointments and promotions.

Vision

The Department of Surgery strives to be a globally-renowned leader in:

- Research that produces the highest quality in patient care outcomes
- Surgical education at all levels from students to master surgeons
- Innovation and enterprise in the conduct of basic and clinical sciences, with a keen focus on translational research.

Purpose

The Department is committed to developing a community of surgeons and researchers who are exploring the mechanisms of disease, translating these into effective treatment strategies and studying the impact of available evidence to ultimately drive the highest levels of value-based care.



79

successful grants

Over
\$50M
in grant funding

24

research Fellowships
and Scholarships

1237

publications

40

books published

6

patents registered

122

research staff

3

honours students

3

Doctor of Medical
Science students

97

PhD candidates

45

masters students

17

thesis submissions

Research Strategy

The past few years have demonstrated that the community landscape is rapidly changing and Surgery must innovate to serve the community to the best of its capability.

Currently placed #102 world-wide for Surgery (as measured by publication and citation research output by *TimesEducation*), DoS continues to guide strong research collaborations and nurture students.

Guided by the University's values of *Collaboration, Teamwork, Compassion, Respect, Integrity, and Accountability*, the Department conducted a comprehensive mid-year analysis that gathered 18 Research, Executive, and Academic staff from across the Precincts to build on the Department's strategic research direction in alignment with the priorities of the University, Faculty, and Melbourne Medical School.

DoS has identified 4 priority areas in a strategic shift to ensure the aspirational goals of the Department aligns with our stakeholder and University expectations:

1. Be a **world class leader in surgical research** spanning translational and fundamental science, clinical studies, education and training, and technological innovation.
2. Promote a culture of **support and inclusiveness** to surgical research and research training.
3. Promote a culture of **collaboration and excellence** in surgical research and research training.
4. Promote a culture of **accountability and integrity** in surgical research and research training.

In setting the scene for the next 3 years, DoS is building a community of surgeons and researchers to operationalise new strategic research priorities:

- ♦ **EDUCATION:** Advances in surgical training; a theory and technology-based approach
 - Led by A/Prof Justin Yeung, Prof Vijayaragavan Muralidharan, Prof Debra Nestel
- ♦ **RESEARCH:** Strengthening collaborations between clinicians and scientists by establishing a tissue bank
 - Led by A/Prof Niall Corcoran, A/Prof Claudia Di Bella, Prof Alice Pébay
- ♦ **SURGERY:** Surgery in extreme environments (including Space, Pandemics and Climate change)
 - Led by Prof Stephen O'Leary and Dr Renu Eapen
- ♦ **HOSPITAL RELATIONSHIPS:** Enabling hospital services across precincts
 - Led by Prof Michelle Dowsey, Prof Christobel Saunders

Roadmap to Excellence in Surgery

STRATEGIC PRIORITY	OBJECTIVES	ACTIONS
<p>1. Be a world class leader in surgical research, across the realms of translational and fundamental science, clinical studies, education and training, and technological innovation</p>	<p>1.1 Develop and acquire new knowledge by supporting translational, fundamental, and clinical research 1.2 Communicate the Department's leadership direction effectively to our stakeholders and to the broader community 1.3 Develop a culture of entrepreneurialism and initiative that seeks to translate innovative research into clinical outcomes 1.4 Focus and facilitate the translation of surgical research to ensure improved outcomes at point of care 1.5 Improve internal awareness of research being performed within the Department</p>	<p>1.1.1 Commit the Department to an annual budget for the support of internal research 1.1.2 Align Departmental grants with the broader research strategy, monitored via a three-yearly review process 1.1.3 Establish a database of skills, biostatistical support, research themes, and infrastructure, accessible to all within the Department 1.1.4 Improve connectivity and communication between geographically disparate precincts across the entire Department 1.1.5 Explore the potential of establishing centralised tissue banks for improved cross-departmental access to suitable specimens for research 1.2.1 Improve clinician-researcher engagement, especially from current and prospective surgeons 1.2.2 Implement a communication strategy that promotes the Department's achievements internally and externally, as well as the broader community 1.2.3 Invest in a partial FTE (Full Time Employee) communication/social media /marketing professional to help promote Departmental activity 1.3.1 Promote the Innovation Committee as a fulcrum for the generation of ideas that will fuel superior surgical research 1.3.2 Facilitate the advertisement of funding calls to the entire department 1.4.1 Investigate the development of a Departmental Clinical Trial Support 1.5.1 Continue and extend DoSTalks 1.5.2 Organise an annual Departmental Research Showcase Day 1.5.3 Develop internal standardised mechanisms of communication (OneDrive or website) 1.5.4 Develop a regular quarterly newsletter by the Head of Department to inform on the Department's life, fresh directions and upcoming meetings and events</p>
<p>2. Promote a culture of support and inclusiveness to surgical research and research training</p>	<p>2.1 Foster Departmental programmes which promote career development and support research staff and students 2.2 Enable the Executive Committee and Department to provide support, stability, and continuity to research staff 2.3 Ensure the adherence and respect of the University's codes of conduct</p>	<p>2.1.1 Develop healthy working relationships between the Mentoring, Promotion, Research, Education, and Innovation Committees 2.1.2 Organise bimonthly meetings of committee chairs to implement inclusive actions for research staff and student development 2.1.3 Develop a Departmental approach to accessing mentors including surgeons and researchers 2.1.4 Research Committee to work closely with Education Committee to facilitate career development 2.1.5 Promote career development activities and information 2.2 Commit the Department to an annual budget for the support of researchers in their last year of funding 2.3 Champion a zero-tolerance policy for actions that transgress the University's codes of conduct</p>
<p>3. Promote a culture of collaboration and excellence in surgical research and research training</p>	<p>3.1 Provide access to collaboration opportunities 3.2 Demonstrate excellence in research and research training 3.3 Improve connectivity, communication, and awareness within the Department 3.4 Strengthen and develop strategic collaborations, funnelling individual projects towards a more unified Departmental effort</p>	<p>3.1.1 Commit the Department to the provision of a partial FTE (Full time Employee) to the support of administration related to research activities 3.1.2 Improve visibility of the Department's research and clinical practice internally (See 1.2) 3.1.3 Encourage engagement with hospitals and external colleagues 3.2.1 Encourage high quality and high impact publications 3.2.2 Provide tailored, personalised support for grant and ethics applications as well as the development of surgical clinical trials 3.2.3 Ensure existing and new infrastructure can support Departmental research activities 3.2.4 Consider Departmental awards that recognise and celebrate excellence in research, collaboration, training, and supervision 3.3 Develop a method of communication that facilitates rapid and efficient dissemination of information between staff across precincts (See 1.2) 3.4.1 Investigate models for a Departmental tissue banking facility 3.4.2 Develop a universal audit tool for all surgical patients across campuses to vastly increase patient cohorts for surgical studies</p>
<p>4. Promote a culture of accountability and integrity in surgical research and research training</p>	<p>4.1 Ensure that the University's codes of conducts are respected</p>	<p>4.1.1 Ensure supervisors, staff and students are aware and appropriately trained for supervision, and delivery of ethical, responsible, and accountable research</p>



2021 Highlights



CERA's Deputy Director and Head of Macular Research **Professor Robyn Guymer AM** (*Ophthalmology*) has been recognised in the 2021 Victorian Women's Honour Roll as a trailblazer who has paved the way for women in ophthalmology and eye research.

Professor Peter Choong AO (*St Vincent's Hospital, Melbourne*) has been recognised in the Queen's Birthday Honours roll in 2022 as an Officer in the General Division of The Order of Australia. Prof Choong was also appointed to the position of Associate Dean for Innovation and Enterprise at the Faculty of Medicine, Dentistry and Health Sciences.



Prof Alistair Royse, cardiothoracic surgeon (*Royal Melbourne Hospital*) and the Director of eLearning Technologies for the Melbourne Medical School, was recently presented the Sir Louis Barnett Medal from the Royal Australasian College of Surgeons for the advancement of and excellence in surgery and surgical research and education.



A/Prof Mehrdad Nikfarjam OAM (*Austin*) was recognised for his contributions to the field of pancreatic and biliary surgery with a Medal for the Order of Australia on 26 January. Notably, A/Prof Nikfarjam is the founder of Pancare Foundation – a not-for-profit organisation that aims to improve the survival and support for Australians diagnosed with pancreatic, liver, stomach, biliary and oesophageal cancer.

Congratulations to **Professor Debra Nestel AM** (*Austin*), who was recently appointed as a Member of the Order of Australia for significant service to medical education through simulated teaching methods.

Professor Igor Konstantinov (*Royal Children's Hospital*) was awarded Educator of Merit – SET Supervisor / SIMG Supervisor of the Year (VIC) for 2021 by RACS on behalf of Academy of Surgical Educators for exceptional contribution towards supporting Trainees or Specialist International Medical Graduates (SIMGs).

Prof Mingguang He (*Ophthalmology*) was awarded \$4.99m over 3 years by the Medical Research Future Fund (MRFF) to develop an integrated AI screening system for patients at risk of eye diseases, heart disease and stroke.

Congratulations to **A/Prof Lauren Ayton** (*Ophthalmology*) who is the recipient of a 2021 Melbourne Medical School Strategic Grants for Outstanding Women. The grant will help appropriately deliver the results of A/Prof Ayton's investigations into inherited retinal diseases to research participants.

MacHSR Future Leaders Fellowship awarded to **Dr Tim Chittleborough** (*Royal Melbourne Hospital*). The MacHSR Future Leader Fellowship program will support a select cadre of established front-line clinical staff to address practical healthcare problems through HSR training and solutions.

PhD student **Samuel Widodo** (*Royal Melbourne Hospital*) won first place and the Viewer's Choice awards at the University's Visualise Your Thesis competition. His presentation, Switching cancer-promoting macrophages to fight brain cancer, takes him to the international competitions.

See Samuel's winning video clip [here](#) or scan the QR



Dr Henry Badgery (*St Vincent's Hospital, Melbourne*) was awarded a Junior Doctor Research Grant by General Surgeons Australia which was established to support junior doctors progress or commence research in General Surgery.

Dr Amanda Nikolic (*St Vincent's Hospital, Melbourne*) was awarded a Royal Australian College of Surgery Herbert and Gloria Kees Research Scholarship, which supports the advancement of surgical research, technologies, techniques and treatments.

The 2022 Nick Christopher PhD Scholarship has been awarded to PhD Candidate, **Kelly Wu** (*Royal Melbourne Hospital*), supervised by Drs Hong Jian Zhu and Rodney Luwor). The Scholarship is awarded to the top ranked students to undertaking a PhD in our clinical departments and encourages local community engagement at Parkville.

A/Prof Alex Dobrovic (*Austin*) was recognised by Bio-Rad for his group's contributions using ddPCR for disease monitoring with plasma DNA in organ transplantation in the 2021-2022 Positive Droplet Awards.





Olympic athlete and DoS student Dr Elena Galiabovitch, one of six flag bearers to carry the Olympic flag at the 2020 Tokyo Summer Olympics

Representing surgery

Delayed by a year due to the pandemic, the 2020 Summer Olympic Games in Tokyo honoured six athletes who dedicated their time to support their communities. Dr Elena Galiabovitch, a Master of Surgery student based at Austin Health at the Department of Surgery, competed at the 2020 Tokyo Olympic Games as a member of the Australian Shooting Team and was one of the chosen flag bearers at the opening ceremony.

The selections for the Shooting Team that would represent Australia at the Tokyo2020 Olympics finished the weekend before our first nationwide lockdown.

With my surgical research having commenced and the quiet comfort of knowing I was to be named on this team, my life as well as everyone else's worldwide was soon turned upside down. Overnight the space inside my four walls became my new training facility, gymnasium, study, 'work from home' space and 'wind-down' area. The initial cancellation and then postponement of the games left me questioning my purpose and wondering what this meant for me in sport and professionally. I am sure many people would have shared in my experience of feeling lost with such uncertainty.

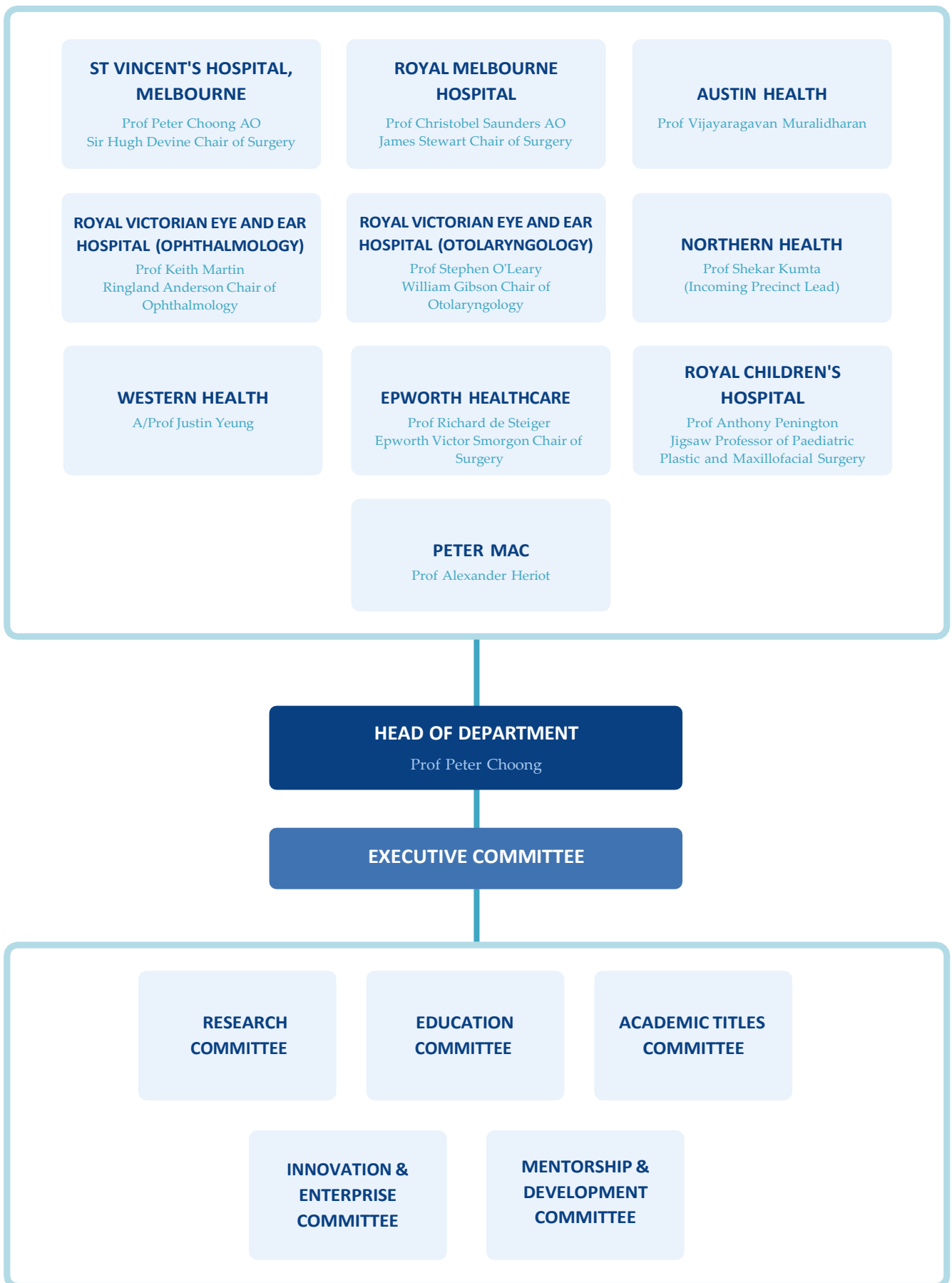
As weeks went by, I realised my values and goals at this time had not changed, but the way I was going to get there looked different. Research was new to me, but with time, patience and support of my supervisors, I made progress. Having to train completely at home was foreign but with the help of my coach and support staff we created appropriate training programs. With time, I found meaningful work some of which was COVID-related. I was constantly looking for avenues to improve my candidature for the Urology training program.

Preparing for an Olympic Games as a full-time researcher during a pandemic was exceptionally challenging largely due to isolation from the team environment, constant changes and little access to competition, both domestic and international in the lead-up. There was pressure to make the most of the extra time.

Managing this with my research, professional and work needs was a constant juggling act, ever changing with many balls dropped. I needed to sit in the discomfort and uncertainty but persevere anyway. There were many ups and downs and underlying level of stress due to the COVID pandemic but when I boarded that plane to Tokyo, before I even competed, I knew it was all worth it.

The journey, carrying the Olympic flag, and the competition were all an incredible life experience and opportunity for personal growth. I learned to be more present, enjoy the journey and appreciate where I am on that journey in any given moment; the destination is ever-changing. That also included enjoying and embracing the struggle. I learned to treat myself and not only others with compassion. We are often our own worst critics but a compassionate response is liberating. I learned that values can change, and that's okay, but if you truly stick to what they are in the present then you will never go wrong. I learned when I came home from Tokyo 2020 that burnout is real, I am not impervious to it, and that we all have to stop and smell the roses.

Lastly, I would like to draw attention to how important our teams and support networks are and how much I am grateful to and value all of mine. There is always a team behind the athlete, a team behind the doctor, a team behind the patient and a team behind the researcher. I would like to extend my thanks here specifically to my graduate research team in the Urology Department, and those who support me at the Austin Health Department of Surgery. I am not a typical student and my path is different, we all have different journeys and that is ok!



Governance

EXECUTIVE COMMITTEE

The executive committee is the University's leadership group in surgery. With leaders from each precinct reflecting our commitment to equity in leadership, we work strategically and collaboratively to raise the performance and achievements of our charges, and to learn from the needs and changing ethos of our communities, how to develop a more progressive view to the academic surgical program.

There are five committees chaired by members from the Executive and supported by members from our various clinical campuses. These committees are responsible for promotions and titles, career development and mentorship, teaching and training, research and research training, and innovation and enterprise.

By involving staff from each of the academic surgical departments, these committees aim to strengthen and nurture existing connections with our wider clinical campuses while also building newer links to further inform our activities. We are indebted to Ms Michelle Marcola who as the official Executive Assistant to the Committee, uses her many talents to support the various committee chairs, as well as assist the promotion of the activities of the Department through the Melbourne Medical School website.

Committee members



Prof Peter Choong
(Chair, Executive)
St Vincent's Hospital, Melbourne



Mr Alan Eddy
Department Manager, Surgery



Prof Michelle Dowsey
(Chair, Mentorship & Development)
St Vincent's Hospital, Melbourne



Prof Stephen O'Leary
(Chair, Academic Titles)
Otolaryngology



Dr Sudanthi Wijewickrema
Otolaryngology



Prof Keith Martin
(Chair, Innovation & Enterprise) Ophthalmology



Prof Robyn Guymmer
Ophthalmology



Prof Christobel Saunders
Royal Melbourne Hospital



Prof Alistair Royse
Royal Melbourne Hospital



Prof Alice Pébay
(Chair, Research)
Royal Melbourne Hospital



A/Prof Justin Yeung
(Chair, Education)
Western Health



Dr Fiona Reid
Western Health



Prof Vijayaragavan Muralidharan
Austin Health



Prof Debra Nestel
Austin Health



Prof Shekar Kumta
Northern Health



Prof Anthony Penington
Royal Children's Hospital



Prof Alexander Heriot
Peter MacCallum Cancer Centre



Dr Renu Eapen
Peter MacCallum Cancer Centre



Jasraaj Singh
(President/Rural Site Chair)
Surgical Students' Society of Melbourne



Nicholas Sclavos
(DoS Liaison Officer)
Surgical Students' Society of Melbourne

RESEARCH COMMITTEE

Currently chaired by Prof. Alice Pébay from the Royal Melbourne Hospital, the Research Committee advises the DoS Executive Committee on the development and translation of the Department's research strategy. The Committee manages the development and integration of the Department's knowledge exchange and impact strategy with its commitment to research excellence.

An integral part of the research framework is to augment the research pipeline, and to organise processes that provide our researchers with greater access and participation in research. These include the annual DoS Research Grant Scheme, which supports the work of interdisciplinary teams, and promotes innovation and ideas designed to tackle a translational problem linked to surgery. These grants encourage innovative science, promote high quality research, collaboration, mentorship and team diversity. Ultimately, this scheme aims to provide adequate support to enable subsequent submission for major grants from peak bodies such as MRFF and National Health and Medical Research Council (NHMRC).

The Committee organises the annual DoS Research Showcase, which promotes and encourages research activities within the department and beyond. The Committee also organises DoSTalks, a six-weekly webinar series aiming to bring our department together in the virtual space. Each webinar showcases the exceptional research conducted across our various sites, with a focus on gender equity, diversity and equitable representation.

Finally, in 2022, the Research Committee organised a Research Strategy day to develop a departmental research strategy that reflects and enables a united departmental vision for research.

2023 & BEYOND

The research committee will continue to provide input to the Department Executive Committee on a research strategy aiming at excellence and innovation in basic, clinical, and translational research. In practice, the Committee will continue to monitor research capacity and capability, identify gaps, and propose solutions to support excellence in research.

The Committee aims to strengthen a departmental culture that encourages research collaboration, bridging of fundamental, clinical and translational research, across disciplines and in which mentoring of early/mid-career researchers is central to the establishment and retention of excellence in research.

The main activities that will be undertaken by the committee for 2023 include:

- Administer the annual DoS Research Grant Scheme
- Organise the DoS Annual Showcase
- Continue to run the *DoSTalks* webinar series
- Explore how to support DoS researchers in grant writing

Committee members



Prof Alice Pébay
(Chair)
Royal Melbourne Hospital



Prof Michelle Dowsey
St Vincent's Hospital, Melbourne



A/Prof Claudia Di Bella
St Vincent's Hospital, Melbourne



Dr James Dimou
Royal Melbourne Hospital



Prof Vijayaragavan Muralidharan
Austin Health



Dr Christo Bester
Otolaryngology



A/Prof Marcos Perini
Austin Health



A/Prof Justin Tan
Western Health



Dr Russell Hodgson
Northern Health



Dr Samantha Bunzli
(Early Career Representative)
St Vincent's Hospital, Melbourne



Dr Carla Abbott
(Early Career Representative)
Ophthalmology



Siddharth Rele
(Student Representative)
St Vincent's Hospital, Melbourne

EDUCATION INNOVATION COMMITTEE

The Surgical Education Innovation Committee comprises a group of surgical clinicians from diverse clinical and teaching backgrounds. In addition to consultant surgeons, the committee also has representation from junior doctors, research scientists and members from the Surgical Students' Society of Melbourne (SSSM).

The committee fosters interest in surgery and develops initiatives that will help provide surgical education, training and mentorship to both undergraduate students and postgraduate clinicians. The committee is supporting the following initiatives:

- A campus-wide mentorship program linking undergraduate students with junior doctors has been extremely popular with medical students to identify mentors within their own precinct who can help with career progression skills.
- The Departments of Surgery and Anatomy Education are running the second *Innovation in Surgical Anatomy Prize* after an extremely positive inaugural competition with near 100 students attending the live virtual award ceremony. Shortlisted finalists who developed winning posters were asked to submit short educational videos for future student education. The resulting submissions were resoundingly impressive.

To see the posters, [visit here](#) or [see QR](#)



- A collection of short educational videos have been developed to prepare junior medical students for their first experience in surgery. These videos included tips by a panel of students, junior doctors and senior clinicians on how to 'tackle their first clinic experience', 'prepare for their theatre experience' and understand the 'surgical ward round'.
- Career development evenings to help students and junior doctors understand the wide and diverse surgical career choices that are available to them. These evenings also provide an opportunity for networking and identifying potential mentors.
- The *Pathway to a Surgical Career Progression* course remains a popular online course. Students have found it helpful in developing key skills required for their career, including knowledge of how to prepare for interviews, how to develop their CV and how to prepare for an oral presentation.
- As part of the new 2022 MD curriculum, the committee is developing new surgical experiences, which will ultimately support diversity within the student cohort.
- SSSM, with the support of the committee, has been producing their 'Time Out' podcast. With access to Australia's top surgeons, the podcast explores the busy lives of surgical consultants and registrars from various specialties.

Committee members



A/Prof Justin Yeung
(Chair)
Western Health



Prof Paul Baird
Ophthalmology



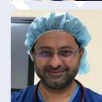
Dr Krinal Mori
Northern Health



Dr Thomas Edwards
Ophthalmology



Dr Sean Stevens
Austin Health



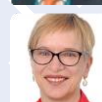
Dr Suhen Ahmed
Northern Health



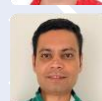
Prof Vijayaragavan Muralidharan
Austin Health



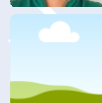
Dr James May
Royal Melbourne Hospital



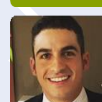
Dr Kirstie MacGill
Royal Children's Hospital



Dr Yasser Arafat
Western Health



Ms Emma Tully
Royal Melbourne Hospital



Nicholas Sclavos
(DoS Liaison Officer)
Surgical Students' Society of Melbourne

MENTORSHIP & DEVELOPMENT COMMITTEE

The vision of the Mentorship & Career Development Committee is to be recognised for promoting a dynamic, sustainable culture of mentorship.

Our mission is to equip clinicians for academic success by offering meaningful mentoring expertise and career development support and resources.

Our focus for 2022 is to establish and grow a Mentorship Program for academic promotion driven by the needs of the program participants and built on a foundation of reciprocity. The program will aim to foster a culture of inclusive excellence by actively promoting and supporting diversity, inclusion and equity in all its forms to expand and enrich our work and elevate the careers of our staff and students.

For more information on this initiative, read more about Surgical Mentor under the Academic Networks section.

INNOVATION & ENTERPRISE COMMITTEE

Recently established, the Innovation & Enterprise Committee encourages DoS researchers to think, where appropriate, about the possible commercialisation of their research at an early stage to help maximise the real-world impact of their work.

The Committee aims to do this through a combination of 'in-house' informal advice from those with relevant experience and by providing guidance towards appropriate University resources as required. The Committee can help with questions such as where to get the initial seed funding to push an idea along and how best to pitch your technology to investors.

The Innovation & Enterprise Committee also hopes to offer DoS researchers an opportunity to gain advice on how to navigate the labyrinth of intellectual property protection and think about spin-off technology companies and business development. The Committee will look to offer teams successful in departmental research competitions the chance to pitch their idea to the committee and hopefully gain some useful feedback. The Committee will also be offering a series of talks and panel discussions at upcoming DoS meetings.

Committee members



Prof Michelle Dowsey
(Chair)
St Vincent's Hospital, Melbourne



Prof Debra Nestel
Austin Health



Prof Anthony Penington
Royal Children's Hospital



Dr Fiona Reid
Western Health



A/Prof Lih-Ming Wong
St Vincent's Hospital, Melbourne



Dr Sina Babazadeh
St Vincent's Hospital, Melbourne



Dr Eunice Lee
Austin Health



A/Prof Iean-Marc Gerard
Otolaryngology



Prof Peter Choong
St Vincent's Hospital, Melbourne



Mr Siddharth Rele
Student representative

Committee members



Professor Keith Martin
(Chair)
Ophthalmology



A/Prof Claudia Di Bella
St Vincent's Hospital



Dr James Dimou
Royal Melbourne Hospital



A/Prof Andrew Morokoff
Royal Melbourne Hospital



Prof Stephen O'Leary
Otolaryngology



A/Prof Raymond Wong
Ophthalmology

ACADEMIC TITLES COMMITTEE

The remit for the Academic Titles Committee relates to both new and renewal appointments for honoraries and paid promotions at levels D and E.

The completed documentation (together with a letter of support from the relevant precinct lead) are reviewed by the committee to ensure that a consistency and rigor (in the appointments criteria) is applied across the entire Department for the appointment and re-appointment of academic surgeons. Advice is given to applicants as to whether they are ready for promotion and how to improve their track record if they are not. Committee recommendations to proceed with an application are taken forward by the Head of Department to the faculty for their deliberation.

Committee members



Prof Stephen O'Leary
(Chair)
Otolaryngology



Prof Kate Drummond
Royal Melbourne Hospital



Prof Anthony Penington
Royal Children's Hospital



Prof Alistair Royse
Royal Melbourne Hospital



Prof Robyn Guymer
Ophthalmology

Teaching and Learning

The Department of Surgery (DoS) is based across the seven precincts of Melbourne Medical School – all at key hospital sites – as well as conducting academic activities in surgery at other hospitals. The Department has a strong emphasis on teaching and research, with educational research gaining increasing importance within the departmental philosophy. The distinctive ‘Melbourne Model’ at the University offers degrees in three broad cycles.

Bachelor level

At the bachelor level, students select from one of six broad degrees (offering a total of 87 major fields of study) and a limited number of specialist offerings.

Masters level

Most professional qualifications are subsequently offered at masters level, where students can choose from a variety of professional or specialist graduate programs, offering intensive graduate-level experiences that promote deep professional learning.

Doctoral level

At the doctoral level, students work alongside and are nurtured by international research leaders in a broad range of fields. DoS is a proud host to the first cohort of MD candidates with many more to come – a clear indicator of the growing demand for academic development.

The Melbourne Model’s curriculum combines academic breadth with disciplinary depth to strategically reposition the University in an increasingly globalised higher education framework. The University prepares its students to enter a world marked by rapid change, where graduates must possess the applicable knowledge, and flexible and adaptable skills, to succeed.

DoS offers a suite of graduate programs in surgery and surgical education up to master’s level, and also regularly hosts students for research training on exchange from other Australian and international universities.

There is a vibrant and highly productive research community within the University and more specifically in the Faculty of Medicine, Dentistry and Health Sciences and its partner institutions. This provides tremendous scope and opportunity to develop multidisciplinary collaborations ranging from basic science discovery, clinical epidemiology and hospital services research to health economics, translational research, device and med-tech development.

COVID-19 research

2021 continues to be dominated by society's response to COVID-19. While the academic work of our various groups has continued, the Department of Surgery continues to contribute to the COVID-19 response.

COVIDSURG

CovidSurg is a platform of studies aiming to explore the impact of COVID-19 in surgical patients and services. The studies are designed and delivered by an international collaboration of surgeons and anaesthetists which reach more than 80 countries that funnel into the Global Surgical Unit (GSU).

Beginning with the first COVIDSurg study in 2020, the global collaborative investigated how surgery was adapting to the fast-evolving environment. Patients diagnosed with COVID-19 who need surgery are a challenging group. Capturing real-world data and sharing international experience, clinicians and researchers came together in 2020 to share their management experience of this complex group of patients who need to undergo surgery throughout the COVID-19 pandemic, to improve their clinical care.

Studies are still ongoing, but numerous publications have already been published. Most importantly, with the data contributed globally (including from all DoS Precincts), CovidSurg Patient Information Booklets in multiple languages have been created to help patients and their families understand the risks of having an operation during the COVID-19 pandemic - a fantastic example of rapid research translation for global practice.

COVIDSURG-3

The Omicron SARS-CoV-2 variant was first reported in 25 November 2021 and has rapidly spread worldwide. Evidence indicates that Omicron has increased transmissibility and the potential to evade immunity, but there is little robust evidence regarding disease severity associated with Omicron in both vaccinated and unvaccinated patients (including in surgical patients), nor is there data to guide patient risk stratification during Omicron COVID-19 waves.

CovidSurg has provided the best available evidence to guide delivery of safe surgery during the pandemic. With the arrival of Omicron, it is clear that there is a need for renewed rapid data collection to guide global practice in 2022 onwards. COVIDSurg-3, the latest study from the COVIDSurg Collaborative, builds on the original call-out and seeks information for two components:

- Patient-level component: Collection of outcome data for patients with peri-operative SARS-CoV-2.
- Hospital-level component: Collection of aggregated case-mix data.

To play our part, the Department of Surgery in various Precincts have been renewing the hospital and patient level data in 2022 to match the evolving environment.

Find out more, [visit here](#) or see QR



VICTORIA'S PERIOPERATIVE EXPERIENCE

A special article published in the ANZ Journal of Surgery in mid-2020 by the members of Victoria's Perioperative Working Group, Consultative Council and Victorian Surgical Directors Group - groups that many of our DoS members participate in - summarised Victoria's experience of the pandemic in surgery.

Faced with limited resources in early March 2020, including sufficiently and appropriately trained medical and nursing staff, mechanical ventilators, intensive care unit beds and the correct personal protective equipment (PPE), the perspective described what was effective, the principles that were followed and what was learnt to help respond to surges or similar future pandemics.

Read on for an excerpt of the lessons learnt.

"Victoria has learned how to respond to an epidemic and to engage the whole health sector in providing rapid and expert advice. It took 2 weeks in mid- to late-March to form the perioperative and other representative advisory groups, which could review evidence, provide expert advice rapidly, often within a few days, and also adjust that same advice as circumstances changed. Consultation within and across specialties enabled a cohesive, collective and collaborative approach. Online video conferencing was remarkably effective for meetings, enabling high attendance rates without travel and ensuring social distancing of health service leaders.

"We have also learned how to cohort hospitals or parts of hospitals, and to shift the more urgent elective surgery to private hospitals. There is a potential for greater collaboration between the public and private sectors in the future, particularly as we face a backlog of elective surgery, as well as for health services within newly established regional and metropolitan partnership clusters.

"We also know much more about PPE, and when droplet/contact or aerosol/contact precautions are required. Initially, PPE guidelines were inconsistent and/or their interpretation led to confusion, frustration, fear and at times anger amongst medical staff. It was the Directors' group, aligned with advice from the colleges, and a multidisciplinary PPE taskforce that enabled Victorian health services to achieve a consistent approach to PPE by late April.

"Experiencing the winding back, definition of what constitutes essential, and staged restoration of surgery, clinicians tend to look to their respective colleges for guidance. The colleges were certainly pro-active, effective and timely with their advice to government as well as having established helpful information hubs for the many specialty society guidelines on their websites. Australian and New Zealand specialty societies should be proud of their contributions throughout the pandemic, and for Victoria, these certainly contributed towards achieving consensus.

"The response to COVID-19 has involved considerable public and private sector collaboration at many levels, much unprecedented, but now something that will always be easier to re-enact in the future. Victoria was fortunate to have already established a multidisciplinary perioperative council that represented all perioperative specialties and could provide un-silo-ed opinion. Thus, we were able to achieve consensus as to priorities, opportunities and challenges. We could also break out into splinter groups to discuss a specific topic and then consult with a larger group (such as the Directors) to ensure any recommendations would be achievable and acceptable.

"There will be opportunities for health service reform as we live with COVID-19. We will likely change models of outpatient consultation, particularly for triage or review so as to embrace telehealth more enthusiastically in the future, whilst being aware of which patients really need to be seen and examined face to face. We hope to improve access to care by utilising spare capacity through partnerships within regions and between public and private hospitals. In this respect, COVID-19 may have had a positive effect on patient experience and outcomes. In early March, perioperative care faced an uncertain future. What has been achieved represents an impressive cohesive response by the whole health sector, including its surgical, anaesthesia and nursing perioperative teams."

To read the full perspective, [visit here](#) or see QR



Professor Vicki Anderson

Children with chronic health conditions are known to demonstrate elevated levels of mental health problems, which may be magnified by stressors such as the COVID-19 pandemic. To understand how such children and their families adjust to such an experience, Prof Vicki Anderson is investigating:

- How children’s activities changed
- Whether their healthcare needs were being met
- The impact of the COVID-19 pandemic on mental health symptoms
- Sources of stress for families
- The mental health status of parents of children with a range of chronic health conditions.

While not traditionally considered ‘a chronic health condition’, children born with a cleft of the lip and/or palate (CL/P) not only engage in multiple hospital and community clinical services from birth through to adulthood but are known to be vulnerable to a range of psychosocial outcomes. To widen the scope of the study, A/Prof Nicky Kilpatrick, the Clinical Lead of the Royal Children’s Hospital Cleft Service, has been leading the CL/P arm of the COVID Resilience Project and the findings have been published in a preprint at *Medrxiv*.

The study is identifying more vulnerable individuals within the cleft service and providing insights for future service improvement.

To read about the study, [visit here](#) or see QR

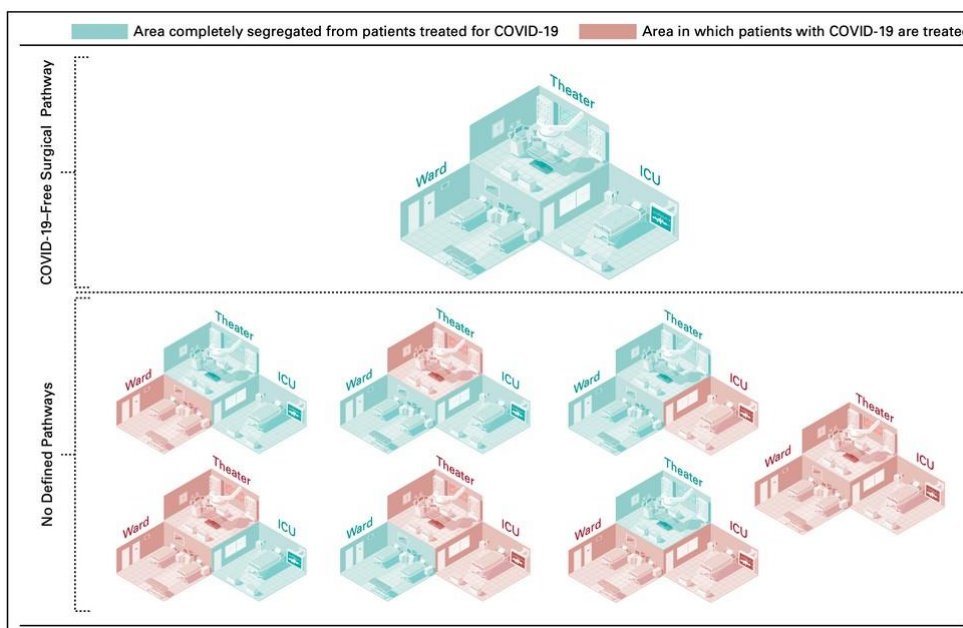


As cancer surgery restarts after the first COVID-19 wave, health care providers urgently require data to determine where elective surgery is best performed. In a report published in the *Journal of Clinical Oncology*, the authors utilised CovidSurg data to determine whether COVID-19-free surgical pathways were associated with lower postoperative pulmonary complication rates compared with hospitals with no defined pathway.

Of 9,171 patients from 447 hospitals in 55 countries, 2,481 were operated on in COVID-19-free surgical pathways. Patients who underwent surgery within COVID-19-free surgical pathways were younger with fewer comorbidities than those in hospitals with no defined pathway but with similar proportions of major surgery. After adjustment, pulmonary complication rates were lower with COVID-19-free surgical pathways. The authors saw that the rate of SARS-CoV-2 infection was consistently lower in COVID-19-free surgical pathways, SARS-CoV-2 infection was associated with a very high rate of pulmonary complications and that the effectiveness of COVID-19-free surgical pathways was most beneficial in high SARS-CoV-2 incidence areas.

The study indicates that where possible given the resources that are available, health providers should prevent harm by investing in dedicated COVID-19-free surgical pathways by reorganising hospital services as this carries significant costs for providers, patients and the community.

To read about the study, [visit here](#) or see QR



Differences between hospitals with a coronavirus disease 2019 (COVID-19)-free surgical pathway and hospitals with no defined pathway. Glasbey, 2021. Elective Cancer Surgery in COVID-19-Free Surgical Pathways During the SARS-CoV-2 Pandemic: An International, Multicenter, Comparative Cohort Study. J Clin Oncol.



St Vincent's Hospital, Melbourne

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MESSAGE

PROF PETER CHOONG AO

SIR HUGH DEVINE CHAIR OF SURGERY

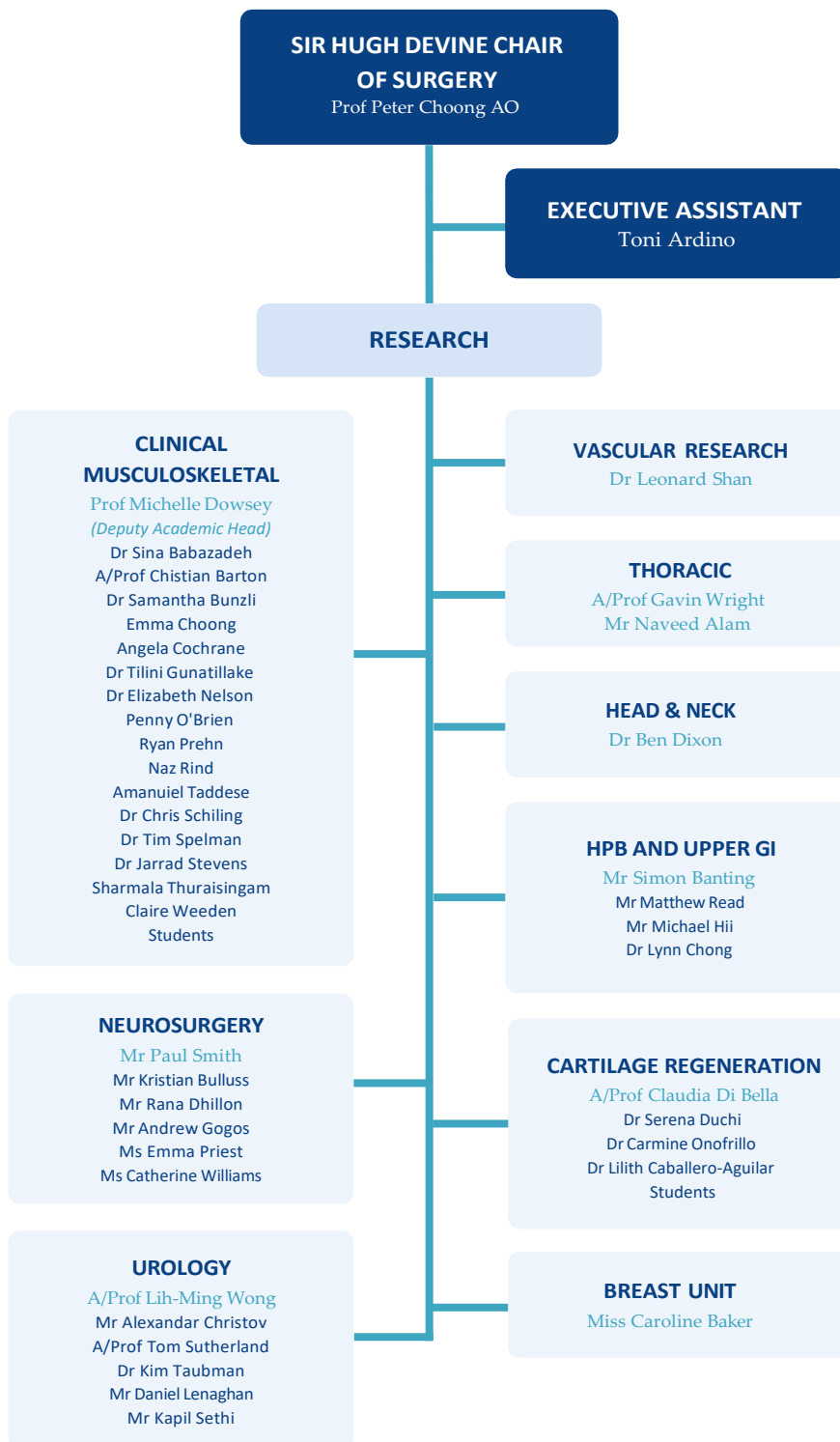
Over the last year there has been a growth in clinical research with keen engagement of more surgical specialties than before. Closer ties with clinical units at St Vincent's through the St. Vincent's Academy of Surgery, has seen a rise in student research, and PhD applications amongst residents and surgeons. One contributing feature has been the strong collaboration between units arising from the *CovidSurg* collaborative, which has seen our surgeons and researchers co-author several major publications. Through the hard work of our St. Vincent's Surgical Student Society and the St. Vincent's Pre-SET Society, teaching, training and research has grown to the benefit of all. The DOS Annual Surgical Forum was a testament to the achievement of the wider department of surgery at St. Vincent's with all units demonstrating their strong commitment to research.

This year we celebrated the promotion of Michelle Dowsey to Full Professor (Level E) and Lih-Ming Wong to Associate Professor (Level D) as well as many new staff to lecturer and senior lecturer positions. We are also delighted to have been awarded numerous competitive grants to continue our interdisciplinary work.

The surgical community at St. Vincent's has continued to support the medical students programme and from this has built a large body of investigatory work that highlights the connection between research and service delivery. Home to the first MD-PhD students, St. Vincent's continues to pioneer and help shape the Melbourne Medical School curriculum.



PRECINCT ORGANISATION



Key staff

Prof Peter Choong AO
Sir Hugh Devine Chair of Surgery

Toni Ardino
Executive Assistant

Cheryl Augustine
A/Prof Christian Barton
Dr Samantha Bunzli
Dr Lilith Caballero-Aguilar
Angela Cochrane
A/Prof Claudia Di Bella
Prof Michelle Dowsey
Dr Serena Duchi
Dr Michelle Lam
Dr Elizabeth Nelson
Penny O'Brien
Dr Carmine Onofrillo
Lauren Patten
Ryan Prehn
Veronique Price
Naz Rind
Dr Chris Schilling
Dr Timothy Spelman
Amanuiel Taddese
Sharmala Thuraisingam
Claire Weeden
Dr Cynthia Wong
A/Prof Lih-Ming Wong

 **332**
publications

 **15**
successful grants

 **4**
Fellowships and
Scholarships

 **\$7.82m**
total grant funding

 **24**
research staff

 **24**
research students

RESEARCH @ ST VINCENT'S

The Department of Surgery at St Vincent's Hospital, Melbourne has broad and diverse areas of interest in basic science, clinical research, and education. The Department has been at the forefront of research and education by employing new technology and a multidisciplinary approach to address the changing needs of the community.

There is a strong focus on translating basic research into practical health outcomes with implementation research to align with the Hospital's strategic focus:

1. Foster the development and retention of academic clinicians to drive clinical research and practice innovation
2. Drive translational research through engagement and alignment with precinct partners
3. Grow Clinical Trials capacity and participation
4. Employ developments in digital health and bioinformatics to improve care and drive Health Services and Implementation research
5. Support Indigenous Health

CLINICAL MUSCULOSKELETAL RESEARCH ANTIBIOTICS AFTER SURGERY

Dr Jarrad Stevens

Dr Jarrad Stevens is looking to understand the prescribing patterns and characteristic of patients who receive antibiotics following total hip and knee replacement by studying the month-to-month prevalence of antibiotic dispensation over the first 12 months post-operation.

Using cross-sectional data from the St Vincent's Melbourne Arthroplasty Outcomes (SMART) Registry, which is linked to prescribing data from the Australian Pharmaceutical Benefits Scheme (PBS), 4836 total hip and knee arthroplasties were analysed.

The study found that patients with poor pre-operative health status were more likely to have antibiotics dispensed in the month following THA or TKA. Factors such as older age, undergoing a TKA rather than THA, obesity and undergoing surgery for inflammatory arthritis, were associated with increased antibiotic dispensation in the 30 days following surgery.

These findings highlight the need to appropriately identify candidates for targeted surgeon follow-up care, so that best-practice antibiotic stewardship and early detection of deep infections can occur.

CLINICAL MUSCULOSKELETAL RESEARCH OPUS

Profs Michelle Dowsey and Peter Choong

The Clinical Musculoskeletal Research group at St Vincent's is focused on improving patient outcomes after joint replacement. The clinical research has been supported by a NHMRC Centre for Research Excellence in Total Joint Replacement (OPUS) and aims to improve patient outcomes for those who experience severe osteoarthritis (OA).

The Centre addresses 5 critical research pillars with a unique multidisciplinary collaboration of surgeons, health economists, statisticians, general practitioners and physiotherapists and more:

Stream 1: Identifying the most appropriate patients for surgery.

Drawing on the power of big data we are developing prediction tools that health practitioners can use to guide the best patients for surgery and alternative non-surgical solutions.

Stream 2: Aligning patient and surgeon expectations.

Meeting patient and surgeon expectations and identifying what risks are acceptable for both groups is an important part of surgical success and satisfaction.

Stream 3: Developing non-surgical alternatives.

Our teams are developing novel solutions which combine mind and body therapies to allow patients to regain control over their symptoms and to realistically adjust to their limitations.

Stream 4: Redesigning a recovery program from surgery.

The post-operative journey of our patients can be optimised and refined for efficiency and effectiveness. We are exploring the multidisciplinary nature of hospital services and using this to inform the refinement of early recovery after surgery programs.

Stream 5: Eliminating waste and identifying cost effectiveness.

Using microsimulation models, we are looking at ways to cut costs to patients and the healthcare system while driving meaningful change.

As the Centre has grown, so has the depth and scope of the research to cover numerous critical unmet needs: Aboriginal healthcare movement, qualitative research education, a burgeoning consumer involvement program and an academic support network that fosters student development.

Head to OPUS for more information: [visit here or see QR](#)



OPUS



OPUS: Centre for Research Excellence in Total Joint Replacement

CLINICAL MUSCULOSKELETAL RESEARCH SMART CHOICES

Dr Chris Schilling and Prof Michelle Dowsey

Up to 20% of patients who have had knee replacement surgery feel unsatisfied with their result. Predictive modelling may help to identify these patients before surgery. However, most predictive tools available are developed for clinicians, not the patient, which can lead to limitations in how predictive tools are used.

The purpose of this project is to develop a predictive tool for patients considering having knee replacement surgery. The tool, named *SMARTChoice*, aims to predict improvement in health state after surgery. As a patient-focused tool, predictors will be limited to those a patient can input without a clinician. However, the tool can be used by clinicians with patients during their consultations, making it extremely powerful in guiding both clinicians and patients to the most appropriate treatment strategy.

SMARTChoice has been developed and integrated onto a web platform and the objective is to evaluate its performance using a mixed-methods approach to understand: its effect on patient willingness for surgery, the economic and value contribution of the tool in the health system, and the qualitative features of the tool that may or may not improve patient experience.

As a predictive tool, *SMARTChoice* will need to influence patient decision-making positively by offering additional information to help patients make better quality decisions. Over 400 patients will be recruited from across Australia for a randomised controlled trial. To date, the study has recruited just over 200 participants with follow-up planned at 6 months. The secondary outcomes that will arise from this study are indications of the best time to use the predictive tool (early or late in the knee replacement journey), decision quality, and overall outcomes for participants who end up with knee surgery.

The SmartChoice team

CLINICAL MUSCULOSKELETAL RESEARCH BARIATRIC SURGERY

Profs Michelle Dowsey and Peter Choong

A collaboration with Monash University has resulted in a publication in *JAMA Network* and outstanding media coverage. Prof Michelle Dowsey led the research linking arthroplasty outcomes with those undergoing bariatric surgery.

People with severe obesity who undergo a total knee arthroplasty (TKA) for osteoarthritis (OA) are at higher risk of short-term and long-term complications compared to people with lower BMI. It is known that post-operative outcomes are inferior in patients with severe obesity compared to patients that lie within the reference weight range. However, there is no evidence that indicate benefits for treating obesity before TKA. This study examines whether substantial weight loss, via bariatric surgery prior to TKA, may reduce the incidence of post-operative complications.

The findings indicated that people with severe obesity and knee OA should lose weight before considering TKA to reduce the chance of complications during surgery. A subsequent observation was that weight loss strategies alone may help defer, or even avoid, TKA in some patients. This observation supported prior studies that found a positive association between losing weight and changes to joint pain and functional improvement with some patients deferring TKA.

Watch the news story: [visit here](#) or see QR



To learn more about *SMARTChoice*: [visit here](#) or see QR



CLINICAL MUSCULOSKELETAL RESEARCH CONSUMER AND COMMUNITY INVOLVEMENT

Dr Elizabeth Nelson and Marion Glanville Hearst

OPUS recognises that within the area of orthopaedic research in Victoria, there are no formal programs through which researchers can incorporate consumer experiences into research project design and implementation.

OPUS has established a formal Consumer and Community Involvement Program to guide the research conducted at the research centre. The program works at the ground level by embedding interested participants early in the research cycle, which ensures that our research outcomes match community expectations and maintain relevance. Equally, consumers benefit from this program by personally expanding their knowledge of the subject matter, building community awareness, and advocating for research into key OA issues.

From a cohort of 11 in 2021, OPUS has now expanded its consumer cohort to 24 participants in 2022 in partnership with Musculoskeletal Australia. Participants are enrolled into the program and can choose to participate in a pool of research activities that are classified into Tiers depending on the level of involvement required. The higher the Tier, the more involvement required. After carefully developing the framework, the structured program has begun embedding consumer participants into student research projects within OPUS successfully.

To find out more: [visit here](#) or see QR



CLINICAL MUSCULOSKELETAL RESEARCH DEVICE INFECTIONS

Dr Sina Babazadeh

The Orthopaedic Device Infection Network (ODIN) is an international collaboration between centres specialising in the management of prosthetic joint infections (PJIs). This collaboration, led by Dr Sina Babazadeh, began in the Melbourne and has since expanded to include major centres in North America, Europe and Asia.

The aim of the collaboration is to better understand, prevent, diagnose and manage PJIs through multi-centred data. To achieve its aims, ODIN has established a comprehensive international registry of PJIs. Data from this registry will be able to help answer questions that require large datasets, including how best to manage PJIs and the long-term outcomes of PJIs.

CLINICAL MUSCULOSKELETAL RESEARCH THE POWER OF QUALITATIVE RESEARCH

Dr Samantha Bunzli and Penny O'Brien

A qualitative skills gap exists in the field of orthopaedics on a national and international scale. To address this, Dr Samantha Bunzli has spearheaded a short course in qualitative research skills geared towards clinicians.

Qualitative research explores the reasons, opinions and motivations for the way people behave and is a necessary core component of implementation trials. It is central to understanding why promising interventions do not always work in the real world, and how researchers can design, test and implement interventions that do.

Trialled in 2020 within OPUS, Dr Bunzli and her team expanded the initial half-day session in 2021 into a three-day short course that introduces beginners to the world of qualitative research. The course has run again in 2022 with positive reviews from an increasingly diverse cohort.

The Short Course is composed of two parts:

- Part I: An introduction to qualitative research covering qualitative research theoretical concepts, methodological approaches and skill-based learning.
- Part II: Qualitative research in practice – participants workshop their own qualitative study with the opportunity for peer review and expert feedback.

Designed for those who have/will have a clinical research background and conducted over Zoom, these classes are a mix of pre-class reading preparation, presentation slides, case studies, group activities and a chance to workshop your own projects. Classes are kept small (below 14 students) to allow for better knowledge exchange and opportunities to participate. This also enables the optional Part II to be tailored specific to each student's needs.

More classes will be scheduled on the OPUS website below.

To find out more: [visit here](#) or see QR



EQUITABLE HEALTH CARE

Penny O'Brien, Dr Samantha Bunzli, Profs Michelle Dowsey and Peter Choong

This research program aims to understand the OA needs of Victorian Aboriginal and Torres Strait Islander communities (respectfully 'Aboriginal Australians'). OA disproportionately affects Aboriginal Australians more than non-Aboriginal Australians and they are less likely to seek care. Quality, appropriate OA knowledge and care has been identified as a contributing factor in other regions of Australia. By reaching out to partner Aboriginal organisations, ECCO is beginning to understand the landscape and meet the needs of Aboriginal Australians by formulating culturally secure resources with community members.

The ECCO team has grown in size and scope with projects to:

- Understand the needs of Aboriginal Australians
- Develop the appropriate resources and tools with the support and guidance of our community reference groups
- Implement these resources and tools to guide patients through the OA management journey.

UNDERSTANDING COMMUNITY NEEDS

To develop appropriate material that will inform Aboriginal Australians about their health, the ECCO team is exploring the OA information needs and beliefs in Aboriginal Australians who have been diagnosed with conditions commonly coexisting with OA e.g. diabetes or cardiovascular disease.

If we can better understand the beliefs of Aboriginal patients, we can also understand the ways of coping with joint pain and OA. Reaching out to the Aboriginal community to understand their perspective is an important step towards changing the way people think about OA and its management.

DEVELOPING RESOURCES

Led by PhD candidate and Ngiyampaa woman Brooke Conley, this project focuses on culturally adapting health resources for Aboriginal communities.

A protocol paper describing how the team will construct appropriate resources has been accepted for publication and Brooke is currently writing a systematic review of the clinical guidelines for osteoarthritis, rheumatoid arthritis, lupus and gout. The review explores the guidelines currently used by clinics around Australia, identifies the knowledge gaps and suggests how to adapt the information appropriately for diverse communities. The research from this review will form the basis for the development of material to be used in clinics.

BUILDING CONNECTIONS

OPUS is committed to working with the Aboriginal community and providing equitable and culturally secure OA care for all Aboriginal and Torres Strait Islanders.

Over the years, ECCO has diversified and strengthened community partnerships:

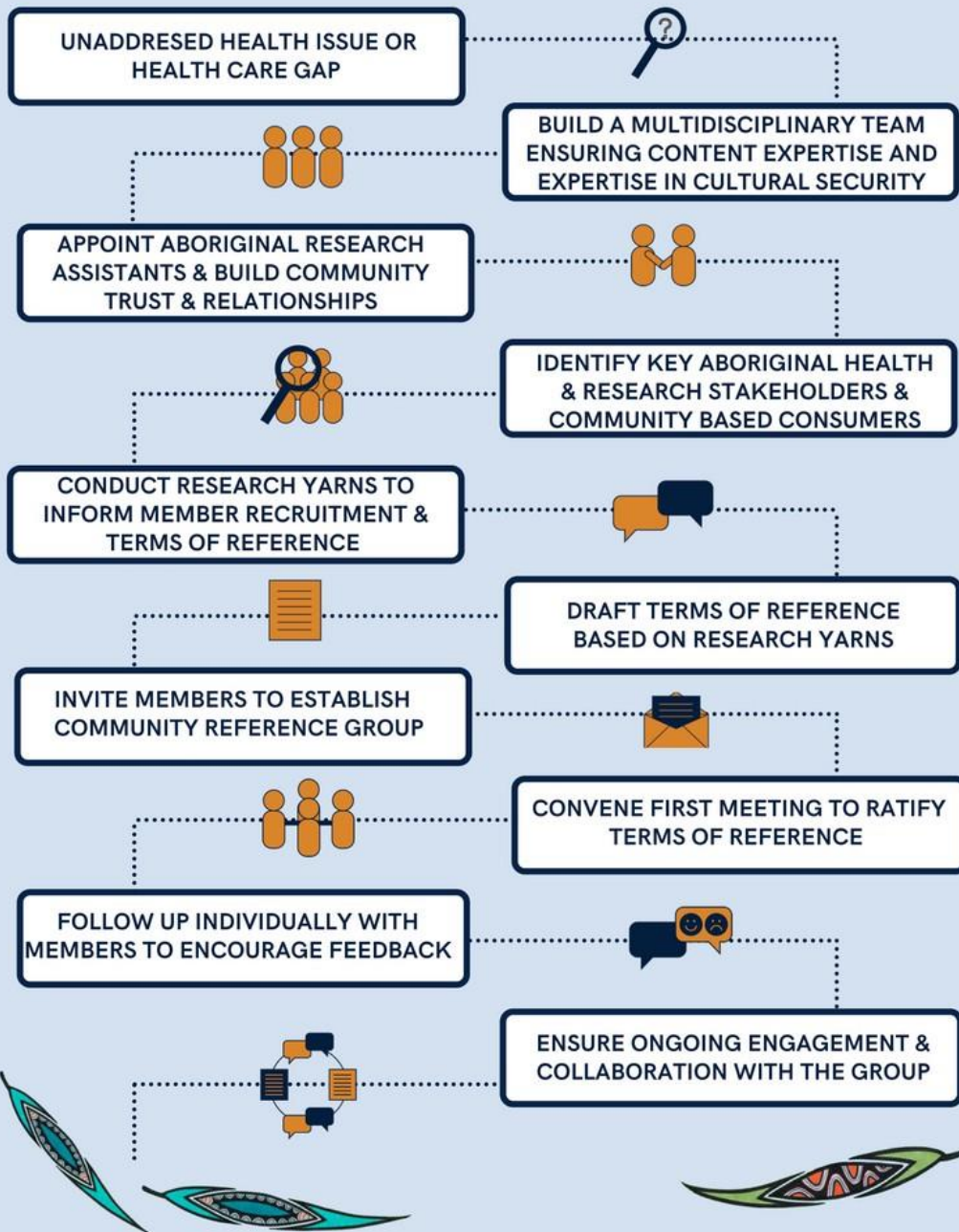
- Victorian Aboriginal Health Service (VAHS)
- Victorian Aboriginal Community Controlled Health Organisation (VACCHO)
- Rumbalara Aboriginal Co-operative
- Hands on Health Australia
- Gippsland and East Gippsland Aboriginal Co-operative
- Seymour Health
- Aboriginal Health Unit, St Vincent's Hospital Melbourne
- Lowitja Institute

A Community Reference Group (CRG) was established in 2021 where members with a range of expertise and experience shaped an appropriate framework to guide the development process of ECCO initiatives and facilitate knowledge translation through their networks.

To learn more about ECCO: [visit here](#) or see [QR](#)



FRAMEWORK FOR ESTABLISHING A COMMUNITY REFERENCE GROUP IN ABORIGINAL HEALTH RESEARCH



Mick Harding - Ngarradjarranun
Gorong Darrang - Healing Scar Tree



Enhancing Equity, Collaboration and Culturally Secure Osteoarthritis Care for Aboriginal Australians

Penny O'Brien et al., Addressing surgical inequity for Aboriginal and Torres Strait Islander people in Australia's universal health care system – A call to action. ANZ J Surgery. 2021

REMOD

REGENERATIVE ENGINEERING
AND MODELLING OF OSTEOCHONDRAL DISEASE GROUP



REMOD: Regenerative Engineering and Modelling of Osteochondral Diseases

REGENERATIVE ENGINEERING AND MODELLING OF OSTEOCHONDRAL DISEASES (REMOD)

A/Prof Claudia Di Bella and Prof Peter Choong

The REMOD research team is a multidisciplinary group aiming to develop therapeutic strategies for the treatment of osteochondral diseases using advanced manufacturing technologies. The multidisciplinary team consists of orthopaedic surgeons (Prof Peter Choong and A/Prof Claudia di Bella), biologists (Dr Serena Duchi and Dr Carmine Onofrillo), material scientists (Dr Cathal O'Connell), chemical engineers (Dr Lilith Caballero Aguilar) and junior biomedical engineers (Stephanie Doyle, Anna Trengove and Wiktor Zywicki).

REMOD is focused on two main areas of interest: the application of 3D bioprinting for the development of implantable solutions to regenerate cartilage and bone after injuries or tumour resection, and the fabrication of 3D biological models to mimic the behaviour of osteosarcoma tumour cells in a physiological manner to test a patient's specific treatments.

Over the years the REMOD team has built strong collaborations with The University of Melbourne, University of Wollongong, Swinburne University and RMIT in Australia as well as international collaborations with the Rizzoli Orthopaedic Institute, University of Bologna (Italy) and the Houston Methodist Hospital (Texas, USA).

REMOD

THE AXCELDA SUITE

A/Prof Claudia Di Bella and Prof Peter Choong

The Department partnered with the University of Wollongong and Swinburne University to create an industrial partnership called *Axcelda*.

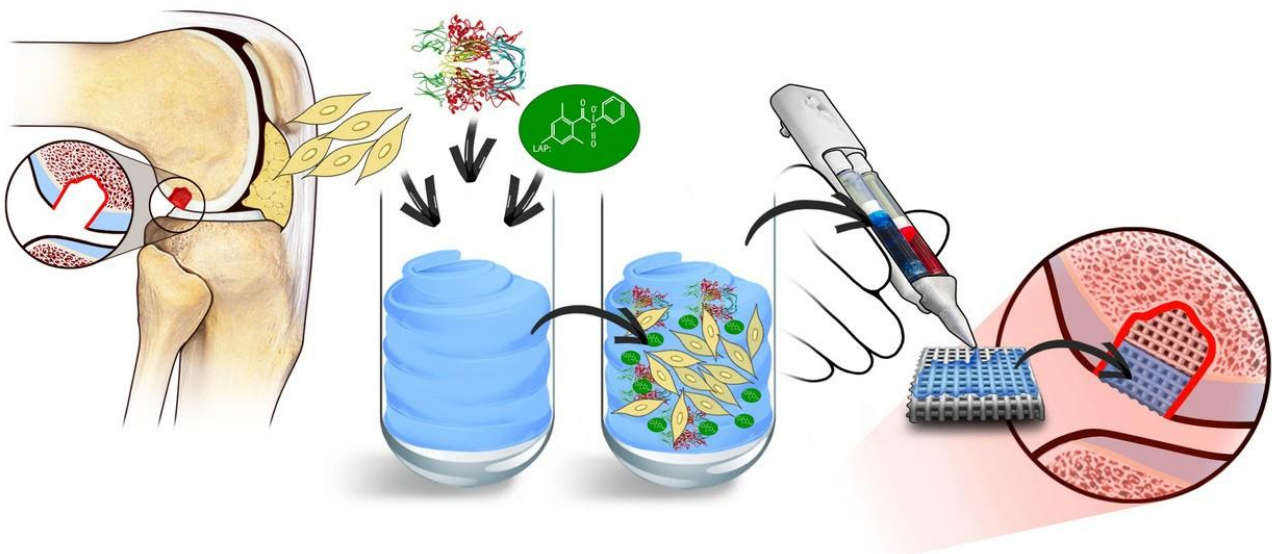
The REMOD team, working within the Axcelda umbrella, are developing a suite of technologies to repair joint injuries. The technology centres around the ability to quickly isolate stem cells from a patient undergoing surgery (AxceldaQjk™), combining the cells with a proprietary biomaterial scaffold (AxceldaInk™) and then printing the scaffold mixture using a hand-held device (AxceldaPen™) directly into the site of injury.

The combination of stem cell technology, engineering and surgical innovation promises to simplify surgery through a one-off surgical procedure with the capacity to bank cells for future use (AxceldaLab™) if repeat surgery is required.

The research supported by BioMedTechHorizon-MTPConnect funds led to the publication of the international patent "Cell Harvest Method" (WO/2021/237295), and to the provisional application "Novel Polymer" (2021903886).

The research has also been supported by the Medical Research Future Fund and National Health and Medical Research Centre.

Combining the latest in 3D printing and bioengineering, the REMOD team are hoping to 3D print bioscaffolds specific to each patient's site of injury. The scaffold is covered in a specially formulated hydrogel matrix loaded with stem cells and growth factors before implantation.



REMOD

AXCELDANK

Drs Serena Duchi and Carmine Onofrillo

Repairing human knee cartilage is difficult: injuries or just regular wear and tear can cause lasting damage to the knee, which ultimately lead to painful osteoarthritis.

The team, led by Drs Carmine Onofrillo and Dr Serena Duchi, have been working with TRICEP (Translational Research Initiative for Cellular Engineering and Printing), Australia's leading biofabrication facility, to formulate implantable gels (the basis for the *AxcelDank*) loaded with stem cells to kick start cartilage repair at an early stage before osteoarthritis symptoms escalate.

Just like any big reno job, building new cartilage requires both construction and destruction. While stem cells are building new cartilage in situ, the soluble gel must also safely break down to leave a cellular matrix that adapts to the surrounding tissue. Drs Onofrillo and Duchi have developed a non-invasive process that monitors the breakdown of the hydrogel used to deliver the delicate stem cells at the site of injury, while new cartilage is forming.

The team used fluorescent markers mixed into their proprietary Gelatin-methacryloyl (GelMA) hydrogel to track the behaviour of GelMA as it breaks down in the body. In different models and in varying gel concentrations, the FLASH (Flourescently LABelled Sensitive Hydrogel) signal was detected amongst the generation of new matrix and the release of fluorophore, the fluorescent marker, from the bioscaffold gel was monitored over time as an indication of gel degradation.

Notably, the team reported that the formation of a new cartilage extracellular matrix accelerated gel degradation and fluorophore release. It is clear that FLASH offers a solid method to assess how the stem cell gel is performing after implantation in real-time and maybe suitable as a contactless high-throughput assessment of chondrogenesis.

To read about the study, [visit here](#) or see QR



REMOD

PRINTING BETWEEN THE LINES

Drs Cathal O'Connell, Serena Duchi and Carmine Onofrillo

The REMOD team have flipped traditional 3D printing to create some of the most intricate biomedical structures yet, advancing the development of new technologies for regrowing bones and tissue using a new technique called Negative Embodied Sacrificial Template 3D (NEST3D).

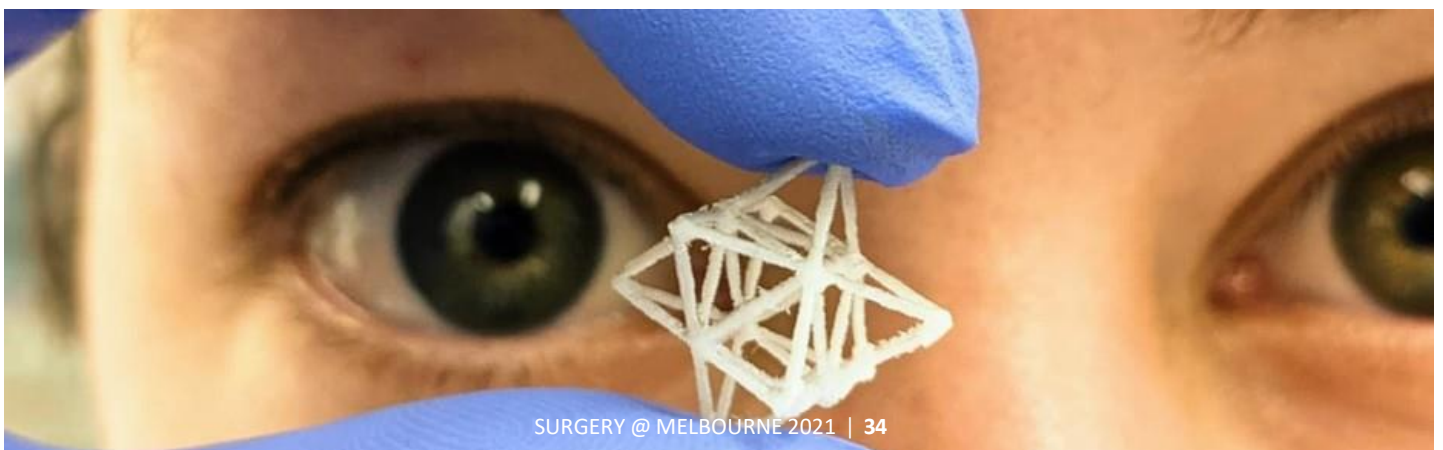
The latest advances from the BioFab lab has been described in a paper published in *Advanced Materials Technologies* which has been chosen as an Editor's pick and featured in the 'Best of *Advanced Materials Technologies 2021*' virtual issue.

Instead of making bioscaffolds directly, the RMIT University team 3D printed moulds with intricately-patterned cavities then filled them with biocompatible materials, before dissolving the moulds away.

The study, led by Dr Cathal O'Connell (formerly DoS researcher, now with RMIT University), has been able to create fingernail-sized bioscaffolds full of elaborate structures that, until now, were considered impossible with standard extrusion 3D printers. Using consumer-grade 3D printers, the REMOD team demonstrate that NEST3D printing achieve high resolution, intricate structures from readily available technology and is therefore cost-effective and easily scalable. The potential applications for this technology and technique is vast and brings the tissue engineering team another step closer to their goals.

The research was supported by the St Vincent's Hospital Melbourne Research Endowment Fund, Victorian Medical Research Acceleration Fund, NHMRC-MRFF Investigator Grant and Australian Technology Network of Universities Industry Doctoral Training Centre.

PhD candidate Stephanie Doyle with a bioscaffold



MEASURING OUTCOMES

Dr Leonard Shan

Arterial vascular procedures are risky, resource-intensive and increasing in number. A holistic outcomes analysis that considers clinician-reported outcomes, patient-reported outcomes/measures (PROM) and economic evaluations (EE) is essential to patient and treatment selection. However, there is a lack of reliable PROM and EE in vascular surgery due to significant methodological flaws and difficulties in their assessment. Furthermore, there is scarce Australian data to guide local practice.

The vascular research group led by Dr Leonard Shan is investigating four key themes:

- To develop a CLTI-specific PROM instrument and compare PROM after operative and non-operative therapies
- To analyse the effect of gender and illness perceptions on PROM.
- To evaluate the impact of patient treatments on informal carers.
- To determine the incremental health gains and costs of different treatment modalities.

Treatment evaluation using a CLTI-specific QOL instrument, illness perceptions and impacts on informal carers will be seminal in vascular surgery.

These allow identification of the right treatment for the right patient at the right time, thus avoiding potentially unnecessary reconstructive procedures.

Vascular surgeons will be better equipped to adopt a patient-centred model of care that is currently underutilised. Patients' understanding and expectation of intervention are enhanced, which facilitates shared decision making. There will also be increased awareness of the health of informal carers and their ability to care for patients and remain productive in society. This project will also provide the basis of a vascular research program that supports future clinician-researchers through the supervision of research higher degrees.

This project is funded by the Australian Commonwealth Government Research Training Program Scholarship through the University of Melbourne, and the Reg Worcester Research Scholarship from the Royal Australasian College of Surgeons. It links DoS and Melbourne School of Population and Global Health at the University of Melbourne, St Vincent's Hospital Melbourne, Department of Surgery at Imperial College London, Charing Cross Hospital London and Bristol Medical School at the University of Bristol.

QUALITY OF LIFE PREDICTORS

Dr Leonard Shan

In a recent review in the *European Journal of Vascular and Endovascular Surgery*, the team have highlighted the need for a more specific quality of life (QoL) measure for chronic limb-threatening ischemia.

Chronic limb-threatening ischemia (CLTI) is a health problem associated with significant morbidity, mortality and places a burden on health care resources. Revascularisation is the first-line therapy, but may not always result in clinical improvement, limb salvage or prolong survival.

While the primary aim of the study was to compare the effectiveness of revascularisation, the research team explored the management of QoL outcomes in chronic limb-threatening ischaemia. Patient-reported outcomes collected from 8909 patients from 55 studies with those collected from clinician-reported outcomes (ClinRO) to establish a baseline of the QoL measures that can accurately represent the patient experience.

The analysis determined that current methodologies and tools used to measure QoL in those with CLTI is diverse, inconsistent and with limitations. Notably for the Australian context, a fit for purpose, standardised QoL tool for CLTI is not available in English and the tools being used have varying and often limited validation for specific population, purpose and context. Improvements for measuring QoL in those with CLTI are needed to fully support appropriate decision-making in clinical practice and ensuring value-based care.

The study highlights that accuracy and reliability in QoL tools are critical for clinical decision-making because this matters to patients: empowering patients with information to make the right decision for themselves.

To read about the study, [visit here](#) or [see QR](#)



NEUROMODULATION

Dr Kristian Bulluss

Deep brain stimulation (DBS) is an established treatment for Parkinson's disease and other conditions that involves delivering electrical stimulation into the brain via a surgically implanted device.

The research team led by Dr Kristian Bulluss, with the Bionic Institute, recorded brain signals from over 150 patients with Parkinson's disease and identified a novel biomarker signal that occurs within the target brain region. This signal is known as ERNA – Evoked Resonant Neural Activity. An ERNA-based device has been developed to be used during DBS surgery to guide electrode implantation and to identify settings to use for ongoing therapy. An innovative DBS system is being developed that uses ERNA to automatically control therapy, leading to better quality of life and reduced side effects.

This work has attracted substantial NHMRC and philanthropic support. Furthermore, the Department of Neurosurgery, with neurologist Professor Mark Cook, have developed a number of first in human trials for new devices used to treat epilepsy.

HIGHLIGHTS

- Rana Dhillon was an Associate Investigator on 'An online brain cancer survivorship platform to improve survivorship experience and quality of life', which received \$2.6 million from the MRFF.
- Kristian Bulluss was Chief Investigator on 'Enabling clinicians to optimise outcomes with deep brain stimulation for Parkinson's disease', which received an NHMRC 2020 Development Grant of over \$700,000.
- Kristian Bulluss, Emma Priest and Catherine Williams were authors on the high impact publication 'Anti-seizure therapy with a long-term, implanted intra-cerebroventricular delivery system for drug-resistant epilepsy: A first-in-man study'.
- Professor Mark Cook was featured on Channel 7's The House of Wellness for a story on the epilepsy trial to treat drug-resistant focal seizures. The same trial was also published in The Age and The Sydney Morning Herald.

ASSISTIVE TECHNOLOGY

A/Prof Gavin Wright and Dr Naveed Alam

A recent innovation that our surgeons, Associate Professor Gavin Wright and Dr Naveed Alam, are trialling is the injection of a dye (VGT-309) which identifies lung cancers with its tumour-homing characteristics and ability to fluoresce when activated by laser light. Then through minimally-invasive video assisted thoroscopic surgery the malignancy can be identified and resected.

In a world-first clinical trial conducted at St Vincent's public and private hospitals in Melbourne, surgeons are fine-tuning the optimal dose and timing of the injection of the dye in patients suspected or known to have lung cancer. They are hoping to confirm that they can easily find even the smallest cancers hidden in the lung and detect if they have spread to the nearby lymph nodes. This would allow them to do the appropriate size operation for a particular patient's cancer. This will minimise the loss of normal lung tissue, but ensure the whole cancer is removed with a clear margin.

This exciting research is potentially practice-changing for lung cancer surgeons around the world. So far 10 patients have been recruited and the results have been very promising, even at the small test doses used so far. Under the microscope, the lung cancer tissue lights up perfectly with the fluorescent area using the same laser light.

Other research includes:

- A pilot study of Video Assisted Thoracic Surgery (VATS) fissure completion prior to Zephyr® Endobronchial Valve insertion for severe chronic obstructive pulmonary disease (COPD) in patients with collateral ventilation.
- Droplet digital PCR – Using chromosome rearrangements as tumour-specific markers in disease monitoring for lung cancer.
- A phase I, dose-finding and signal-seeking study of the safety and efficacy of intravenous Cavatak™ alone and in combination with Pembrolizumab in patients with late-stage solid tumours.



GUT TASTE RECEPTORS

Drs Matthew Read and Michael Hii

Obesity affects 31% of Australian adults. Bariatric surgery is the most effective treatment for obesity. These surgeries consistently produce profound and sustained weight loss, as well as demonstrable improvements, and often complete remission, in obesity-related comorbidities, such as type 2 diabetes.

Additionally, bariatric surgeries alter food preferences; with patients reporting a reduced craving for, and intake of, sweet and fatty foods. The mechanisms underlying bariatric surgery are not well understood. However, the recent discovery of taste receptors in enteroendocrine cells of the gut provides a compelling theory.

Utilising both human and animal models, this study contrasts food preference, weight loss, and serum metabolic markers with the expression of sweet and fatty taste receptors in the gastrointestinal mucosa of patients before and after laparoscopic sleeve gastrectomy. A thorough investigation exploring the linkages between our food preferences to physiological changes will allow researchers to examine the effects of bariatric surgery on gastrointestinal taste receptors.

BENEFITS OF SYNBIOTICS

Drs Matthew Read and Michael Hii

Surgeries of the foregut including oesophagectomy, gastrectomy, distal pancreatectomy, pancreaticoduodenectomy, and liver resections are associated with a high incidence of postoperative infections. Patients with hepatobiliary or upper gastrointestinal cancers experience preoperative dysbiosis due to their underlying pathology, neoadjuvant chemotherapy and radiotherapy, medications including antibiotics, weight loss, stress, and diet. Interventions that improve their microbiota and clinical outcomes may be beneficial.

Perioperative administration of synbiotics (a combination of probiotics and prebiotics) has been associated with a relative risk reduction in postoperative infectious complications of 50% for patients undergoing general surgery.

The DISCO study will involve conducting a randomised, placebo-controlled, double-blinded trial to assess the effectiveness of perioperative synbiotic administration on reducing postoperative infections in major foregut surgery patients. The research team will also assess other clinical outcomes such as the impact of synbiotics on time to first bowel movement, length of stay in intensive care, length of hospital stay, antibiotic therapy duration, and mortality.

WEIGHT LOSS PRE-SURGERY

Drs Matthew Read and Michael Hii

Bariatric surgery results in significant weight loss over a long period of time, with a large proportion of the weight lost contributed by fat mass in the initial post-operative period. Fat-free mass also shows an early post-operative loss but has been shown to slow after 6 months. While bone mineral density has not yet been extensively investigated, a small, but significant loss following bariatric surgery has been reported with no detrimental health problems noted.

Several bariatric surgeons recommend patients undergo a very low calorie diet prior to surgery in order to enhance weight loss results post-surgery. Only sparse evidence exists to support the value of a strict diet plan in order to modify body composition prior to surgery. Apart from Roux-en-Y gastric bypass, very little research has been performed on other bariatric surgery procedures. Most importantly, there is a paucity of long-term follow-up data due to poor patient compliance.

This study explores these current limitations by evaluating patients' body mass composition with DXA (dual-energy X-ray absorptiometry) imaging pre-operatively, and post-operatively at 6 monthly time intervals. Results from the study will inform patient care improvements, provide surgical education by determining the most efficacious procedure, as well as identifying and quantifying the patients' risk of regain in fat mass, loss of bone mineral density or sarcopenia.

To read about the study, [visit here](#) or [see QR](#)



Stay up to date by [visiting here](#) or [see QR](#)



HEPATOBIILIARY | UPPER GI

WINNING HIIT STUDY

Drs Lynn Chong and Michael Hii

The HPB and UGI unit at St Vincent's were the recipients of the *SVHM Life Changing Awards* in 2021 for their project: *High-Intensity Interval Training after major cancer surgery: the HIIT Cancer Project* which won the Life Changing Research category.

This innovative research study introduces patients to in-hospital high intensity interval training following major foregut cancer surgery as part of their recovery process to improve physical and overall wellbeing.

The group postulated that high-intensity exercises in hospital would help patients recover quicker and to a higher degree. Exercises begin on Day 1 post-surgery and progressively increases in intensity up until the day of discharge. The team embedded the training program in collaboration with all aspects of the patient care journey from: operating theatre, intensive care, wards, physiotherapists all the way to dietetics. While the project is still ongoing, the feasibility study showed that the study is safe with early results indicating there are positive improvements in recovery time with potentially faster discharge and less complications.

Read on for more insight on the feasibility study.

The feasibility study involved 21 participants (14M:7F) who underwent laparoscopic (14%), laparotomy (52%) or dual cavity (33%) surgery for hepatobiliary or upper gastrointestinal cancer. The participants received exercise intervention twice daily by an upskilled project coordinator until day of discharge.

The participants were able to achieve a maximum heart rate of $60\% \pm 5.46$ per exercise set and their rate of exertion (RPE) was perceived as moderate (4.5 ± 1.16). HIIT training did not exacerbate pain when compared to their baseline levels.

By discharge, patients reported a trend towards improved emotional and social functioning (SP36 & HADS) and their functional capacity (a 6-minute walk test) did not decline significantly when compared to their baseline measurements. Compliance to the in-hospital HIIT was 71%. The program was well-supported by the ward nurses and surgical unit and most importantly, the exercise program could be conducted safely in the patient cohort and in a multi-room ward setting.

Learn more about the project [here](#) or [scan the QR:](#)



St Vincent's HPB and UGI Unit



BREAST AND ENDOCRINE UNIT

EXPANDING BREAST & ENDOCRINE RESEARCH

Establishing a strong research presence in the breast and endocrine field, both units have initiated projects to commence and support future research outcomes including:

- Actively pursuing basic science, translational and clinical research with the aim to develop more personalised diagnostic tools and treatment options for patients.
- Establishing a comprehensive cancer biobank.
- Creating research partnerships with educational institutes and hospitals to develop novel technologies to better diagnose and prognosticate cancer.

The units obtained several grants over the past year and have collaboratively created a new full-time research coordinator position. Ms Suraya Roslan is an experienced scientist with more than 10 years of experience working in major cancer research institutes such as the Peter MacCallum Cancer Centre and the Olivia Newton-John Cancer Research Institute.

BREAST AND ENDOCRINE UNIT

CANCER BIOBANK

For the discovery of novel tumour markers and new therapeutic targets, matched clinical blood and tumour samples are required.

The Breast Unit and the Endocrine Unit – under the direction of Caroline Baker, Steve Farrell and with coordination from Simon Tsao – have established a comprehensive cancer biobank. Samples of cancer patients' blood are serially collected during systemic therapy, before and after surgery. These are matched with the fresh tumour specimens and will be used to develop further research into novel biomarkers and potential therapeutic targets seen at different stages of disease.

BREAST AND ENDOCRINE UNIT

PREDICTING WITH EXOSOMES

Breast cancers can have three different responses to chemotherapy:

- 10 per cent will not respond
- 60 per cent will reduce in size
- 30 per cent will have a very positive response effectively destroying all cancer cells before surgery.

Our research aims to differentiate these groups with a blood test, potentially saving up to 10 per cent of the patients from unnecessary chemotherapy and 30 per cent from unnecessary surgery.

A collaboration with Macquarie University has developed a compact novel microfluidic technology that can perform to the testing parameters in one hour – rather than several days – and only requires 1mL of blood. We will use this technology to analyse patients' exosomal signatures to understand how this signature changes with treatment. This technology is highly portable and can be used in every laboratory in Australia. This will have a strong impact on all breast cancer patients, reducing unneeded chemotherapy and surgery.

BREAST AND ENDOCRINE UNIT

CIRCULATING TUMOUR CELLS

Predicting treatment outcomes at the time of breast cancer diagnosis is important for deciding on the type and extent of treatment. Circulating tumour cells (CTCs) are cancer cells that have been released into the blood and can be analysed via a simple blood test. Numerous studies have shown CTC analysis can provide meaningful information that may influence the treatment chosen.

A novel nanotechnology technique for CTC analysis was invented by Simon Tsao during his PhD with Associate Professor Wang from Macquarie University and has been shown to be effective in the study of melanoma CTCs (published in Nature Communications).

The first step of this project will aim to validate its use in breast cancer patients. Subsequently, we will develop a portable diagnostic device to allow easy CTC analysis in clinic. This project is currently supported by St Vincent's REF grant and the prestigious James Ramsay Project Grant from the Royal College of Surgeons.

NOVEL DIAGNOSTICS

Our immune system reacts to the presence of microscopic amounts of cancer and secretes antibodies that can be detected in blood (cancer-specific antibodies, CSAb).

The Olivia Newton-John Cancer Research Institute (ONJCRI) has developed a novel technology that is capable of using one drop of blood to sensitively quantify trace amount of CSAb. Studies using this technology in several cancers have shown that it can sensitively detect CSAb produced by small cancer.

Our surgeons are involved in a collaboration supported by the international earlier.org research grant (early detection of breast cancer) and St Vincent's REF grant (minimal residual disease detection).

REGULATING TREG LEVELS

Immunotherapy has revolutionised cancer treatment in recent years, however this strategy has had only limited success in breast cancer. Regulatory T cells (Tregs) are a subset of immune cells that suppress the function of anti-tumour immune cells. They accumulate in the tumour microenvironment and their abundance correlates tightly with poor prognosis. It is therefore possible that by targeting these cells, we may improve anti-tumour immunity against breast cancer.

Supported by a Victorian Cancer Council Grants-in-Aid, our surgeons are collaborating with Austin Hospital researchers to understand how we can suppress Tregs in order to promote immunogenicity of breast cancers.

BREAST MRI EVALUATION

The Breast MRI Evaluation is an Australian study conducted by Breast Cancer Trials (BCT), which will enrol up to 400 participants across seven hospitals.

Dr Jocelyn Lippey is a co-investigator on a \$2.6 million NHMRC grant and she is leading its implementation at St Vincent's Hospital. This study is open to women recently diagnosed with breast cancer where the medical treatment team suggest that an MRI of the breast prior to undergoing initial treatment or surgery will help plan those treatment options. The study will also help to answer if having a breast MRI after being diagnosed with breast cancer might change plans for treatment and how this might affect patient outcomes.

BREAST CANCER AI (BRAIX)

Dr Lippey is an Associate Investigator on a \$2.26 million MRFF grant that centres around the use of artificial intelligence. The BRAIX project has assembled a cross-sectoral and interdisciplinary health research team comprised of epidemiologists, AI computer scientists, data scientists, health statisticians, radiologists and breast surgeon (healthcare practitioners), qualitative researchers, and genomic researchers. The diverse team is investigating utilising novel AI techniques in developing deep learning algorithms to improve analysis and interpretation of mammograms and ultimately transform breast cancer screening.

Breast cancer is the most common cancer affecting Australian women. Mammographic screening reduces the risk of dying from breast cancer, however, interpretation of mammographic images is challenging, subject to human variability, and has some room for improvement. Despite independent double reading of all mammograms by radiologists (and a third arbitration read if there is disagreement), approximately 33,000 Australian women are recalled annually for assessment and later determined not to have breast cancer (false-positive), whilst approximately 1000 women subsequently discover they have breast cancer after receiving an 'all clear' result (false-negative).

The BRAIX team has already demonstrated the opportunity to significantly improve screening outcomes, lower harms and reduce costs using AI. The BRAIX team's current AI algorithm was trained to distinguish between 'normal' and 'cancer' samples from small patches of mammograms. The team then tested the model using previously unseen images. Their model produced 88 per cent accuracy, which is on par with human performance.

The next stage of research for the BRAIX team is applying their developed deep learning algorithms in a 'proof of concept' prospective screening study to measure the model's real-world performance accuracy at detecting cancers. Concurrently, BRAIX researchers at University of Melbourne are applying models to discover novel aspects of a mammogram that predict a woman's risk of breast cancer. Underpinning these novel AI research aims, BRAIX researchers are also leading engagement on the ethical, legal and social implications of utilising AI models in healthcare, developing approaches to explain AI prediction and will use a co-creation approach in implementing these models in St Vincent's BreastScreen services.

With this technology, the team envision a more nuanced detection of breast cancer and a more personalised assessment of a woman's risk of developing breast cancer at the time of a mammographic screen.



Austin Health

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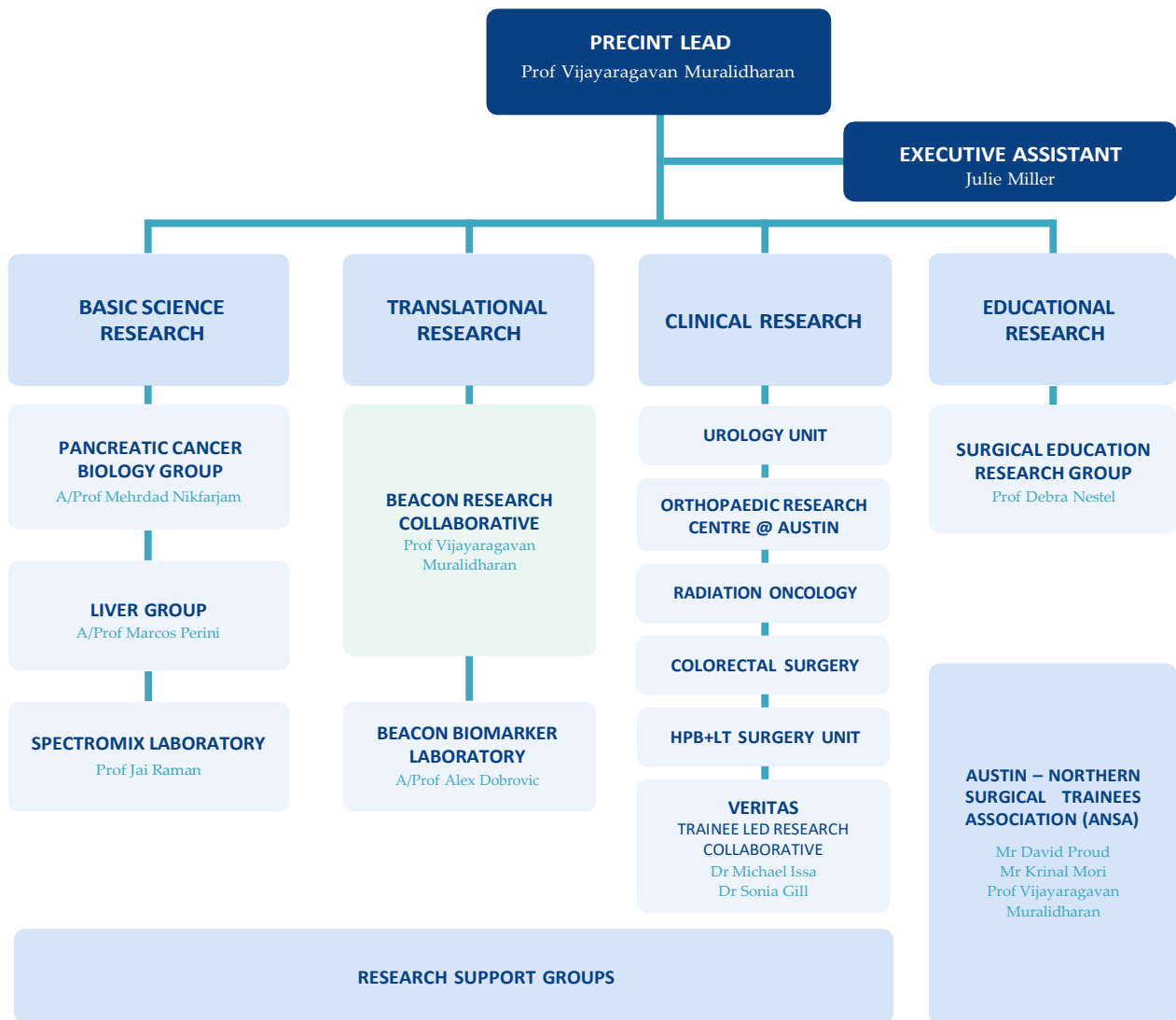
MESSAGE

PROF VIJAYARAGAVAN MURALIDHARAN

The major principle that underpins the strategic direction of the Austin Precinct is to engage with and support clinicians to participate in clinical and translational research. The precinct will profess for all craft groups within surgery by providing a platform for engagement between clinicians, scientists and educationists and supporting collaboration at all levels. The precinct is ably supported by exceptional collaborative clinical research emanating from leading clinical research groups in intensive care, anaesthesia, gastroenterology & hepatology, liver transplantation, oncology, emergency and radiology units.

Surgical education and educational research are one of the cornerstones of the precinct philosophy. The precinct is a national leader in the development of surgical trainee organisations which give trainees some agency in shaping their training, but also enable them to develop some of the non-technical competencies that are vital in their careers as future surgeons. The presence of an educational research group, trainee association (Austin Northern Surgical Trainee Association – ANSA), a junior doctors’ surgical interest group (ASPIRE) and a successful trainee-led research collaborative (VERITAS) are examples of empowering trainees and students in research and education.

PRECINCT ORGANISATION



RESEARCH @ AUSTIN

RESEARCH SUPPORT GROUPS

The Research Support Group concept was created at the precinct to increase engagement with the honorary clinical staff while developing a platform that would support all members in the endeavours in all aspects of research.

The premise is that every member of the precinct, honorary or salaried, would identify an area of interest and passion and offer their expertise to those who required it. This is co-ordinated through the precinct office and allows students, trainees, scientists and surgeons to link and access such expertise.

The process also enables members to identify and engage in a tangible manner.

Some examples of such groups are listed below

- Manuscript Review Group
- Statistical Support Group
- Research Database Group
- Qualitative Study Design Group
- Human Ethics Support Group
- Clinical Trial Design Group
- Grant Review Group
- Quality & Safety Group
- Student Advisory Committee
- Student Examinations Committee

Key staff

Prof Vijayaragavan Muralidharan
Precinct Lead

Julie Miller
Executive Assistant

Prof Debra Nestel
A/Prof Alex Dobrovic
A/Prof Mehrdad Nikfariam
A/Prof Marcos Perini
Dr Li Dong
Dr Michael Fink
Dr Hong He
Ida Candiloro
Chelsea Dumesny
Fan Zhang



292
publications



12
successful grants



16
Fellowships and
Scholarships



\$4.71m
total grant funding



11
research staff



31
research students

RESEARCH @ AUSTIN

The Austin Precinct of the Department of Surgery has broad expertise in research from the basic sciences through translational genomics and clinical research.

A major focus at Austin is to improve the early detection, surveillance and treatment of a wide variety of cancers and develop our understanding of the molecular mechanisms behind them. Austin has built an international reputation for research into hepatobiliary and pancreatic malignancies, liver transplantation and ischaemia reperfusion in renal surgery.

Clinical research is further enhanced by the large number of specialty surgical units including orthopaedic, cardiothoracic and all general surgery units as well as new additions in mucosal immunity, colorectal surgery (based at St Vincent's Hospital, Melbourne) and the biotechnology and bioinformatics group (based at Deakin University).

BEACON PROGRAM

BIOMARKER ENHANCEMENT FOR CLINICAL OUTCOMES & TRANSLATION

Prof Vijayaragavan Muralidharan

The BEACON program, Biomarker Enhancement for Clinical Outcomes & translation, provides the structure that links the research groups within the Precinct (Liver Research Group, Pancreatic Cancer Biology Research Group and TGEG), external groups (Olivia Newton-John Cancer Research Institute, School of Biomedical Sciences) and clinicians together.

The strategic focus of BEACON is patient-centred individualised therapies using cost effective diagnostic techniques and empowers collaboration between scientists, geneticists, clinicians, allied health, computer scientists and health economists to develop truly individualised therapeutic streams in the diagnosis, management and surveillance of various disease processes. Critically, the program provides the foundation which facilitates every clinical unit at the Austin Precinct to engage in ongoing translational research.

The research collaborative holds monthly meetings including participants from the Departments of Surgery at Austin Precinct, St Vincent's Precinct, Olivia Newton John Cancer Research Institute/La Trobe University and Deakin University and has grown extensively to include representation from gastro-enterologists Hepatologists, Colorectal Surgeons, HPB Surgeons, Oncologists, Molecular Biologists, Immunologists along with trainees, students and laboratory personnel.

The foundation of the program is based on collaborative work by clinicians in the Hepatopancreatobiliary (HPB) and Liver Transplant Surgery Unit, Department of Gastroenterology and Hepatology and the BEACON Biomarker Laboratory. The initial direction was a focus on liver transplantation leading to the development of circulating cell-free DNA assays that can detect acute rejection after liver transplantation earlier than conventional liver biochemistry. This has now shifted to the use of organ specific methylation patterns of DNA and the ability to measure mitochondrial DNA, which will enable broader clinical applications and support all surgical specialties.

THE BEACON BIOMARKER LAB

A/Prof Alex Dobrovic

There are many opportunities because of the transformative power of new technologies, including droplet digital PCR for which we have an international reputation. The laboratory is an Australian leader in developing and utilising methodologies as judged by both publications and by translation of research into practice. Translating research into practice is also facilitated by the accreditation of our laboratory for genetic testing (NATA/RCPA).

The research team applies enormous creativity to research that is highly focused on clinical relevance and thus depends on partnership with clinical colleagues. The close relationship of key clinicians with the laboratory further enables research to be translated into better treatment and care. A key application is sequential monitoring to allow patients to be managed with a more nuanced approach.

The Lab's principal expertise is in the frontier areas of circulating DNA and DNA methylation, in particular:

- DNA methylation for predictive biomarkers and as a toolbox of genetic markers
- Circulating free DNA for diagnostics and monitoring in cancer and organ transplantation.

These areas synergise as developing DNA methylation markers for circulating DNA is becoming the principal area of research for the unit whose aim is to enable the clinical utilisation of this expertise in organ transplantation and cancer. Some of the key projects the Unit are working on include:

MONITORING OF LUNG CANCER POST-SURGERY

The need to develop a workflow that can be used to monitor all patients post-surgery led to the development of this project which aims to assess the use of chromosome rearrangements as tumour-specific biomarkers for the detection of circulating tumour DNA using digital PCR.

DNA METHYLATION OF BRCA1

The research group identified that BRCA1 could be methylated in cancer and to follow-up on this promising discovery, BRCA1 (and RAD51C) methylation studies are being conducted in breast and ovarian tumours for a Cancer Australia-funded multi-centre phase II clinical trial in association with the NHMRC Clinical Trials Centre.

DNA METHYLATION AS A CIRCULATING DNA BIOMARKER

This project relates to the validation of DNA methylation biomarkers to monitor breast cancer using ctDNA in a longitudinal study of 50 metastatic breast cancer patients. This follows on from our previous studies addressing optimal methylation markers for breast cancer.

PERSONALISED IMMUNOSUPPRESSION AFTER TRANSPLANTATION

This study explores the use of DNA methylation markers specific for the liver as an alternative to the current use of donor-specific circulating DNA to monitor graft rejection in liver transplant recipients. If successful, this could revolutionise organ transplant management with a simple readily performed digital PCR assay. We are also assessing mitochondrial DNA as a marker of tissue damage.

MOLECULAR COLONOSCOPY

Austin Health faces an increasing challenge to provide timely colonoscopy to patients due to high demand for the procedure. The predominant non-invasive test to date has been faecal occult blood testing (FOBT). More recently, a multi-target stool DNA test looking for tumour DNA in faeces has been shown to have superior sensitivity to FOBT for the detection of CRC and advanced polyps. However, patients are averse to faecal testing so we will be doing a trial in which a toolbox of DNA methylation markers will be used to screen the blood. A toolbox of recurrent mutation markers e.g. BRAF V600E will be used for comparison.

A/Prof Alex Dobrovic and the BEACON Biomarker Lab





The Pancreatic Cancer Biology Group

PANCREATIC CANCER BIOLOGY GROUP

CELL SIGNALLING IN CANCER

A/Prof Mehrdad Nikfarjam and Dr Hong He

The Pancreatic Cancer Biology Research Group is focused on world-class research into pancreatic ductal adenocarcinoma, with a particular interest in identification of novel methods to improve treatment response, overcome chemotherapy resistance and improve survival.

We have a multiple array of projects that utilise various animal models of pancreatic cancer that replicate the human situation, which is essential prior to the translation of findings into the human situation. We are strengthened by our team's involvement with national pancreatic cancer trials, including contributions to the Australian Pancreatic Cancer Genome initiative. Links with drug development companies and initiatives for early pancreatic cancer detection will allow rapid translation of the findings into the clinical setting. Our unique team consists of surgeons, clinicians and researchers who work closely together and with collaborate links with various groups both nationally and internationally.

The group's main basic research interests are:

- Identifying key molecules responsible for pancreatic cancer initiation and growth and metastasis
- Developing and testing new chemical compounds in cancer cell lines and pancreatic cancer models to develop novel therapies.

The current research focuses on several themes:

- Targeting P-21 activated kinase proteins to improve the treatment of pancreatic cancer
- Determining the effects of chemokines in pancreatic cancer
- Investigating the mechanism(s) involved in tumour immune response to stimulate the immunotherapies in pancreatic cancer
- A randomised controlled single blinded multicentre trial of polyethylene glycol sealant to the staple line vs staple line alone in distal pancreatectomy (PEGDP-01)
- BERP - A multicentre randomised controlled trial of the effect of Braun Enteroenterostomy reconstruction on delayed gastric emptying rates after pylorus resecting pancreaticoduodenectomy
- PanTher -A Phase I Study of PTM-101 as Neoadjuvant Therapy for Borderline Resectable or Locally Advanced Pancreatic Ductal Adenocarcinoma (PDAC)
- NEO-adjuvant chemo-IMmunotherapy in PAnCreaTic cancer, NEO-IMPACT study.

The group also commenced a national randomised controlled clinical pancreatic surgery trial during this period. It received funding via grants from University of Melbourne, Pancare Foundation, Austin Medical Research Fund and Tour De Cure.

RESEARCH HIGHLIGHTS

As internationally recognised experts in the field of p-21 kinase (PAK) in cancer research, the Pancreatic Cancer Biology Research Group have been prolific:

- In a recently published a cutting-edge review paper in *Cancer Letters*, the group summarised their findings that implicate the potential connection among p21 activated kinases, autophagy and tumour immune evasion in pancreatic cancer with a goal to provide some insight to tumour immune response of pancreatic cancer, which would contribute to improving immunotherapy in pancreatic cancer.
- The group have demonstrated the efficacy of a novel PAK inhibitor in combination with Gemcitabine in pancreatic cancer and published the results in *Translational Oncology*.
- The role of a chemokine (CXC-L5) in pancreatic cancer and submitted the data for publication.
- Several clinical research projects have also begun in collaboration with numerous research groups including a study on polyethylene glycol as a sealant in pancreatic surgery which has commenced recruitment and should be completed in 2022.
- Notably, the group was involved in a successful multicentre MFF bid for funding of almost \$3 million looking to improve CT scan reporting of pancreatic cancers.
- A/Prof Nikfarjam was featured in the media for his management of a retired AFL player Paul Dear who was affected by pancreatic cancer. See below for the coverage.

Watch A/Prof Nikfarjam's feature [here](#) or [scan the QR](#)



SPECTROMIX LABORATORY

TISSUE BIOBANK

Prof Jai Raman

Using multi-modal spectroscopy and computation, the Spectromix Lab is translating multi-modal spectroscopy into a Point-of-Care capability.

Under the guidance of Prof Jai Raman and Prof Bayden Wood (Monash Biospectroscopy), the multi-campus collaboration run a virtual lab called Spectromix in partnership with Monash BioSpectroscopy, University of Queensland & University of Eastern Finland, University of Melbourne Engineering, University of Sydney Heart Biobank, A2I2 at Deakin University, St Vincent's Hospital, Austin Health, Peter MacCallum Cancer Institute. The collaboration has a strong foundation at the Austin campus with the newly set up Australian Donation & Transplantation Biobank (ADTB).

With a new PhD student joining the team, the research group is building a Tissue Biobank where chemical imaging by the Spectromix Lab has been particularly effective: by detecting and quantifying specific tissue such as the extent of fibrosis in the heart, differentiation between fatty liver and cirrhosis in the liver, detection of bladder cancer, bone quality determination, along with exploratory forays into infectious diseases & urine analyses. The collaborative have connected with biobanks elsewhere in Melbourne and Sydney and helped establish a tissue biobank at James Cook University in Townsville, with a significant number of indigenous patients participating.

The establishment and staffing of the Austin Transplant Tissue Biobank has helped provide tissue to support multiple collaborations including:

- Dr Isaac Afara (University of Queensland & Eastern Finland) - Multi-modal spectroscopy with interest in evaluation of cartilage
- Industrial Partnership with Si-Ware, a company that has built small puck-shaped spectrometers that are very portable.
- Prof Rohit Bhargava (Beckman Institute, University of Illinois at Urbana-Champaign, USA) - The assessment of fibrosis in the heart and detection & characterisation of amyloid in the heart.
- Prof Claudia Maier (Linus Pauling Institute, Oregon State University, Corvallis, USA) – Lipidomics and metabolomics of heart failure.

Prof Jai Raman assisting A/Prof Siven Seevanayagam



RADIATION ONCOLOGY RESEARCH

BRINGING MR-LINAC ONLINE

A/Prof Farshad Foroudi

The Radiation Oncology Research group is an accredited RANZCR training unit with a heavy clinical load and a collaborative focus with other departments including Austin breast surgery, urology, hepatobiliary, and upper and lower GI.

In August 2021, the Austin Health MR-Linear Accelerator went clinical, the first in Victoria. The MR-Linac combines a 1.5T MRI scanner with a linear accelerator (linac). It can take MRI scans before and during radiation therapy to allow highly accurate treatment delivery and adaptation of the radiation plan according to the anatomy of the day. It can also allow assessment of tumour response using functional imaging. The MR-Linac is ideal for cancers that are difficult to treat due to anatomical changes or poor soft tissue visibility. With a high degree of accuracy, the MR-Linac targets tumours while avoiding irradiation of healthy tissue, thereby allowing the team to tailor treatments specific to patients in real-time.

The group's research focus is on clinical trials, registry studies, health services research and imaging in oncology with 64 peer reviewed publications, and many national and international presentations.

RESEARCH HIGHLIGHTS

- The group's latest addition, Ms Jean Dean, a Research Radiation Therapist will be bolstering the research expertise of the research group by implementing new radiotherapy techniques in clinical trials.
- Dr Sweet Ping Ng is leading the development of a registry for all patients in the MR in Radiotherapy Program. Tumour sites are being progressively opened as part of a HREC approved study (FIRM), with Brain, Head and Neck, Breast, Prostate active and other sites in progress of opening.
- Dr Richard Khor has received a VCCC Value based health care grant to conduct collaborative research looking at disparities in radiotherapy access across Victoria. Over three years with a total budget of over \$1 million with representatives from across the VCCC, department of health, and consumers, this project aims to describe the association of increasing travel time/distance to radiotherapy centre on utilisation rates. The utilisation rate is the proportion of patients who undergo radiotherapy within a 12-month period after initial diagnosis.

Read more about the MR-Linac [here](#) or [scan the QR](#)



A/Prof Farshad Foroudi



LIVER & PANCREAS CANCERS

Prof Vijayaragavan Muralidharan

The HPB+LT Surgery Unit is an academic surgical unit combining clinical expertise in HPB oncology, liver and multi-visceral transplantation with basic science, translational and collaborative clinical research.

The major areas of research interest include treatment, surveillance and response assessment in liver, pancreas and biliary cancers, as well as liver and multi-visceral transplantation. The unit has a strong academic background and research output with 37 articles published in peer-reviewed journals in 2021. National and international engagement by the surgeons include organisations such as AP-HPBA, TSANZ, ANZHPBA and Pancare Foundation.

A major area of translational research is with the Translational Genomics and Epigenomics Group in using droplet digital PCR, DNA methylation patterns and mitochondrial DNA analysis with LiREG group using colorectal cancer derived organoids.

In 2021, despite the continued impact of COVID pandemic affecting research the HPB+LT Surgery Unit was able to participate in international (COVIDSurg Collaborative and GlobalSurg) and national collaborative studies under the auspices of the Victorian collaborative for Education, Research, Innovation, Training and Audit by Surgical trainees (VERITAS) and engaged with clinicians and trainees all around the globe.

Notable research publications include:

Read more about predicting liver transplantation rejection [here or scan the QR](#)



Read more about using dscfDNA as a clinical tool [here or scan the QR](#)



Read more about the link between cmtDNA and hepatocellular damage [here or scan the QR](#)



Read more about venous thromboembolism post-surgery [here or scan the QR](#)



LIVER ONCOLOGY

A/Prof Marcos Perini

Colorectal cancer detection has increased worldwide mainly due to adherence to screening programs. However, most patients continue to present with metastatic disease at diagnosis. In the past, most of these patients (with metastatic colorectal liver metastases) were considered incurable. However, up to one third of these patients are actually eligible for potentially curative surgery as a result of advances in liver surgery, chemotherapy and perioperative care.

The Liver Research Group (LiReG) seeks to understand cellular signalling pathways involved in carcinogenesis, liver regeneration as well as the interplay of the immune system in these complex scenarios by exploring three major research streams:

- The interaction between tumour and normal liver cells (hepatocytes, immune cells, vessels and lymphatics)
- The capacity for liver regeneration in different clinical scenarios (post resection, new drugs)
- The use of patient-derived liver cancer cell organoids as an ex-vivo model for studying tumour-immune responses, efficacy of novel therapeutics, genotyping and testing.

In collaboration with the Doherty Institute, the ONJCC, St Vincent's Hospital and the BEACON program, LiReG uses new translational models such as patient derived organoids and tissue collection for their collaborative projects including the following:

TAILORING TUMOUR GROWTH IN LIVER METASTASES

A well known anti-hypertensive drug has shown immune modulation effects in the growth of colorectal liver metastases after liver resection, increasing the armamentarium of drugs that could be used to modulate cancer control.

TUMOUR ORGANOID IN LIVER METASTASES

Developing novel methods for drug testing and cancer survival improvements. A VEGFR3 inhibitor drug was tested in an animal models of colorectal liver metastases and has modulated the immune cell infiltration and tumour burden, opening avenues for further exploration drugs harnessing the immune system.

ORTHOPAEDIC SURGERY
**ORTHOPAEDIC RESEARCH
CENTRE @ AUSTIN (ORCA)**

A/Prof Andrew Hardidge & Mr Gerald Quan

ORCA, the Orthopaedic Research Centre @ Austin, was established to present and promote research within the Orthopaedic Surgery Unit at Austin Health. The research centre is the umbrella covering research undertaken by the many orthopaedic craft groups in many disciplines within the hospital. It serves as the custodian of the newly formed orthopaedic clinical quality data registry and is a resource for staff within the orthopaedic unit who are interested in research.

With the support of Stryker, ORCA has recruited a Clinical Research Nurse, Elizabeth Walkley, to support the research projects at the centre:

PATIENT OUTCOME AND HEALTH ECONOMICS STUDY

In association with Stryker Australia, this study compares robotic/non-robotic Joint Arthroplasty at Austin Health. The project includes the formal collection of Patient Reported Outcome Measures for this cohort of patients and the establishment of a clinical quality data registry to enable longitudinal research and other studies in the future.



ENHANCED RECOVERY PROGRAM

Led by physiotherapist Marisa Delahunt and Associate Professor Andrew Hardidge, the Enhanced Recovery Program prepares and enables Hip and Knee Arthroplasty patients for early functional recovery and early discharge. Patients are supported to recover at home. The worldwide Length of Stay (LOS) for joint arthroplasty is 1 day and there is significant evidence to suggest that patient outcomes and experience are no different for a longer inpatient stay.

Currently at The Surgery Centre at Austin Health our average LOS is 4.5 days. Bringing Austin Health in line with best practice international guidelines will have a number of benefits:

- Improved bed access for the hospital
- Improved surgical access (eg. Reduced future waiting list numbers)
- Throughput beyond the COVID response
- Assist patients to stay out of hospital

The Enhanced Recovery Program team



UROLOGY

Prof Damien Bolton

Experience in clinical urology and translational research has encouraged the Urology Department to identify methods by which the function of the kidney can be preserved and optimised after surgery where impaired renal function is a post operative risk. A major research focus in the research group is the evaluation of the role of high-dose intravenous zinc (HDIVZn) as a mechanism of limiting ischaemia reperfusion injury in the kidney at partial nephrectomy.

In 2020 the group completed a phase 1 clinical trial of high dose intravenous zinc with fantastic results, and this has since been published. This first in human study was undertaken in accordance with the protocol approved by the ethics committee of Austin Health, and demonstrated safety and tolerability in humans at the required dose of zinc previously noted in animal models to limit ischaemia reperfusion injury to the kidney.

The research group have subsequently built a strong team of researchers from renal, ICU and cardiac disciplines to assist in a larger project that will establish the utility of HDIVZn in patients post cardiac bypass.

Additionally, the Urology Research Unit published work in renal pathology, with studies on intrarenal pressure during endoscopic surgery and changes in treatment patterns for patients with advanced renal cancer being published, as well as publications dealing with other aspects of urologic oncology.

Other research highlights include:

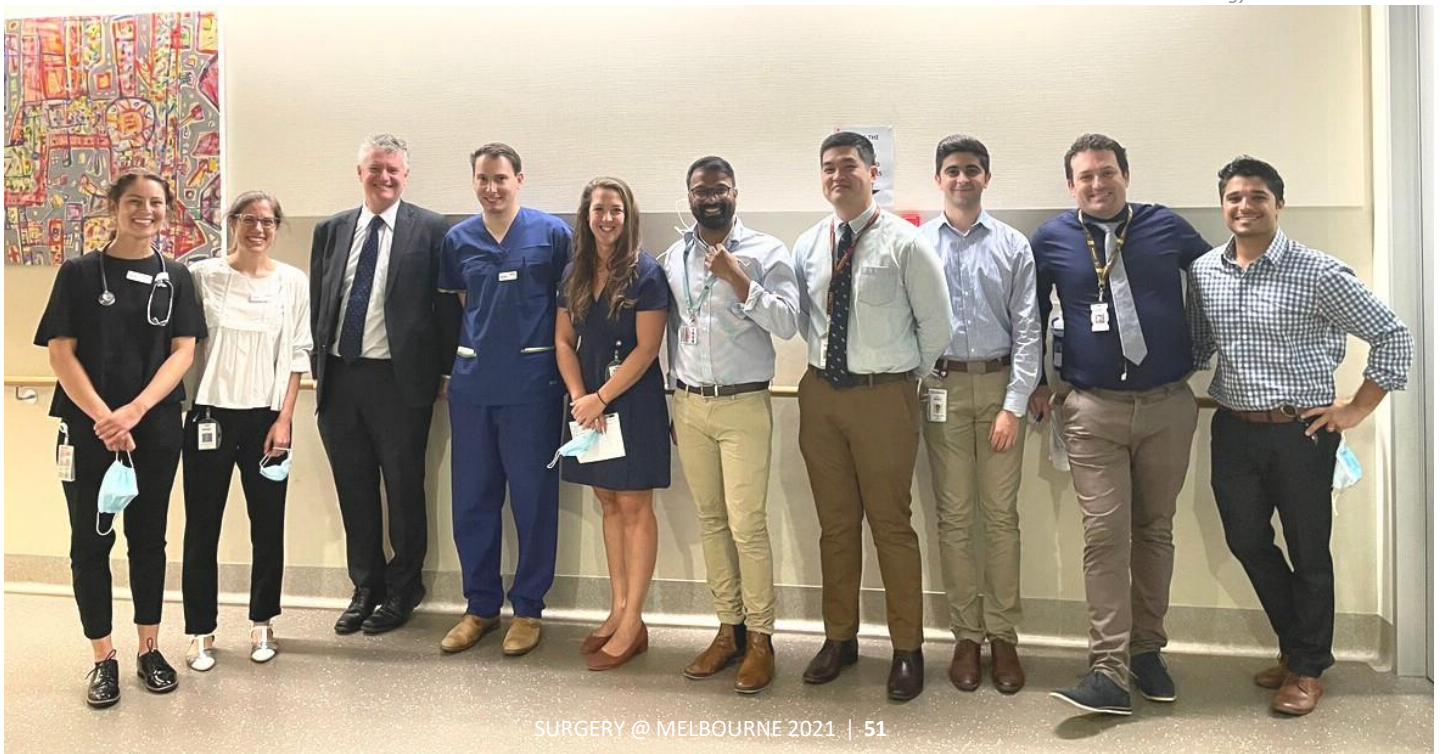
- ♦ PhD candidate Dr Jasmine Coles-Black was awarded First Prize in the BANTUC award, for development of new technology in urology at the Societe International d'Urologie Annual Scientific Meeting. This award has never previously been won by an Australian candidate and reflects the original nature of her work on 3D printing of models for assessment and planning of kidney surgery to assist in training and reduce morbidity of such surgical intervention.
- ♦ In association with colleagues at Mt Sinai hospital New York the research group have developed a predictive model for management of urologic pathology in periods of constrained resources which has wider applicability for issues similar to Covid 19 in the future.

The cornerstone of our program remains the commitment of our key clinicians who drive our research programs. Chief amongst these are A/Prof Joseph Ischia and A/Prof Nathan Lawrentschuk, as well as Dr Greg Jack and Dr Dixon Woon.

Read about the COVID-19 test triage tool [here](#) or scan the QR



Austin Health's Urology Unit



SURGICAL EDUCATION RESEARCH

LEADING SURGICAL TRAINING

Prof Debra Nestel

The Surgical Education Group's (SERG) has grown from the success of the Graduate Programs in Surgical Education, a co-badged degree between the Department of Surgery and the Royal Australasian College of Surgeons.

The Program now lists over 60 graduates at master's level with at least half of the graduates taking a research path. With the complete transfer to online offering of the Graduate Programs in Surgical Education, in 2021 SERG achieved the highest number of enrolments ever. SERG also had the highest number of students enrolled in the thesis subject leading to increased publications in 2021 and beyond and at the time of this report's publication, surpassed these 2021 figures in 2022!

Notching up almost ten years of the Graduate Programs in Surgical Education, the impact of graduates is evidenced in many ways. Most noteworthy is in substantive changes in Surgical Education and Training programs. Development work on the new General Surgeons Australia curriculum has been heavily influenced by graduates of the programs. Graduates have also led innovations to Fellowship Examinations as a direct response to COVID-19. There was a time that these innovations would have just been introduced but now we are witnessing the impact of our graduates who are not only creating the innovations but establishing parallel research program.

The breadth of publications from students of the Master of Surgical Education degree reflects the diversity of interests and also surgical experience of the researchers. We have also seen publications that have built on their initial thesis work demonstrating success in building research capability. Further, this high impact published research is addressing real world issues in surgical education and training such as: diversity and inclusion in surgical training; management of underperformance and remediation approaches; and well-being of surgeons after adverse outcomes. A selection of publications can be viewed below:

Read '*The odds were stacked against me*' [here](#) or scan the QR



Read '*Remediation for surgical trainees*' [here](#) or scan the QR



Read '*Psychosocial impact of surgical complications on the operating surgeon*' [here](#) or scan the QR



COLORECTAL SURGERY

COLORECTAL STUDIES

Drs Adele Burgess, Philip Smart, David Proud and Helen Mohan

The Austin Colorectal Surgery Unit is an accredited CSSANZ training unit. Despite a heavy clinical workload of more than 2000 admissions, it maintains a strong interest in research.

There is a focus on collaborative research and in the past 12 months the unit has contributed to the COVID-Surg, NATO, DAMASCUS, RETAINER, SUNRRISE, SCORE, PelvEx, REACT and RQCCSS studies.

At a local level, the unit is running numerous programs of research including:

DIVERTING ILEOSTOMY FOR RECTAL CANCER PATIENTS

Patients who have had surgical removal of the rectum often have a temporary ileostomy to divert stool from the surgical anastomosis. After the ileostomy is closed it is common for patients to experience disturbances of bowel function such as increased frequency of motions, reduced faecal continence and diarrhoea. These symptoms form a syndrome known as Low Anterior Resection Syndrome (LARS). We aim to investigate mechanisms of LARS and to identify potential treatments that may improve cancer survivorship. Dr Helen Mohan has joined our group as a research fellow this year and has several projects in development.

ANALGESIA FOR HAEMORRHOID SURGERY PATIENTS

Haemorrhoids are a very common condition and surgical treatment of the disease can be very painful. We are investigating the effectiveness of various techniques for pain relief following hernia surgery. Most notably, a multicentre randomised control trial comparing local anaesthetic techniques after rubber-band ligation of haemorrhoids has commenced recruitment and is progressing well.

CARTWHEEL

Our group has had increased involvement with University of Melbourne medical students by establishing CARTWHEEL (Colorectal Austin Research Team- Weaving High quality Evidence into Everyday Life), a research group that embeds students into research. This group has already seen publications from enthusiastic students with more in the pipeline. Researchers from the group have also supervised 7 students in the MDRS program.



The Royal Melbourne Hospital

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MESSAGE

PROF CHRISTOBEL SAUNDERS AO
JAMES STEWART CHAIR OF SURGERY

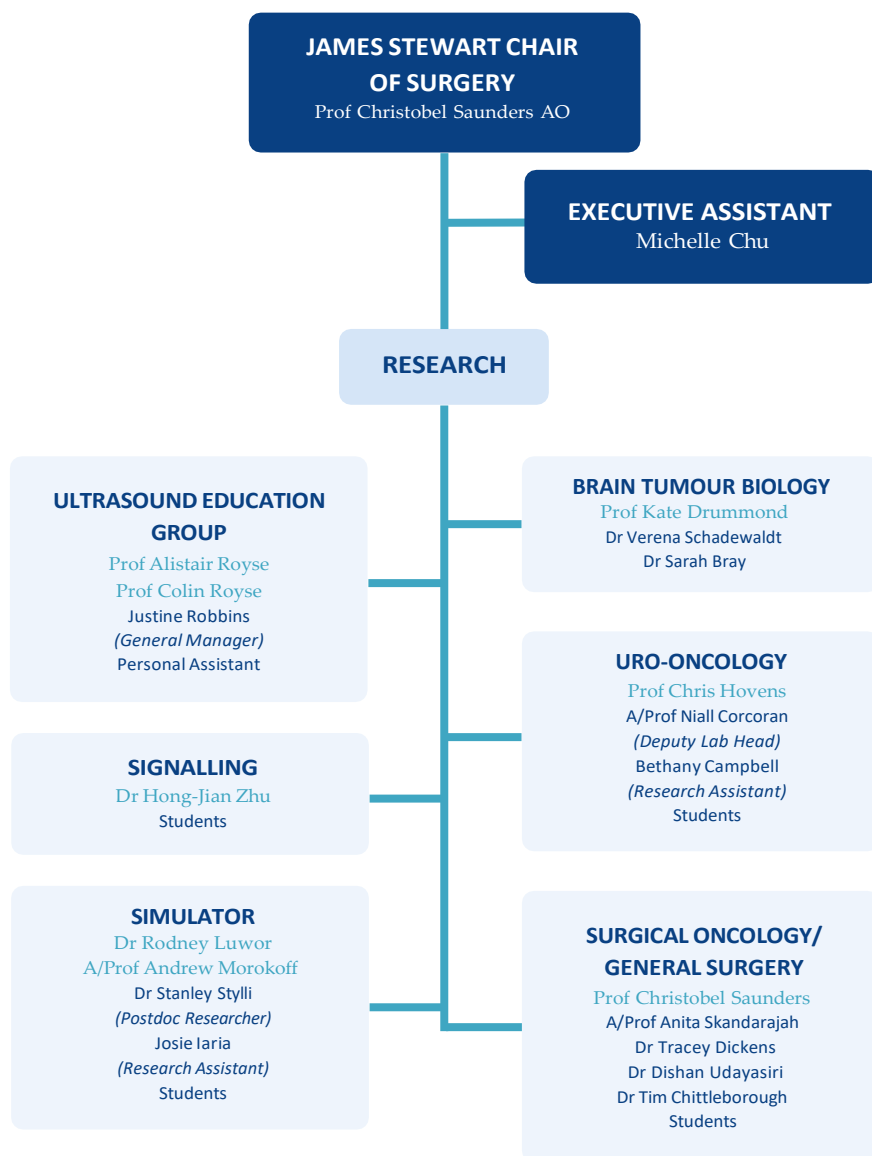
The Department at The Royal Melbourne Hospital (RMH) is dynamic and rapidly growing, with 25 employed staff, including a number of recent appointments from level B to E, as well as new support staff. We are proud to have 115 honorary academic staff within the RMH, with many considered national and international leaders in their respective fields.

The precinct has 18 students undertaking research higher degrees, and the Department plans to launch an educational program for junior doctors to build their research skills. The Department has an active agenda in teaching both under and postgraduates in the hospital, with the recently updated Surgical Forum giving us a precinct-wide postgraduate presence.

I was honoured to be appointed in December 2021 to the James Stewart Chair of Surgery at the RMH, as well as joining the clinical staff at both the RMH and Peter Mac, and as co-chair to the Value-Based Healthcare research stream at the Victorian Comprehensive Cancer Centre. My task now is to cement the RMH as a leading centre for research and education in collaboration with partners both nationally and internationally. We are developing a strategic vision for academia at the RMH (see Research @ Melbourne) and I welcome all input to continually build on this vision.



PRECINCT ORGANISATION



Key staff

Prof Christobel Saunders AO
James Stewart Chair of Surgery

Michelle Chu
Executive Assistant

Dr Andrea Bowyer
Dr Sarah Bray
Dr Lindsay Bridgford
Dr David Canty
A/Prof Niall Corcoran
Prof Anthony Costello
Prof Helen Danesh-Meyer
Dr Tracey Dickens
Prof Richard de Steiger
Prof Katherine Drummond
Prof Christopher Hovens
Josie Iaria
Dr Rodney Luwor
Dr Theo Mantamadiotis
A/Prof Andrew Morokoff
Dr Hong Nguyen
Prof Alice Pébay
Justine Robbins
Prof Alistair Royse
Prof Colin Royse
Dr Verena Schadewaldt
Dr Anita Skandarajah
Dr Stanley Stylli
Dr Andrew Symons
Dr Dishan Udayasiri
Dr Hongjian Zhu

 **411**
publications

 **15**
successful grants

 **2**
Fellowships and Scholarships

 **\$15.37m**
total grant funding

 **27**
research staff

 **20**
research students



RESEARCH @ MELBOURNE

The Royal Melbourne Hospital Department of Surgery has broad and diverse areas of interest in basic science, clinical research, and education. The Department has been at the forefront of research and education by employing new technology and a multidisciplinary approach to address the changing needs of the community.

There is a strong focus on translating basic research into practical health outcomes with implementation research to align with the Hospital's strategic focus:

1. Foster the development and retention of academic clinicians to drive clinical research and practice innovation
2. Drive translational research through engagement and alignment with precinct partners
3. Grow Clinical Trials capacity and participation
4. Employ developments in digital health and bioinformatics to improve care and drive Health Services and Implementation research
5. Support Indigenous Health

To view the Strategic Plan for RMH: [visit here or see QR](#)



URO-ONCOLOGY RESEARCH GROUP INCREASING METASTASIS RISK

Prof Chris Hovens and A/Prof Niall Corcoran

Ductal adenocarcinoma is an uncommon prostate cancer variant. Previous studies suggest that ductal variant histology may be associated with worse clinical outcomes, but these are difficult to interpret. To address this, we performed an international, multi-institutional study to describe the characteristics of ductal adenocarcinoma, particularly focussing on the effect of presence of ductal variant cancer on metastasis-free survival. This paper is the first to definitively show that this variant of prostate cancer is associated with significantly increased risk of distant metastasis.

The presence of any ductal variant adenocarcinoma at the time of prostatectomy portends a worse clinical outcome than pure acinar cancers, with significantly shorter times to initiation of salvage therapies and the onset of metastatic disease. These features appear to be driven by uncoupling of chromosomal duplication from cell division, resulting in widespread copy number aberration with specific gain of genes implicated in treatment resistance.

For further information: [visit here or see QR](#)



BREAST CANCER CLINICAL RESEARCH GROUP

Prof Christobel Saunders

The Breast Cancer Clinical Research Group is dedicated to the translation of cancer research into policy and practice to improve patient outcomes. The group's focus spans clinical trials in breast cancer, new technology development in cancer diagnosis and treatment, supportive care research, and cancer outcomes research with a focus on value-based health care.

The team are involved with the VCCC value-based healthcare research stream, with Professor Saunders being co-chair. Current projects include:

CLINICAL TRIALS

- Breast MRI study – Validating the usefulness of MRI to aid the diagnosis of breast cancer (MRFF funded)
- Long-term outcomes of lidocaine infusions for persistent postoperative pain in patients undergoing breast surgery (LOLLIPOP trial, MRFF funded)
- Camera-based optical elastography: in-vivo detection of residual cancer using next generation optical imaging.
- POSITIVE – An international study to evaluate the pregnancy outcomes of young women who have had breast cancer and safety of interrupting endocrine treatment to attempt conception.
- Whole genome sequencing of high risk breast cancers – A national project to help identify novel somatic and potentially targetable mutations to improve therapeutic outcomes (MRFF funded)

TRANSLATIONAL PROJECTS

- Improving the outcomes of breast tumour surgery – see the next article for more information about this work with OncoRes Medical.
- The creation of the *Global Centre for Person Centred Value-based health care* – a worldwide collaboration which aims to improve the outcomes that matter to people and enable advances in patients' perception of treatments thereby leading to improvements in care and future policy developments.
- *Continuous Improvement in Care Cancer* - a program that adopts Value Based Health Care approaches and integration into Health Service provision. This program fosters the adoption of patient-centred approaches by Western Australia Health to Health Victoria. More details at ciccancer.com.

To find out more: [visit here](#) or see QR



BREAST CANCER CLINICAL GROUP GETTING CANCER OUT THE FIRST TIME

Prof Christobel Saunders

For the one in seven Australian women who are diagnosed with breast cancer, the first line of treatment is surgery. While surgeons aim to excise all of the cancer in one go, they must rely on their sense of touch to find the edges of the cancer which feel stiffer than normal tissue.

'The reality is, it's often difficult at the time of surgery to know you've hit the right spot,' breast surgeon Prof Christobel Saunders, James Stewart Chair of Surgery at the Department of Surgery, explains.

In breast-conserving surgery around 30 per cent of women must have repeat surgery to take out residual cancerous tissue.

To improve this result, Prof Saunders has identified a novel way to visualise what surgeons feel through touch. Stiffer cancer tissue reflects light differently to normal tissue so the research team are utilising light with Quantitative Micro-Elastography (QME) where the contrast in reflection can indicate cancer cells at a microscopic scale. Using this technique, the research team created an automated QME reader which identifies cancer cells with almost 100% accuracy. The QME probe is wired by fibre optic cable to a desktop console and will fit in traditional operating theatres where surgeons operate directly with their hands. The benefits of the technology is clear: surgeons are able to see cancerous tissue in real-time and the reduction in repeat surgery could significantly improve outcomes for Australian women who get breast cancer. The potential to expand its scope beyond breast cancer surgery is immense.

To turn their QME technology into a real-time surgical probe, OncoRes Medical was established to develop and refine their technology. The probe has received FDA Breakthrough Device designation and has just recently secured \$12.5 million to further fund clinical trials leading to commercialisation of the device.

While it can take years to bring a product from research to market, sustaining a start-up company can be tough. OncoRes Medical is developing new probes such as the Stereoscopic Optical Palpation (SOP), to restore the surgeon's sense of touch and improve accuracy in keyhole surgery.

"To be a sustainable Australian-based business, it's important to have a pipeline of products in development," OncoRes Medical CEO Dr Katharine Giles says. "Having the SOP product line underway is future-proofing our company."

BRAIN TUMOUR BIOLOGY

Profs Kate Drummond and Andrew Morokoff

The neurosurgery brain tumour research programs undertaken in the Department at Royal Melbourne Hospital focus on the biology and treatment of brain tumours, particularly gliomas, the most common and aggressive form of brain tumour. The Brain Tumour Biology unit are experts in tissue and data collection and the use of primary patient-derived samples to further investigate what is seen as the key hope – that genetic markers may be identified to facilitate therapy. The samples and data collected have become a key resource for brain tumour research across the precinct.

The team of clinician researchers, scientists and Masters and PhD students are undertaking research across the spectrum of brain tumour care to improve the dismal outcomes patients currently suffer. The research spans the basic science of the genetics and diagnosis of brain tumours, novel clinical trial platforms and supportive care improvements with major projects in liquid biopsy for glioma and malignant peripheral nerve sheath tumour, perioperative clinical drug trials and quality of life research with a focus on online platforms.

BRAIN TUMOUR BIOLOGY

REGAINING MOBILITY

Prof Andrew Morokoff

In a world-first, the SWITCH trial, a study designed to test a minimally invasive, fully implantable brain-computer interface (BCI, the 'Stentrode') for paralysed people to operate digital devices with their minds, has successfully completed trials in 5 patients at RMH.

Over 30 million people suffer from paralysis, with open brain surgery traditionally used as a treatment. The tiny fully implantable device is hoping to assist people with paralysis to text, email and shop online via thought; it has the potential to vastly improve the quality of life for many paralysed patients.

Developed by Synchron, a startup born from The University of Melbourne, in collaboration with the Morokoff laboratory at Royal Melbourne Hospital, the Florey Institute of Neuroscience and Mental Health and Faculty of Engineering and Information Technology, the device translates neural information from a blood vessel near the motor cortex into on-screen commands. The BCI is inserted via blood vessels and the challenge was to engineer a tiny device that could be embedded with electrodes, collapse to a few millimetres during delivery and self-expand to conform to the curvature and diameter of the implanted vessel once deployed.

Having raised AU\$97 million in capital to support the commercialisation of the device, Synchron is now entering US trials following FDA approvals and has been named TIME's Best Inventions of 2021.

BRAIN TUMOUR BIOLOGY

BRAIN CANCER CENTRE

Prof Andrew Morokoff

The Brain Tumour Biology unit formally cemented their collaboration between partner organisations in the Melbourne Biomedical Precinct through the formation of the Brain Cancer Centre, an initiative led by Carrie's Beanies 4 Brain Cancer and the Walter + Eliza Hall Institute. Founded on a shared vision to end brain cancer as a terminal illness, it will bring together the brightest brain cancer researchers to translate research discoveries into new treatments.

The Brain Cancer Centre will drive new collaborations by leveraging broad array of expertise with scientists (such as biologists, chemists, mathematicians, computer scientists and technologists) and clinicians (oncologists, surgeons, radiation oncologists and immunotherapists) all co-located within the Parkville precinct.

The Centre is forging ahead with its agenda to discover novel treatments, conduct clinical trials, data and tissue banking, and quality-of-life research, develop better predictors of how brain cancer develops, and ultimately, accelerate more effective and targeted treatments for patients.

The Brain Cancer Centre includes research collaborations between WEHI, Peter MacCallum Cancer Centre, The Royal Melbourne Hospital, The Royal Children's Hospital, Murdoch Children's Research Institute, Monash University, the University of Queensland and the Victorian Comprehensive Cancer Centre.

The collaborative have taken steps to push their research forward and recently applied for 2 major funding rounds through MRFF in 2022.

To read about Synchron's achievements, [visit here or see QR](#)



WOMEN IN NEUROSURGERY

Prof Kate Drummond

As neurosurgery celebrated its first century, women neurosurgeons came into the spotlight for Women's History month in March 2021. Prof Kate Drummond led a reflection on the history of women in neurosurgery in Asia and Australasia in a special feature for the *Journal of Clinical Neurosurgery* and highlighted the trailblazers that paved the way for opportunities in today's setting.

Casting a wide net across Asia and Australasia, Prof Drummond led a working group to reach deep into their own networks to connect as many women neurosurgeons as possible in participating countries. Data on the number and proportion of women neurosurgeons, the history of the first neurosurgeon in each participating country and stories of female leaders who made significant contributions were collected. Unsurprisingly, women neurosurgeons in the Asia and Australasia regions make up 25% or less of the total neurosurgeons in any participating country.

In India, Professor Thanjavur Santhanakrishna (T.S.) Kanaka, "a lovable terror" as described by her doting students, became the first woman neurosurgeon in Asia in 1968. Within Australia, Dr Elizabeth Lewis was the first woman neurosurgeon and completed her neurosurgery training in Cambridge in 1972. Professor Marianne Vonau became the first woman neurosurgeon trained solely in Australia in 1990.

The authors highlighted that 'In this male-dominated specialty, the challenges for women in Asia and Australasia have perhaps been even more pronounced than in North America and Europe, given the conservative social and religious contexts of many nations'. Barriers such as rigid gender roles, societal expectations, priority education for women, exploitation and discrimination in places for training and professional progression were raised. Other struggles women faced included a work-life balance, hiding pregnancies, working without pay, being underestimated and barred from receiving patients were reported in the feature.

Encouragingly, the authors noted that the turn of this century has seen smaller countries begin to produce women neurosurgeons. As society advances, women are overcoming challenges by positive role-modelling, mentorship and sponsorship by senior colleagues with more women in neurosurgery networks forming to play important roles. The authors have laid down the challenge for the next century: '...to ensure that the discussion as to whether women have a place in neurosurgery becomes obsolete'.

To read the feature: [visit here or see QR](#)



LIFE AFTER SURGERY

Prof Kate Drummond

Significant advances in treatment options and surgical techniques have dramatically improved the survival and reduced gross neurological morbidity of patients with brain tumours. Patient-centred measures of success includes an important, but complex consideration: health-related quality of life (HRQoL). In assessing HRQoL, the concept is multidimensional; factors such as physical, emotional, role, social and cognitive components of quality of life must be captured and self-assessed.

In the largest prospective, longitudinal, cross-sectional cohort study of HRQoL in low-grade glioma (LGG) patients, the Drummond research group aimed to identify actionable determinants of HRQoL.

Post-operative patients underwent HRQoL assessment using a questionnaire administered at follow-up visits and by mail. Scores at 12 month intervals were compared with those from a normative reference population and the change in symptom scores were monitored over time. Overall, the study analysed 366 questionnaires from 167 patients. These patients reported reduced global HRQoL at nearly every 12 month interval with significant impairments at 12, 72, 108, and 120+ months post-operative.

LGG patients reported considerable, sustained impairments in HRQoL after surgery, particularly in cognitive, emotional, and social function, as well as suffering significant fatigue and insomnia. These are strongly associated with global HRQoL and can be considered determinants of global HRQoL that with intervention, may improve HRQoL for LGG patients.

The study is ongoing, but it is clear that by identifying several determinants of impaired HRQoL with the available management options and interventions, there is potential to significantly improve HRQoL in these patients.

To read about the study, [visit here or see QR](#)



STEM CELL DISEASE MODELLING

Prof Alice Pébay

Prof Pébay's laboratory uses patient-specific induced pluripotent stem cells (iPSCs) to model selected human neurodegenerative diseases of the eye and brain, to uncover fundamental molecular mechanisms involved, to identify novel treatment targets for vision loss and neurodegeneration and functionally validate and translate these research findings.

The laboratory uses traditional two-dimensional cell cultures and organoids to investigate phenotypes in vitro. The research group is currently focused on creating a library of genetic characteristics for primary angle open glaucoma (POAG), age-related macular degeneration (AMD), and Alzheimer's disease. A large bank of iPSCs from healthy individuals and those affected by these conditions has been created, differentiated to cell types of interest, and then subjected to single cell RNA Sequencing. By comparing the transcriptional landscape of the various cohorts, the team can establish molecular pathways likely to be involved in the progression of these conditions.

STEM CELL DISEASE MODELLING UNCOVERING VISION LOSS

Prof Alice Pébay

AMD is a progressive, degenerative disease caused by dysfunction and death of the retinal pigment epithelium and photoreceptors, leading to irreversible vision loss. There are currently no treatments available for the advanced form of AMD (geographic atrophy), however recent studies by the Pébay laboratory confirm that mitochondrial dysfunction plays a role retinal pigment epithelium from patients with geographic atrophy.

Using iPSCs generated from patients with geographic atrophy and healthy individuals, the Pébay laboratory have been able to differentiate iPSCs to retinal pigment epithelium. Comparisons between transcriptional profiles of 127,659 retinal pigment epithelium cells generated from 43 geographic atrophy patients and 36 healthy controls were made. Transcriptomics and proteomic approaches identified molecular pathways significantly upregulated in geographic atrophy. The laboratory uncovered 5 significant protein quantitative trait loci that regulated protein expression in the retinal pigment epithelium, 2 of which share variants with cis-expression quantitative trait loci, including proteins involved in mitochondrial biology and neurodegeneration.

To read the study: [visit here or see QR](#)



STEM CELL DISEASE MODELLING A ROADMAP TO GLAUCOMA

Prof Alice Pébay and Dr Maciej Daniszewski

One of the largest and most detailed stem cell modelling studies reported for any disease, has just been published in *Cell Genome*. The multi-institutional collaboration have developed a detailed genetic roadmap of glaucoma to better understanding its aetiology as well as the identification of novel drugs targets.

The findings are the result of a national collaboration led by Prof Alice Pébay and Dr Maciej Daniszewski (Surgery and Anatomy and Physiology), Prof Alex Hewitt (University of Tasmania and the Centre for Eye Research Australia) and Prof Joseph Powell (Garvan Institute of Medical Research).

Healthy retinal ganglion cells – which transmit visual information from the eye to the brain via the optic nerve – are essential for vision. In glaucoma, the gradual damage and death of these cells leads to a progressive, irreversible decline in sight.

Obtaining retinal ganglion cells from people with Primary Open Angle Glaucoma to characterise its healthy and diseased state in living donors has always been invasive. Prof Pébay has overcome this challenge by using iPSC technology to 'reprogram' skin cells provided by donors back into stem cells and differentiating these into retinal ganglion cells in the lab. The Pébay laboratory mapped the individual genetic expression of almost a quarter of a million cells to identify features that could impact on the way genes are expressed in the cell, impacting its function, and potentially contributing to vision loss. 312 unique genetic features in the retinal ganglion cell models were identified for further investigation by Prof Powell's research team.

The research provides hundreds of new targets for researchers developing new drugs to treat glaucoma which is predicted to affect more than 80 million people globally by 2040.

To read about the study, [visit here or see QR](#)



CARDIOTHORACIC SURGERY UNIT

CARDIOTHORACIC SURGERY

Prof Alistair Royse

The Cardiothoracic Surgery Unit performs all types of cardiac surgery and thoracic surgery at The Royal Melbourne Hospital as well as Melbourne Private Hospital. The multidisciplinary team includes surgeons, anaesthetists, perfusionists, intensive care and other associated specialties within The Royal Melbourne Hospital including cardiology oncology, and radiation therapy.

Across the two campuses, approximately 1100 cardiac surgery cases and approximately 400 thoracic surgery cases are performed.

Particular areas of interest:

- Total arterial coronary artery bypass surgery
- Radial artery use as a coronary bypass conduit
- Sutureless aortic valve replacement
- Aortic aneurysm reconstruction
- Blood transfusion
- Use of a monoclonal antibody drug to lower cholesterol and measure the effect on late coronary graft outcomes
- The PEARS operation for aortic aneurysm
- Minimally invasive valve surgery
- Minimally invasive thoracic surgery.

In 2015 the unit was successful in obtaining the largest NHMRC grant awarded to a department from The University of Melbourne, for The International Multi-Centre Randomised Trial on Transfusion Triggers in Cardiac Surgery (TRICS-IV), led from Ontario, Canada. In 2019 and 2020 there were successful Canadian and Australian grants for the TRICS-IV study, focusing on younger patients.

The Royal Melbourne Hospital Cardiothoracic Unit has adopted the exclusive use of arterial coronary bypass conduits in 85 per cent of cases since 1997 –the international practice is for 5 per cent total arterial revascularisation. The technique heavily depends on the use of the radial artery – Professor Royse was the first surgeon in Australia to harvest this vessel in 1994. The Royal Melbourne Hospital is the leading international centre for its use in approximately 95 per cent of coronary bypass cases.

CARDIOTHORACIC SURGERY UNIT

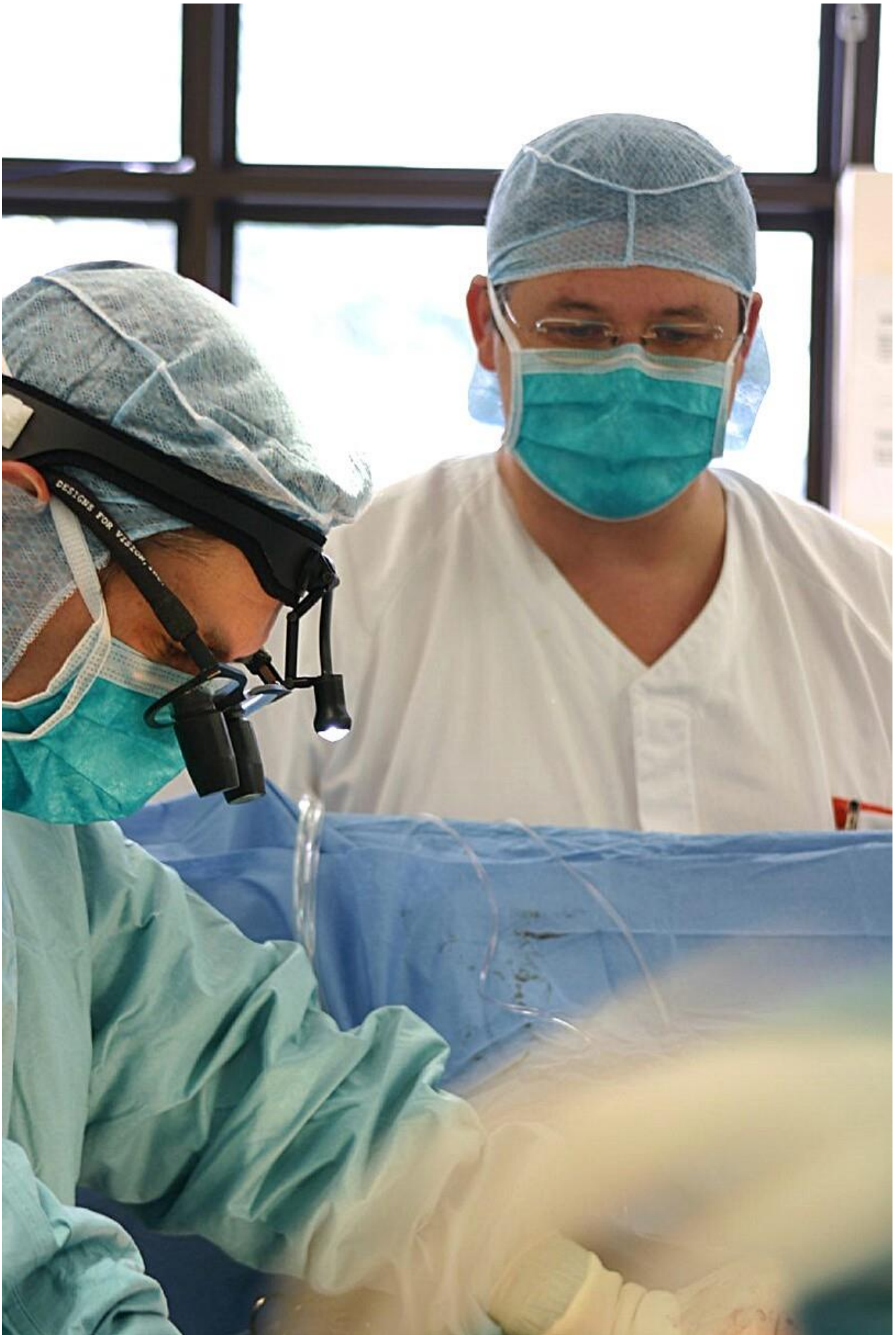
ARTERIAL CORONARY BYPASS SURGERY

Prof Alistair Royse

Although 95% of world practice for coronary bypass surgery (CABG) involves the use of at least one saphenous vein graft (SVG), the group have undertaken major analyses finding that the exclusive use of arterial conduits - total arterial revascularisation (TAR) - has a large survival advantage. In a meta-analysis of the literature and a new multi centre study of 127,000 patients, five times larger than any prior series, Bayesian analysis found that use of SVG was the cause of lower survival of at least a moderate degree with a 99.8% probability.

A PhD student, Justin Ren, further found that use of the radial artery or the internal mammary artery was associated with negligible to no evidence of any progressive failure up to 28 years postoperative, whereas use of SVG was associated with a high degree of failure from conduit atherosclerosis in the late time frame. Thus there are credible prospects for considering arterial grafts as being permanent grafts.

This work has resulted in multiple manuscripts and international or national presentations. It has significant implications for the practice of coronary surgery internationally.



EDUCATION @ MELBOURNE

The Department has an extensive online learning platform, and the Ultrasound Education Group (UEG) is one of the largest providers of clinical ultrasound training in the world. It is also a pioneer in simulator-based training which includes the use of robots for surgery.

The education platform is also the basis for the Mobile Learning Unit (MLU), academics, students and clinicians pursuing research and education projects. The MLU delivers continuing professional development training on behalf of the Melbourne Medical School and carries a wide suite of educational eLearning courses on the dedicated MLU platform.

For courses offered by UEG: [visit here or see QR](#)



For courses offered by MLU: [visit here or see QR](#)



ULTRASOUND EDUCATION GROUP INTRODUCING POINT OF CARE TRAINING

Dr David Canty

UEG has successfully introduced point of care ultrasound training into the medical school curriculum for the first time.

This year Dr Canty has been training the fourth-year medical students and staff at all the clinical schools how to perform ultrasound guided peripheral venous access. UEG are currently developing two approved Discovery subjects to be released in semester 1 next year utilising five new high-fidelity ultrasound simulators donated by the University.

The Foundations of Point of Care Ultrasound subject will train the first-year students how to use ultrasound to enhance their learning of anatomy and clinical examination of the peripheral vascular system, heart, lungs, abdomen, and pelvis.

The Application of Point of Care Ultrasound will teach the students how to perform ultrasound of the heart and cardiovascular system to enable them to diagnose a range of common cardiovascular pathologies.

ULTRASOUND EDUCATION GROUP LOOK BEFORE YOU LEAP

Prof Colin Royse and Dr David Canty

The UEG has been successful in securing a \$3.68 million MRFF grant for a pragmatic randomised controlled trial (RCT) of focused cardiac ultrasound before surgery for fractured neck of femur.

Hip fracture surgery is a major world health care burden that is worsening as the average age increases, causing major suffering to the patients and their families. This randomised controlled trial will confirm whether or not preliminary studies, indicating that an ultrasound of the heart performed before hip fracture surgery, are correct in saving lives and reducing health care costs.

This five year grant will fund a 2000 patient RCT incorporating 10 centres across Australia. Ethics has been approved and we are currently undergoing governance approval, with the hope of commencing at the Royal Melbourne Hospital later this year.

MOBILE LEARNING UNIT GRADUATE DIPLOMA OF PERIOPERATIVE MEDICINE

Dr Andrea Bowyer

The MLU launched the Graduate Diploma in Perioperative Medicine; Subjects 1 and 2 in Semester 1, 2021 and Subjects 3 and 4 in Semester 2, 2021.

The Graduate Diploma of Perioperative Medicine's objective is to upskill health professionals in the use of point-of-care ultrasound in their care of perioperative patients. The Graduate Diploma provides up-to-date critical analysis of current perioperative issues, drawing on perioperative perspectives of surgeons, perioperative clinicians and critical care specialists.

Developed and coordinated by Dr Andrea Bowyer, a Clinical Senior Lecturer and Specialist Anaesthetist within the Mobile Learning Unit, the course consists of 43 subjects written by 45 authors, drawn from surgical, medical, anaesthetic, critical care and allied health backgrounds. A total of 31 students enrolled in the advanced subjects in 2021, with additional students commencing with pre-requisite clinical ultrasound subjects.

The course leverages off the current and hugely successful point-of-care ultrasound courses provide by the MLU and extends students' knowledge on how to apply their new-found skills to the management of perioperative patients, to ultimately improve patient perioperative outcomes.

THE ROYAL VICTORIAN EYE AND EAR HOSPITAL

Centre for Eye Research Australia

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MESSAGE

PROF KEITH MARTIN

RINGLAND ANDERSON CHAIR OF OPHTHALMOLOGY

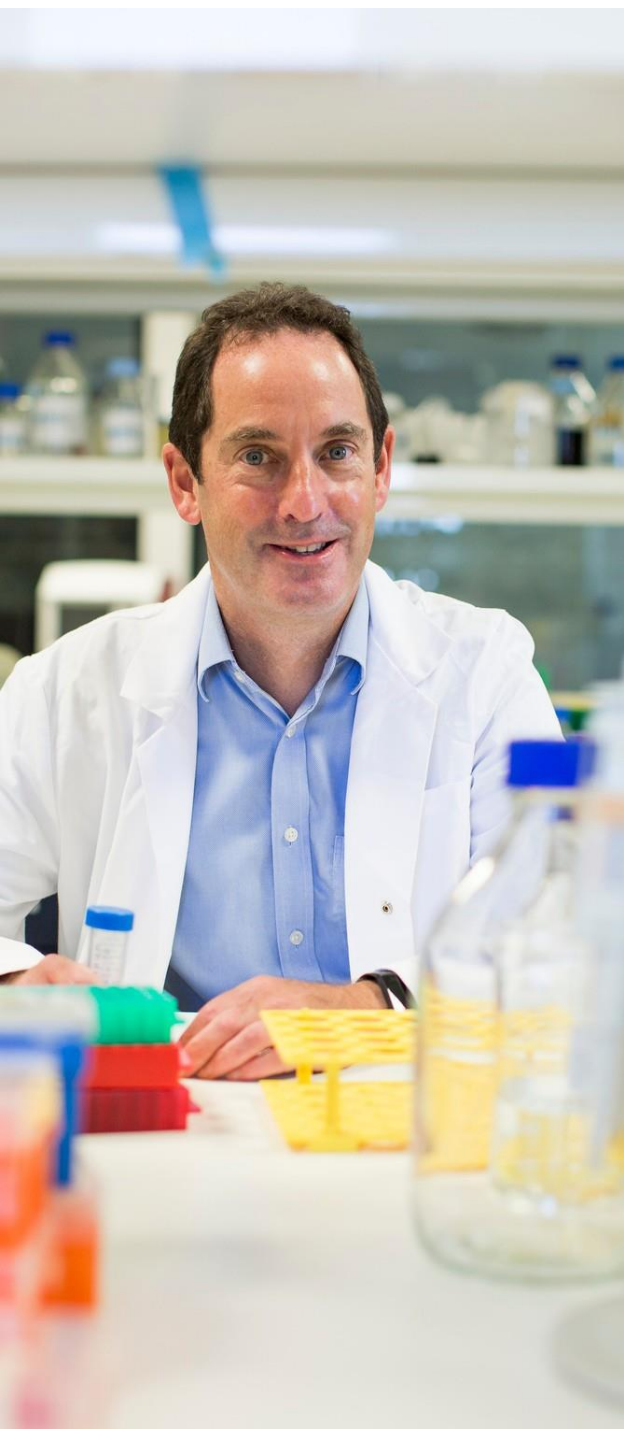
Ophthalmology research is co-located at the Centre for Eye Research Australia (CERA) and the Royal Victorian Eye and Ear Hospital. The strength of this collaboration sees the team ranked among the top five ophthalmology research groups globally – and continuing to advance vision research despite the challenges of recent years.

In 2021, ophthalmology researchers continued to deliver cutting-edge new treatments for trial participants and attract competitive research funding.

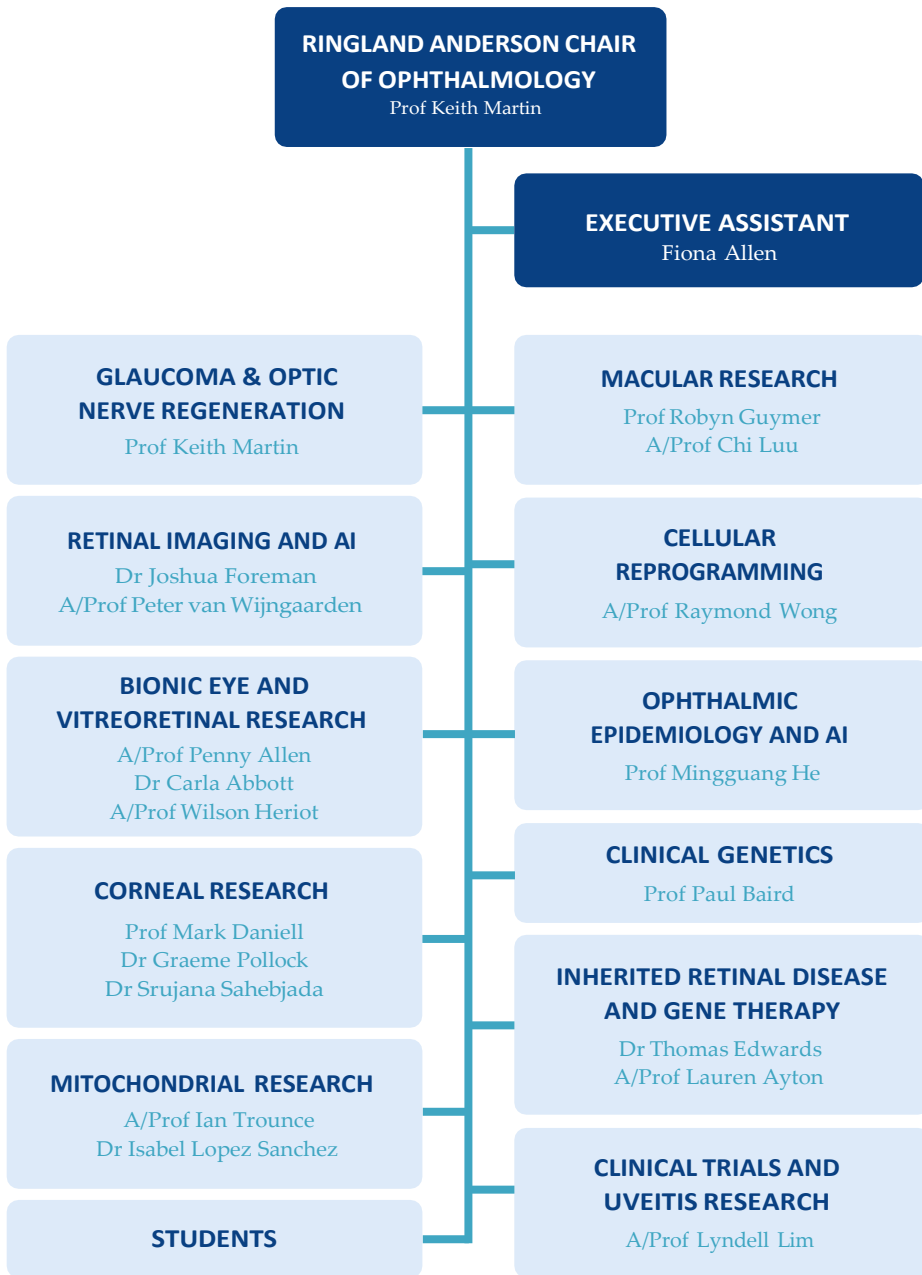
Our retinal gene therapy researchers continued progress on Australia's first trial of an experimental gene therapy for dry age-related macular degeneration. They were also part of another global study investigating the use of an anti-oxidant to prevent vision loss from retinitis pigmentosa in people with Usher syndrome.

Our corneal researchers became founding partners in BIENCO, a pioneering national collaboration funded by the Medical Research Future Fund to develop a fully bioengineered cornea.

Researchers utilising artificial intelligence and detailed imaging techniques to improve the diagnosis of eye and cardiovascular disease received funding from the National Health and Medical Research Council's Investigator Grants Scheme.



PRECINCT ORGANISATION



Key staff

Prof Keith Martin

Ringland Anderson Chair of Ophthalmology

Fiona Allen

Executive Assistant

Dr Carla Abbott
 A/Prof Lauren Ayton
 Prof Paul Baird
 Dr Thomas Edwards
 Dr Joshua Foreman
 Prof Robyn Guymer
 Prof Mingguang He
 A/Prof Lyndell Lim
 A/Prof Chi Luu
 Dr Graeme Pollock
 Dr Srujana Sahebjada
 Dr Isabel Lopez Sanchez
 A/Prof Peter van Wijngaarden
 A/Prof Raymond Wong



430
publications



19
successful grants



\$5.76m
total grant funding



15
research staff



22
research students

RESEARCH @ OPHTHALMOLOGY

Department of Surgery researchers embedded in the Centre for Eye Research Australia (CERA) have continued to develop and deliver cutting-edge novel treatments for untreatable diseases to improve patient care and create a better health system.



Prof Robyn Guymer AM. Image: Anna Carille

LEADING THE WAY IN EYE RESEARCH

Prof Robyn Guymer

For over 25 years, CERA's Deputy Director and Head of Macular Research, Professor Robyn Guymer AM has risen through the ranks of a male-dominated profession to become a world leader.

Prof Guymer was Victoria's first female medical retinal specialist at the Royal Victorian Eye and Ear Hospital and the first Australian-born woman to become a full academic Professor of Ophthalmology. Through her leadership, Prof Guymer continues to lead in age-related macular degeneration (AMD) research, currently ranking in the top two in the world for macular research.

Her team at CERA – made up of more than 20 predominantly female staff and students – has built an impressive international research program. It's a long way from the initial grant of \$10,000 which established Prof Guymer's research career and laid the early foundations for the establishment of her research team.

"I bought a portable retinal camera and spent several years travelling through regional Victoria collecting blood for DNA analysis and taking photos of the eyes of families with AMD," she says. That work was critical in developing a genetic database which informed much of Professor Guymer's early research in the years that followed.

It was also the start of a long working partnership with research nurse Melinda Cain, who is still part of her team today.

"We drove around Victoria collecting blood samples from families. A lot of the time, Melinda drove because I was either pregnant or had a new baby at home and was too tired to drive."

TEAM EFFORT

Prof Guymer says she is humbled to be inducted into the 2021 Victorian Women's Honour Roll along with so many other high calibre women. She says it's a privilege to work in research and make a difference for patients.

"I'm incredibly grateful for all of the support I've had over the years – from my colleagues in research and ophthalmology, funding bodies and generous donors," she says.

"But clinical research could not happen without the patients and I am truly grateful that they put their trust in my team and take part in our research."

MENTOR AND ROLE MODEL

A/Prof Lauren Ayton began her career in Professor Guymer's group, and says she is an inspiration to many emerging women researchers.

"Robyn is a tremendous source of support and leadership for women in our field," says A/Prof Ayton. "She actively advocates for her colleagues and provides opportunities for them to give keynote lectures, lead clinical trials and to receive awards. She is well known in our field as someone who will provide good advice and support, ensuring advancement of women. I am honoured to have her as a mentor and colleague."

CERA Managing Director Prof Keith Martin says Prof Guymer's work has been instrumental in raising the profile of macular research around the world. "Robyn is recognised as a global leader in vision research and helped save the sight of millions of people worldwide," he says. "She is an inspiration to all of us here at CERA and we are very proud of her achievements."

ADVANCES IN AMD TREATMENTS

Early in her career, Prof Guymer cared for patients with AMD. Frustrated by the lack of options to help treat patients, Prof Guymer embarked on a research career.

"I kept seeing patients in the clinic who I couldn't help," says Prof Guymer. "I decided I could continue on the same path and see a finite number of people each week and deliver the same news to them over and over again – or I could do research and help find a treatment that could change the lives of an infinite number of people."

Today, effective treatments do exist to prevent vision loss from the wet form of AMD.

Prof Guymer and her team are now focused on halting progression and finding treatments of the dry form – for which there are still no treatments. In an exciting Australian-first, the research team has begun conducting clinical trials utilising gene therapy to treat the dry form of AMD and is expecting up to 20 patients to participate in the Phase II study.

Prof Guymer also leads the National Health and Medical Research Council-funded Synergy High Risk AMD project, along with senior female colleagues Professors Melanie Bahlo, Erica Fletcher and Alice Pébay.



Dr Isabel Lopez Sanchez. Image: Anna Carlile

UNCOVERING THE LHON RISK

Dr Isabel Lopez Sanchez

New research has revealed for the first time that 96 of Australian families are affected by genetic mutations that cause the rare genetic eye disease Leber Hereditary Optic Neuropathy (LHON) – and the risk of going blind from the disease.

The research, led by CERA's Dr Isabel Lopez-Sanchez and Prof David Mackey AO from the Lions Eye Institute and University of Western Australia, has been published in the American Journal of Human Genetics.

The findings also reveal the risk of losing vision from the disease may be less than previously reported. The new information is expected to help families affected by LHON make better informed family planning decisions. It will also aid studies researching why some people are at higher risk of vision loss from the disease and help identify patients suitable for future clinical trials into potential cures.

What is LHON?

LHON is a rare genetic eye disease where mutations in mitochondrial DNA affect the optic nerve. It carries an uncertain diagnosis as some family members with the same mutation may express different phenotypes and very few people carrying the mutation will experience vision loss. However, some can experience sudden and permanent vision loss – with blindness sometimes occurring in a matter of weeks.

“People affected by LHON never go completely blind, and a small percentage may recover some vision, but the vast majority will not be able to drive, read or recognise faces,” says Prof Mackey.

“For 30 years I have worked with eye specialists around the country and the research team at CERA to be able to assemble some of the most accurate data about LHON risk anywhere in the world. Although we are still working to find treatments for LHON, knowing exactly the risk for vision loss allows us to design better clinical trials. If the federal government passes legislation to allow mitochondrial donation, we will be able to give family members accurate risk data so they can make an informed decision about opting for this new treatment.”

Study Results

The new study found 96 Australian families currently have the gene and 355 people are currently living with vision loss because of it.

It also shows the overall risk of losing vision if you have the LHON gene is 17.5 per cent for males (one in six males) and 5.4 per cent for females (one in 20 females). This is significantly less than the popularly quoted risk of 50 per cent for males (one in two males) and 10 per cent for females (one in 10 females).

Lisa Kearns, a research genetic counsellor and orthoptist at CERA has worked with LHON families for 20 years, says LHON has traditionally been known as a young man's disease.

“However, the study's findings confirm LHON can also affect a smaller number of women, older adults and younger children,” she says.

Research Impact

CERA Principal Investigator Dr Isabel Lopez Sanchez says because LHON is very rare, some ophthalmologists may have never encountered a patient with the disease.

“As a result of our study we want them to consider LHON could be a possibility if a woman, younger child or older adult has lost their vision, to avoid a delayed diagnosis or even misdiagnosis,” she says.

Dr Lopez Sanchez says the study will provide researchers with a comprehensive database of people they can ask to take part in future clinical trials and studies aiming to prevent or treat vision loss.

Accurate information on the risk of vision loss allows families to make informed choices when planning their families. Future clinical trials aimed at preventing vision loss in LHON will also rely on accurate data on risk and age of vision loss because an inaccurate risk may lead to an underpowered study or a false claim of efficacy.

The research is supported by the Ophthalmic Research Institute of Australia, the Mito Foundation, and Australia's National Health and Medical Research Council. The Centre for Eye Research Australia (CERA) receives Operational Infrastructure Support from the Victorian Government.

To read the article: [visit here](#) or see QR



GLAUCOMA & OPTIC NERVE REGENERATION

RECONNECTING NERVE TRANSPORT SYSTEMS

Prof Keith Martin

Despite being vastly different conditions, both glaucoma and dementia affect the nervous system. In glaucoma, an interruption of signal transmissions along the optic nerve leads to vision loss and blindness, while in dementia the build-up of tau proteins in the brain disrupts communication between the cells responsible for memory and cognitive function.

Research led by Prof Keith Martin and Dr Tasneem Khatib from the University of Cambridge has shown that a new approach to gene therapy may restore nerve function and reverse symptoms of both conditions.

Pre-clinical studies where the introduction of genes promoting the production of brain derived neurotrophic factor (BDNF) and tropomyosin receptor kinase B (TrkB) to encourage axon growth, have shown an improvement in optic nerve activity after receiving the therapy as well as signs of improved vision.

An additional slight improvement in short-term memory was also seen among dementia pre-clinical models. Crucially, the approach also appears to lead to a sustained therapeutic effect, which is an important consideration for treating chronic degenerative diseases.

Creative application of gene therapy to polygenic conditions opens the door to exciting possibilities and provides hope in treating debilitating diseases.

This research was published in the journal *Science Advances* in April 2021, and was funded in the UK by Fight for Sight, Addenbrooke's Charitable Trust, the Cambridge Eye Trust, the Jukes Glaucoma Research Fund, Quethera Ltd, Alzheimer's Research UK, Gates Cambridge Trust, Wellcome Trust and the Medical Research Council (UK).

OCULAR ONCOLOGY RESEARCH

IMPROVING EYE CANCER CARE

Dr Rod O'Day

Victoria's first Ocular Oncology Research Unit is investigating new ways to improve diagnosis and treatment of melanomas of the eye. Led by Dr Rod O'Day, the research unit is looking to diagnose cancers earlier by educating optometrists in how to diagnose and manage tumours using improved techniques with imaging technology.

Like skin, the eye can develop a freckle or mole called a choroidal nevus. While these growths, which affect as much as six per cent of the Australian adult population, are almost always benign, they can grow into malignant melanomas.

Current multimodal imaging can accurately distinguish between a benign mole and a melanoma, but this requires having access to expensive pieces of equipment and the experience to interpret the results. Dr O'Day is working with CERA Deputy Director A/Prof Peter van Wijngaarden, to use hyperspectral imaging to help characterise tumours at the back of the eye. The hope is that this technique can precisely mark out the borders of lesions and monitor change and growth more accurately.

Crucial to this work will be integrating basic and clinical research into the routine care of patients with eye cancers at the Eye and Ear. Collaborations with medical and radiation oncologists at Alfred Health, Peter MacCallum Cancer Centre and across Australia will also be critical to ensuring patients have access to clinical trials and new treatments.

To read the article: [visit here or see QR](#)





Dr Rod O'Day. Image: Anna Carlile



THE ROYAL VICTORIAN EYE AND EAR HOSPITAL

Otolaryngology

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MESSAGE

PROF STEPHEN O'LEARY

WILLIAM GIBSON CHAIR OF OTOLARYNGOLOGY

The Royal Victorian Eye and Ear Hospital is a world leader in the treatment of hearing loss and ear (otological) surgery. The Department plays a pivotal part in ensuring that new innovations are brought into surgical practice.

We interface lab-based and clinical research, leading to highly productive translational research outcomes. We are at the front of research into cochlear implantation, and the preservation of hearing and balance function while operating on the inner ear.

Our laboratory research seeks to understand the biological response of the inner ear to surgery and other types of stress, and applies drug delivery, gene therapy and regenerative strategies to the protection of restoration of hearing and vestibular function.

PRECINCT ORGANISATION



Key staff

Prof Stephen O'Leary
William Gibson Chair of Otolaryngology

Cassandra Lewis
Executive Assistant

Dr Christo Bester
Kate Brody
Amy Brown
Dr Aaron Collins
Amelia Darke
Helen Feng
Amy Hampson
Samantha Moreland
Elizabeth Rose
Dimitra Stathopoulos
Dr Justin Tan
Emma Watson
Dr Sudanthi Wijewickrema
Dong Zhang

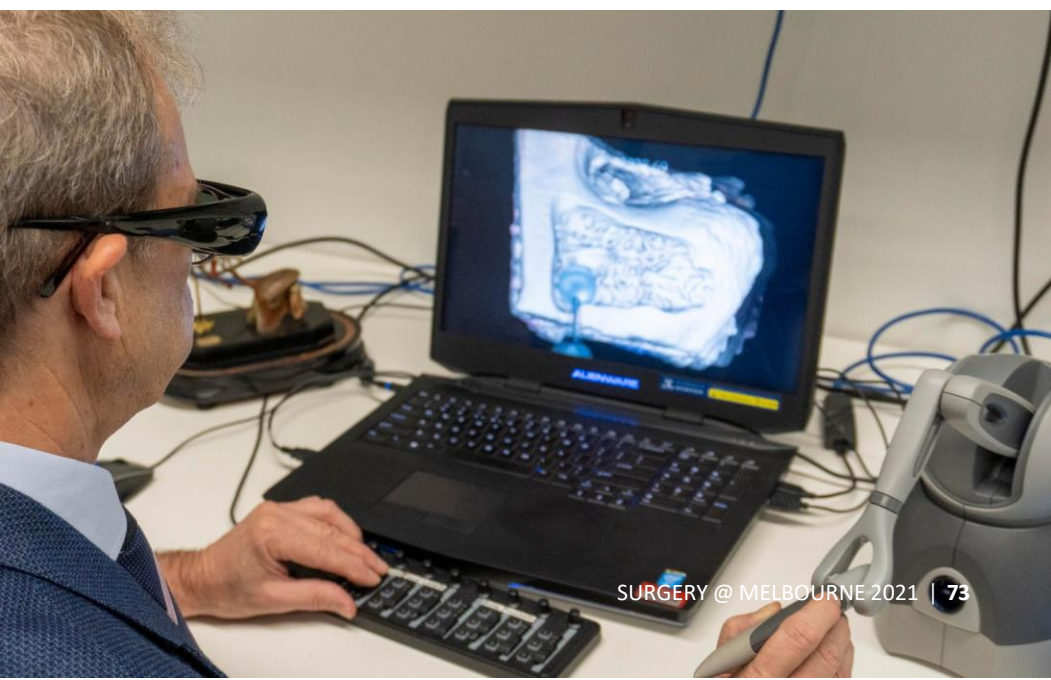
 **114**
publications

 **2**
successful grants

 **\$1.36m**
total grant funding

 **17**
research staff

 **12**
research students



RESEARCH @ OTOLARYNGOLOGY

The Royal Victorian Eye and Ear Hospital is a world leader in the treatment of hearing loss and ear (otological) surgery. The Department plays a pivotal part in ensuring that new innovations are brought into surgical practice.

The Department is uniquely situated at the interface of lab-based and clinical research, leading to highly productive translational research outcomes. The research team sits at the forefront of research into cochlear implantation, and the preservation of hearing and balance function while operating on the inner ear.

The Department seeks to understand the biological response of the inner ear to surgery and other types of stress, and applies drug delivery, gene therapy and regenerative strategies to the protection of restoration of hearing and vestibular function.

OTOLARYNGOLOGY

NOVEL HEARING PROTECTION DRUGS

Professor Stephen O'Leary and Dr Justin Tan are collaborators with Monash University on a multi-disciplinary project to investigate the role of proteases and their inhibitors on hearing.

Patients with mutations in an inhibitor gene, Serpinb6, lose their hearing between 10 and 20 years of age and their hearing continues to deteriorate as they become older. Through this collaboration, the Department will be the first to use mouse models to demonstrate that this deafness originates in the inner ear associated with the death of multiple cell types when the inhibitor is absent. The team have successfully refined their mouse model to closely mimic the time course of cochlear degeneration in humans.

More interestingly, noise accelerates the hearing loss in mutant mice lacking the Serpinb6 gene, providing clinical insights into how deafness in this cohort of patients could be better managed. The research team have identified small molecule mimetics of Serpinb6 gene and have filed a provisional patent to protect the use of these mimetics to treat hearing loss.

OTOLARYNGOLOGY

HEARING LOSS AFTER IMPLANTATION

Professor Stephen O'Leary, Dr Christo Bester, Dr Aaron Collins and Dr Sudanthi Wijewickrema are pioneering the use of real-time intra-operative monitoring of hearing function during cochlear implantation to actively preserve function in theatre. They have developed and are testing an automated system that detects damage to the sensitive hearing structures during the implantation of the electrode array and enables the surgeon to intervene to protect hearing.

The intra-operative monitoring system includes a suite of electrical measurements such as impedance, and has been integrated into Cochlear Ltd's Research Platform for international deployment. The team are now working on understanding the exact underlying mechanisms that cause both intra-operative and post-operative hearing losses after cochlear implantation by leveraging a strong understanding of the normal function of auditory physiology, and an in-house database of intra-operative recordings – the largest database of its type in the world.

OTOLARYNGOLOGY

VIRTUAL REALITY SIMULATION

Dr Sudanthi Wijewickrema, A/Professor Jean-Marc Gerard and Prof Stephen O'Leary have been working on multi-disciplinary projects that utilise virtual reality to span through areas of surgery, education and computer science.

Several projects were completed in 2021 such as:

- The automatic generation of cochlear implant electrode trajectory
- A study on the transfer of skills from virtual reality to real media and the effect of surgical rehearsal on a novice cohort
- Development of a simulation-based anatomy module for teaching clinically oriented temporal bone surgery
- Using deep learning for 3D medical image processing

This work has resulted in numerous publications in journals and conference proceedings.

Two PhD candidates working on these projects successfully completed their thesis (Bridget Copson and Tohidul Islam) while two more PhD students (Jesslyn Lamtara and Zhixuan Wei) began their candidatures.

HEARING RESEARCH

The Department has been using light sheet microscopy to explore cochlear implantation research. Building on their imaging techniques, the team have been refining the process by using the same tissue imaged by light sheet microscopy for subsequent confocal microscopy. The tissue is re-hydrated, dissected and subsequently processed for further immunofluorescent labelling. Processing the tissue in this way offers greater clarity at high magnification, allowing cellular morphology and sub-cellular structures such as synapses to be analysed.

- PhD candidate, Tayla Razmovski, is examining how to manage bleeding during surgery. Blood is usually flushed out of the cochlear during surgery, but does this influence cochlear trauma, the tissue response and hearing in general? Early work has shown that flushing the cochlear does reduce the extent of tissue response following cochlear implantation, but does not show further damage to hearing.
- Kate Brody and Dong Zhang are characterising the different subtypes of collagen present in the cochlea to understand the development and effect of scar tissue within the inner ear after cochlear implantation and how this influences the cochlear implant function. The collagen subtypes are labelled in both implanted and control tissue to look for alterations in their distribution after implantation. By immunostaining for inflammatory markers (*see below, panel A*) as an indication of the tissue's response to the cochlear implant, the team is able to map both inflammatory and myo-fibrotic tissue (*below, C*) and examine how the cochlear reacts to the implant.

ABORIGINAL EAR HEALTH

Otolaryngology is committed to supporting Indigenous ear health. In 2020 Professor O'Leary co-authored national guidelines on the treatment of otitis media amongst Indigenous Australians, and on International Hearing Day in 2022, Prof O'Leary presented a webinar on the innovative Otitis Media Guidelines app, which provide clear and practical guidance for clinicians and Indigenous communities.

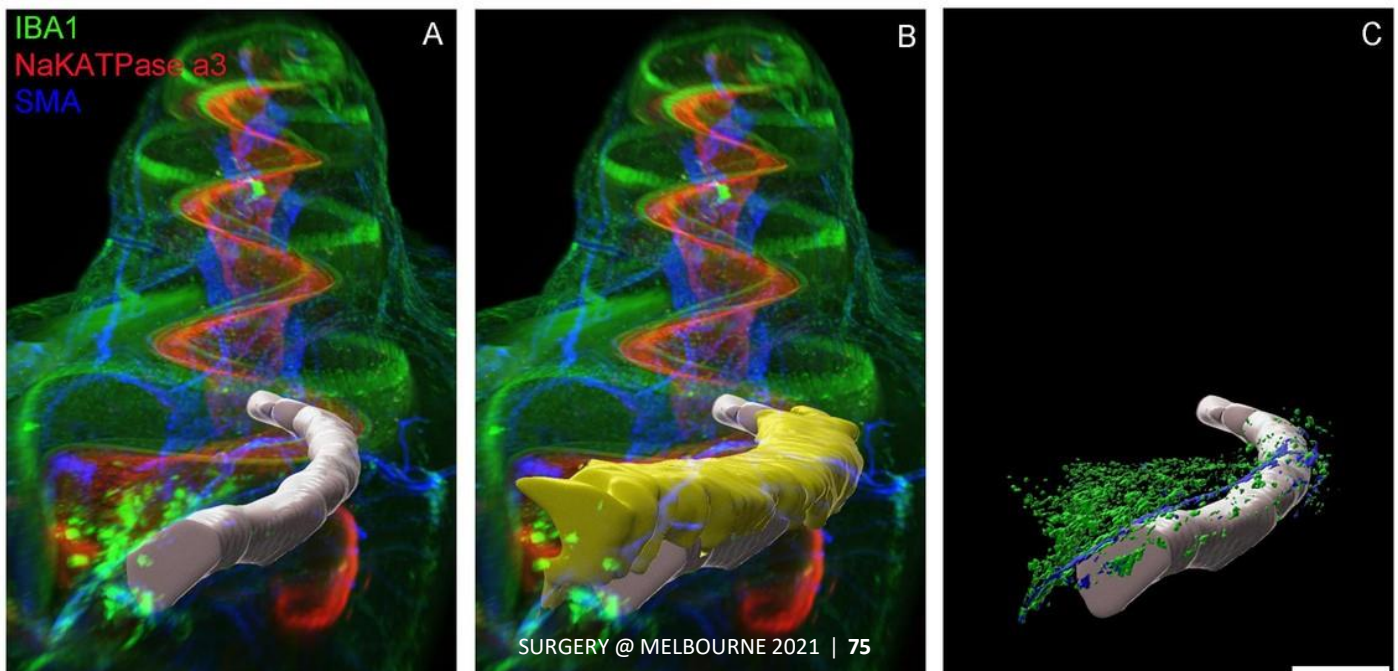
On the national front, the Department has led a large, multi-site, national study on the success of surgical treatments for young Indigenous children who have otitis media. This has shown the relative strengths of the treatment options available, and this will assist clinicians with evidence-based decision-making and provide communities with evidence upon which to decide upon the treatment for their children.

Dr Aaron Collins won the prestigious Dean's Innovation Prize in 2020 for surgical tools to progress his work on a surgical tool to quantify ear-bone (ossicular) movement. The work was motivated by observations that Indigenous Australians with chronic ear infection (otitis media) had poorer hearing outcomes than expected. Ultimately, the tool is expected to play a major role in clinical trials to understand the cause of poorer hearing outcomes in the community.

For more on the guidelines and the app: [visit here or see QR](#)



An implanted cochlea triple labelled with a surface indicating the position of the implant; Labelled with IBA1 for inflammatory cells, NaKATPase alpha 3 for neuronal tissue and smooth muscle actin for myo-fibrotic tissue. Scale 700µm.





Northern Health

Northern Health

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MESSAGE

PROF SHEKAR KUMTA

The Department at Northern Health has newly appointed Prof Shekar Kumta to the role of Precinct Lead who will be joining the Department in September 2022.

Prof Kumta will build on the progress made by Head of Surgical Research, Dr Russell Hodgson, to further broaden the research expertise at Northern.

Prof Kumta explained at his appointment: "I am excited about my role as academic lead in an important Hospital that straddles Melbourne's growth corridor.

Research and Education as integral towards providing high quality healthcare. I am interested in helping colleagues in their research endeavours, so that they may contribute not only towards their academic growth, but also, to improve healthcare outcomes in a variety of ways. Likewise, I also hope to leverage my teaching experiences particularly towards addressing any gaps we may have, in helping students during their transition from medical student to a responsible health professional."

RESEARCH @ NORTHERN

Northern Health is actively pursuing a clinical research program with a good mix of retrospective and prospective studies.

The research is concentrated in general surgery and orthopaedics, although there are also research interests in plastics, urology and vascular surgery. The researchers have been involved in the international *CovidSurg* studies and are one of the highest recruiting centres in Australia, which reflects their location as one of the critical centres within geographical distance to many of the Victorian COVID outbreaks.

Research highlights for this year include:

- A randomised controlled trial exploring the use of negative pressure dressings to reduce wound infections in emergency laparotomies
- The multi-centre SoCS FREE OT study looking at using sequential calf compression only during laparoscopic cholecystectomies for the prevention of deep vein thrombosis
- A prospective histological assessment of de novo gastro-oesophageal reflux disease after sleeve gastrectomy.

People is the biggest asset at Northern, and the Department has doubled the number of honorary staff to include A/Prof Wanda Stelmach (CMO and breast surgeon), Dr Juliette Gentle (Head of Orthopaedics), Dr Sarah Condron (Deputy Director, and Head of Paediatric Surgery) and Dr Neil Strugnell (Head of Colorectal Surgery).

The Department continues to play a large role in the Doctor of Medicine Rural Stream, and research required by registrars as part of their training.

Northern has a well-established pathway that develops a research culture embedded into every surgical unit and is looking forward to the time that every patient who comes through the doors is considered for the next study that advances our knowledge.

Key staff

Prof Shekar Kumta
Precinct Lead

Michelle Marcola
Executive Administrator

Dr Russell Hodgson
Surgical Lead

Dr Candy Cheng
Honorary

Dr Yuen Chiu Kang
Honorary

Dr Sarah Condron
Honorary

Dr Juliette Gentle
Honorary

Dr Rodrigo Plens Teixeira
Honorary

Dr Prassannah Satasivam
Honorary

A/Prof Wanda Stelmach
Honorary

Dr Neil Strugnell
Honorary



8
publications



1
successful grant



\$5,000
total grant funding



10
research staff



Western Health



Western Health

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MESSAGE

A/PROF JUSTIN YEUNG

The Department of Surgery at Western Health is geographically located across two campuses: Footscray Hospital and Sunshine Hospital, where the Department is located in the Western Centre for Health Research and Education (WCHRE).

The Western Health network has continued to grow over the last year and this has been reflected in the investment of a new Footscray Hospital site which will be completed in 2025.

With this growth, there has been an increased involvement of our Department to support the Western Clinical School in the mentorship and teaching of medical students, help develop training opportunities for our surgical trainees, and develop and lead new research initiatives to find novel treatments for diseases that affect our multicultural patient population.

PRECINCT ORGANISATION



Key staff

A/Prof Justin Yeung
Precinct Lead

Anna Bogusz
Executive Assistant

Jill McGregor
Administrative Assistant

Mr Yasser Arafat
Colorectal Clinical and Research Fellow

Prof Steven Chan
Professor of Surgery

Elizabeth Degabrielle
Research Assistant

Doris Ke Cao
Clinical Research Fellow

Jo Yeung
Research Assistant

 **35**
publications

 **1**
successful grant

 **\$100,000**
total grant funding

 **6**
research staff

 **4**
research students



RESEARCH @ WESTERN

The research conducted at the Department of Surgery at Western Health focuses primarily on inequalities in cancer care, tailored cancer treatment and optimising surgical education and training to improve on student and trainee mentorship, career guidance and development of well-being in the work environment.

In the past year, Western Health has been focused on a number of projects with an eye to improve patient outcomes, particularly for patients with culturally and linguistically diverse backgrounds (CALD).

CANCER CARE

SUPPORTING THE CALD COMMUNITY

Few programs of research have focused on the CALD community, but Western is challenging this with new projects and collaborations that are gaining traction:

- Working in partnership with Western Health, the department is developing a patient-centred information app, *Leaflet*, to better inform and support patients from CALD backgrounds in their surgical treatment pathway and journey, in their own language. The research group was awarded \$300 000 to support the development of the app to be developed in conjunction with TAG Direct, Melbourne.
- A joint study with the Colorectal Cancer Unit at the Peter MacCallum Cancer Centre investigated the Patient Reported Outcome Measures (PROMs) in colorectal cancer patients. The purpose of the study was to identify the inequalities in GI cancer care with respect to diagnosis, treatment and surgical outcomes throughout Victoria by examining the uptake of PROMs from patients with CALD backgrounds.

CLINICAL CARE

EXPANDING WESTERN'S EXPERTISE

- **Dr Richard Gartrell**, a CSSANZ Clinical Colorectal Fellow, is currently completing his Masters of Research at the Western Precinct on rectal cancer outcomes and its association with body composition. Richard has been invited to speak on his research findings at the 2022 RACS Annual Scientific Congress. Richard has also been heavily involved in the development of surgical education, teaching at the Western Precinct and importantly, supporting retake students to succeed.
- **Dr Yasser Arafat** is a new colorectal researcher and teaching fellow at Western Health. Yasser is a Consultant General Surgeon, having completed his training in Queensland. He has recently started in this unique academic position which encompasses an important teaching role both with the Western Clinical School as well as being a member of the DoS Education Committee and involvement with curriculum development with the new MD course at the MMS. Yasser's interest is in colorectal cancer outcomes and how we can better tailor treatment to this common condition.
- **Ke Cao (Doris)** is an interdisciplinary research fellow at the Western Precinct, specialising in applied artificial intelligence and bioinformatics in Medicine. Ke is completing her PhD at CERA, but has recently joined Western Health to support the at-risk prediction tool development. Her interest in machine learning on clinical data has the potential to improve our knowledge disease, improve diagnostic and prognostic tool accuracy, and informing decision-making.

CLINICAL CARE

PREDICTING OUTCOMES WITH MACHINE LEARNING

In collaboration with VCCC and Western's Departments of Geriatrics and Allied Health, the department is developing a predictive tool that identifies at-risk colorectal cancer surgery patients who may benefit from prehabilitation therapy.

Funding from IAP supports innovative solutions that have potential for global product and services impact with support and mentorship as innovations move from ideas to articulated products ready for IP protection, investment and commercialisation.

EDUCATION @ WESTERN

Surgical teaching has been challenged in the last two years. Like all DoS Precincts, Western Health has adapted with the changing environment.

Mentorship has become a prominent feature at Western and the department has excelled in offering a surgical mentorship program that initially ran over six months every week for two hours to cover essential surgical skills and examination techniques, professional mentorship and career guidance. Developed in collaboration with the University's MD2 students, the curriculum has been adopted by other Precincts.

Surgical intern teaching was also tailored towards the requirements of our junior doctors, in particular with the introduction of clinical scenarios as well as teaching of skills that were commonly required during their rotation including plastering, assessment of ischaemic limbs and troubleshooting difficult urethral catheterisation. As part of this initiative, we offered access to these teaching sessions to our final year medical students by Zoom.

SURGICAL EDUCATION

GROWING A RESEARCH COLLABORATIVE

Excellent clinical care begins with quality clinical research. It has been a priority this year to focus on mentorship for junior researchers, in particular medical students and junior clinicians. A study at Western Health examined the barriers to research at the undergraduate level has found that improved mentorship and skills training, as well as engagement as part of a research collaborative, was essential.

To tackle these two areas, the Western Health Surgery Research Group (WestSuRG) was formed in 2020 which included surgeons, trainees, junior doctors and medical students as members, to create an environment that fostered research interest, talent and encourage collaborations with inter/national institutions. To foster the skills of emerging researchers, WestSuRG has been supporting trainee-led initiatives such as monthly mentorship meetings and regular monthly research forums (such as statistical methodology).

Since its inception, WestSuRG has been busy. The collaborative has participated in, or leads, the following new projects:

COVIDSURG

WestSuRG participated in and recruited for this international prospective multi-centre study in 2020. The aims were to determine the optimal timing of surgery following COVID-19 infection and assess postoperative morbidity and mortality. Over 120 countries were involved and more than 142,000 patients recruited. Research team members at Western Health played an important role in contributing data for this pivotal study. The study has resulted in two publications thus far, including one published in the *British Journal of Surgery*.

POSTVENTT

This is an international collaborative prospective clinical audit that WestSuRG is participating in 2021. It involves over 50 centres across Australia and New Zealand with the aim to look at current anaemia management clinically following major abdominal surgery. This study will soon enter recruitment phase in July and data entry will likely finish in mid September 2021.

PROTECTING

WestSuRG is one of the research teams for this large Australian multicentre retrospective study. The current study looks at patients who have had anti-reflux surgery over a 10 year period and analysing 30 day outcomes, including bleeding and venous thromboembolism. This study is in data collection phase now and this likely will be completed in early September 2021.

SOCS FREE OT

WestSuRG leads a new national multi-centre clinical trial with Northern Precinct research lead Dr Russell Hodgson to examine the use of sequential compression alone for the prevention of DVT in operating theatres in patients having laparoscopic cholecystectomies (SoCS Free OT).





Epworth HealthCare

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MESSAGE

PROFESSOR RICHARD DE STEIGER
VICTOR SMORGON CHAIR OF SURGERY

As with all hospitals, COVID-19 has taken its toll. It's been felt particularly on a hospital network such as Epworth HealthCare which relies heavily on elective surgery.

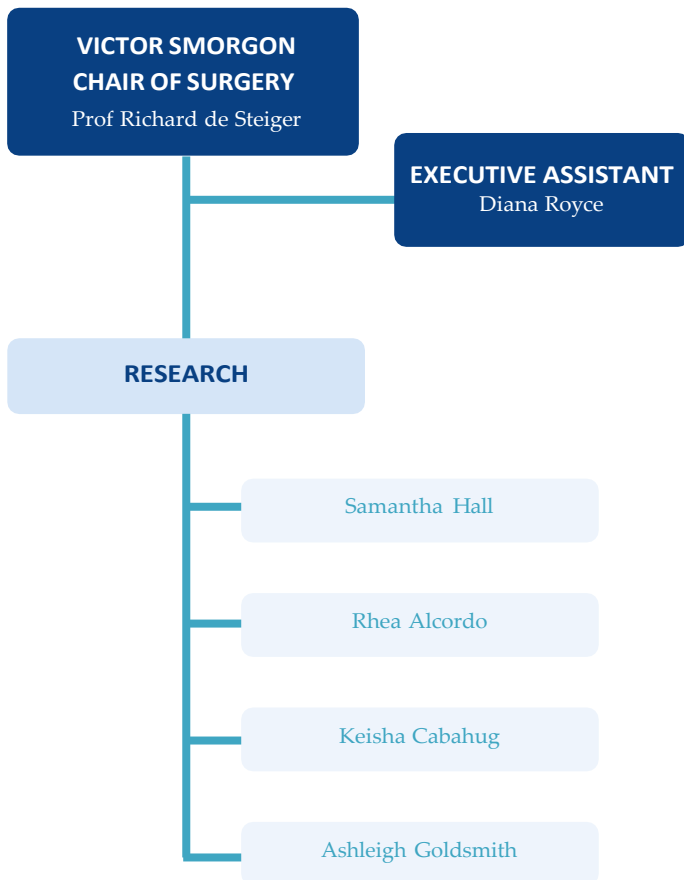
There was an approximate 30 per cent reduction in joint replacement surgery last year, and this impacted on recruitment for two of our large clinical trials. We have continued our relations with the University of Melbourne Department of Engineering and the CMIT project, and worked closely with the TGA in conjunction with developing documentation on personalised medical devices.

Access to the hospital for medical students in the teaching program rapidly changed to online Zoom tutorials. Epworth did its best to accommodate our Medical School by allowing students to attend the private practice consulting rooms at the end of their year to enable some patient contact. We have also introduced supervised examination sessions in the Foundation term to better prepare students for the ward.

As part of Epworth's Strategic Plan for Innovation and Surgical Research, a Centre for Robotic Surgery is being developed using different robotic technologies.

Closer to the Department, a major focus will be to establish the Epworth HealthCare Surgical Research and Innovation Centre, which will support all aspects and types of surgical research projects but primarily focus on musculoskeletal.

PRECINCT ORGANISATION



Key staff

Prof Richard de Steiger
Victor Smorgon Chair of Surgery

Diana Royce
Executive Assistant

Samantha Hall
Clinical Research Team Leader

Rhea Alcoro
Clinical Research Nurse/Research Assistant

Keisha Cabahug
Clinical Research Nurse

Ashleigh Goldsmith
Clinical Research Coordinator

The Epworth research unit



 **12**
publications

 **2**
successful grants

 **1**
Fellowships and Scholarships

 **\$50,000**
total grant funding

 **5**
research staff

 **7**
research students

RESEARCH @ EPWORTH

While small, the Department of Surgery at Epworth HealthCare have been incredibly productive and highly collaborative in 2021.

Epworth HealthCare has the largest volume of orthopaedic procedures in the state and performs one of the highest number of joint replacements annually in Australia. This makes Epworth Healthcare well-placed to conduct quality clinical trials examining patient outcomes and the use of new technology enabling joint replacement arthroplasty.

The research team have completed the recruitment for two large multi-centre research studies and the information is currently being analysed in preparation for publication (see the updates for ASAP and CRISTAL studies).

A new clinical study on the evaluation of a digital health platform for total knee replacement recovery has commenced (see the update for *mymobility™*) and the team is also developing a smartphone app to support pain management for post-operative patients. Another study that has been completed investigates the evaluation and validation of SENSOR technology to measure soft tissue tension for optimal knee replacement balancing.

To build on their work with Digital Healthcare, the research team were successful in a hospital-based grant to improve rehab in the home for joint replacement patients. The department also collaborated with other institutions on two successful grants evaluating AI for fracture identification and for reducing the length of stay of patients undergoing surgery for fractured neck of femur.

CLINICAL CARE

PATIENT EDUCATION

Ongoing research at Epworth in conjunction with Deakin School of Nursing over several years has investigated the use of multimedia technology to prepare patients for surgery and to aid their post-operative recovery.

Modules have been developed for hip and knee replacement, cardiac surgery and obstetrics in conjunction with clinical experts and robust literature searches. Modules on spinal surgery (discectomy and fusion) was completed and implemented for clinical use in late 2021. The modules are now embedded in Epworth's point-of-care and future research will examine other surgical interventions.

CLINICAL CARE

ARC TRAINING CENTRE FOR MEDICAL IMPLANT

TECHNOLOGIES (CMIT)

Epworth is a major contributor to the University of Melbourne Technology Grant under the direction of Professor Peter Lee, Department of Mechanical Engineering.

Epworth has developed guidelines for an implant registry for 3D printed devices and has engaged with the TGA to develop a document on personalised medical implants which was published in late 2021.

There has been completion of online learning modules for PhD students, in conjunction with PRAXIS, consisting of the regulatory and research requirements for device introduction into marketplace. The research team have also engaged with several industries involved in 3D printing to develop workflows.

For further information: [visit here](#) or [see QR](#)



DATA LINKAGE

DATA LINKAGE PROJECTS

Professor Richard de Steiger has a longstanding role as Deputy Director of the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) and is Clinical Investigator on a number of projects with the aim of enhancing joint replacement outcomes. An NHMRC grant has enabled linkage of the AOANJRR to existing health data, including MBS and PBS data, state-based hospital data and the Australian Cancer Database.

Data linkage between 21 Australian datasets has been completed, linking over 1 billion records across all states and territories. This has taken over 30 months to perform, reflecting how difficult it is to get all states to co-operate. Over 95 per cent of records matched with all joint replacements performed in Australia since 2002.

Professor de Steiger is also leading a study on periprosthetic joint infection (PJI) rate in Australia with two manuscripts submitted for review. Other papers currently in preparation include linking co-morbidities with outcomes to develop risk calculators, complications and medication use in relation to joint replacement. Notably, the team have published on the correlation between medications with ASA scores for joint replacement.

To read about the study, [visit here](#) or [see QR](#)



ASAP STUDY

A MULTI-CENTRE RANDOMISED DOUBLE-BLIND PLACEBO-CONTROLLED TRIAL OF COMBINATION VANCOMYCIN AND CEFAZOLIN SURGICAL ANTIBIOTIC PROPHYLAXIS

This is a national trial that examines the addition of Vancomycin to the standard antibiotic prophylaxis regime for patients undergoing hip and knee joint replacements. The team will be investigating whether the addition of Vancomycin to the standard perioperative antibiotic will reduce the infection rate in joint replacement – currently one of the major issues facing implant surgery.

Leveraging the large volume of MSK patients seen at Epworth HealthCare Richmond, the department will recruit the largest number of patients. COVID-19 markedly reduced Epworth's ability to recruit in early 2021 but with the resumption of surgery, Epworth managed to navigate COVID challenges and recruited a tremendous 645 participants for this trial. The trial has now closed and analysis and manuscript writing is currently ongoing.

MYMOBILITY™ STUDY

A PROSPECTIVE MULTI-CENTRE LONGITUDINAL COHORT STUDY OF THE MYMOBILITY PLATFORM FOR RECOVERY AFTER TKR

This study determines if exercise and education provided through a mobile application can provide a superior model of care when compared to current standard of care models for hip and knee arthroplasty.

This study was due to finish December 2021 however due to COVID-19 interruptions it is continuing throughout 2022. This study currently has 45 participants enrolled.

PAIN TRACKER APP

Epworth is currently in the early phases of commencing an investigator-initiated study to assess the use of a new iPhone-based Application that will allow tracking and monitoring of patients' pain levels and analgesic usage post orthopaedic surgery. This App may assist clinicians to identify uncontrolled pain levels or inappropriate analgesia usage in patients.

CRISTAL STUDY

A REGISTRY NESTED STUDY

Venous thromboembolism (VTE) is a common complication following joint replacement surgery. This multi-centre cluster-randomised crossover non-inferiority trial aims to determine the relative effectiveness and safety of aspirin compared to low molecular weight heparin (LMWH) in preventing VTE in elective hip and knee replacement surgery patients.

The study has been completed, and a manuscript has been submitted for publication in Journal of American Medical Association (JAMA).

For an accompanying publication describing the statistical analysis, [visit here](#) or [see QR](#)



DISTINCT STUDY

RANDOMISED TRIAL OF DUAL MOBILITY VS STANDARD THR FOR FRACTURED NECK OF FEMUR

Dual mobility cup (DMC) total hip replacements are a commonly used total hip replacement (THR) design that allow an increased range of motion in all directions before dislocation occurs. Further evidence is required to determine whether DMC total hip replacements can reduce the number of dislocations and revision surgeries for patients who have a hip fracture compared to the use of a conventional hip replacement.

Set across more than 50 sites nationally, Epworth has currently recruited 12 patients into this cluster randomised trial. The team is looking to reach 16 participants to compare the effectiveness of DMC to conventional THA for femoral neck fracture in reducing the risk of hip dislocation in the first post-operative year.



Royal Children's Hospital

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MESSAGE

PROFESSOR ANTHONY PENINGTON
JIGSAW PROFESSOR OF PAEDIATRIC PLASTIC AND
MAXILLOFACIAL SURGERY

The Royal Children's Hospital, the Murdoch Children's Research Institute and the University of Melbourne together make an interwoven, symbiotic relationship delivering high-quality clinical services underpinned by research and education.

Collectively, the independent entities contribute to a paediatric health sciences precinct which is greater than the sum of the parts. The presence of each benefits the other, ensuring the primary focus of each entity is achieved.

The delivery of innovative, high-quality paediatric care is unsustainable without the input of research and education. World standard research into paediatric diseases and education of medical students and other health care professionals in paediatric health is not possible without access to a paediatric clinical environment. Hence the interdependence of the three partners.

VASCULAR ANOMALIES

Prof Anthony Penington

Prof Tony Penington leads a multidisciplinary team for vascular anomalies including haemangioma, the most common tumour of infancy and vascular malformations, a less common condition. Prof Penington also provides leadership for the Plastic and Maxillofacial Unit's clinical research effort to find new treatments for other plastic surgical conditions including cleft lip and palate, craniofacial deformity, congenital hand conditions.

Vascular malformations are abnormal growths of blood vessels that affect hundreds of children born in Australia every year. They range from small birthmarks to large destructive growths that cause lifelong pain, bleeding, major deformity and diminished quality of life.

The recent, surprising discovery that they arise through similar genetic mechanisms to many cancers, suggests that drugs already in the clinic for cancer treatment should be effective in these conditions.

A recent MRFF grant will explore how a 'precision medicine' approach may give children and adults with the most severe vascular malformations their first opportunity to benefit from a clinical trial.

CLEFT PROGRAM

A/Prof Nicky Kilpatrick

Every 3 minutes, somewhere in the world, a baby is born with a cleft of the lip and/or palate making it one of the most common birth defects. In these children, there is a separation through the upper lip to the nose and often also through the upper jaw and along the palate. In Victoria, approximately 120 infants are born every year with this type of anomaly, the cause of which remains unclear. The care of these infants commences ante-natally (if the diagnosis is made by ultrasound) and continues from birth through to adulthood. A large team of clinicians including plastic, maxillofacial and ENT surgeons, speech pathologists, audiologists, paediatric dentists, orthodontists, paediatricians, specialist nurses, geneticists, psychologists and social workers work together as a team to provide the best care possible. While the quality of the primary surgical repair is such that many children have good function and little or no scarring, ongoing management of speech, teeth and jaw position is often required until the completion of growth.

Led by A/Prof Nicky Kilpatrick, the Cleft Program in the Plastic and Maxillofacial unit brings together a wide range of expertise from basic science and genetics to clinical and public health research to improve the understanding of both the cause and effects of orofacial clefting.

Key staff

Prof Anthony Penington

Jigsaw Professor of Paediatric Plastic and Maxillofacial Surgery

Caron Israelsohn

Department Administrator

Prof Christian Brizard
Prof Igor Konstantinov
Dr Edward Buratto
A/Prof Nicky Kilpatrick
Prof John Hutson
A/Prof Warwick Teague
A/Prof Sebastian King
Dr Ruili Li



78

publications



3

successful grants



\$4.29m

total grant funding

SURGICAL RESEARCH GROUP

ABDOMINAL STUDIES

A/Prof Sebastian King

The Surgical Research Group work mostly with surgeons who operate on the abdominal organs (the urinary tract, reproductive organs, and gastrointestinal tract) to investigate organ defects and improve treatment.

UROGENITAL DEFECTS

The major areas of study include urogenital defects, including undescended testis, a condition that occurs in five per cent of boys. We also study ambiguous genitalia. Anatomical abnormalities of genitals occur in one in 2000 to 5000 children, but even though rare, have a major impact on affected infants and society. Penile development is the third area of urogenital defects under investigation. Research projects include:

- **Normal and abnormal descent of the testis** (*Prof John Hutson*). Undescended testes are infertile and develop cancer; the group explores the mechanisms controlling descent and development with the aim of providing possible non-surgical treatment.
- **Normal and abnormal postnatal germ cell development** (*Dr Ruili Li*). Germ cell development is believed to be the key to preventing infertility and testicular cancer in men with previous undescended testes in childhood

GASTROINTESTINAL DEFECTS

Gastrointestinal defects studied include intestinal dysmotility such as chronic constipation and anorectal malformations which can block the bowel. The group is pioneering the use of a physiotherapy method giving small electrical pulses through electrodes on the belly and back to treat chronic constipation. Nervous control of the intestine is very complex as the intestine has its own nerve cells (the enteric neurons) and connections to the spinal cord and brain. The group also examines surgical outcomes in the hospital.

- **Intractable chronic constipation** (*Dr Bridget Southwell*) - Exploring the causes of intractable chronic constipation, and the development of novel investigations and novel treatments, including electrical stimulation
- **Duodenal Atresia** (*A/Prof Warwick Teague*) - The cause of duodenal atresia, using a new knockout mouse with downregulation of FGF10
- **Novel treatments for colorectal disorders** (*A/Prof Sebastian King*) - such as anorectal anomalies and Hirschsprung disease
- **Gastrointestinal problems of the gut** (*A/Prof Sebastian King*) - Using state-of-the-art manometry to understand surgical problems in the gut, such as oesophageal atresia and Hirschsprung disease

CARDIAC SURGERY

BIOENGINEERING HEARTS

Prof Igor Konstantinov

The Cardiac Surgery Unit studies many aspects related to cardiovascular health in children. The key to our research is improving the acute diagnosis and treatment in the paediatric setting, as well as follow-up of the psychosocial and cognitive consequences for children who undergo clinical care.

Prof Konstantinov leads clinical and experimental research in two key areas: 1) Molecular biology of multi-organ protection against ischaemia-reperfusion and of rejection after heart transplantation and 2) Retrospective clinical studies of the outcomes of surgical management of children with congenital heart defects and heart failure.

Heart disease is the leading cause of death in infants in Australia. To date, few studies have explored the potential for stem cells in the setting of childhood heart disease. A recent MRFF grant was awarded to Prof Konstantinov's team to evaluate the safety and effectiveness of bioengineered heart tissue in a pre-clinical model of paediatric heart failure. If successful, the approach could radically transform patient outcomes and improve the quality of life of children affected by heart disease.

Peter MacCallum Cancer Centre

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MESSAGE

PROFESSOR ALEXANDER HERIOT

The Division of Cancer Surgery at Peter MacCallum Cancer Centre strives to foster a strong culture of academic excellence that underpins our collective motivation to provide and improve upon the world's best cancer care.

Our research covers the complete range of surgical oncology (excluding neurosurgery and bone sarcoma), and is structured across multidisciplinary tumour streams. The approach encompasses the spectrum of clinical trials and clinical, translational, and basic science research, with important interactions with other clinical disciplines across the multidisciplinary teams, and the laboratories within the Research Division at Peter MacCallum.

Maintaining a rigorous research program requires a strong supporting and collaborative team to optimise ethics processes, recruitment and data collection. Our team of committed research nurses, under the leadership of Sam McKeown, is central to the success of this research effort.



Key staff

Prof Alexander Heriot
Clinical Director of Cancer Surgery

Dennise Salter
Administrative Assistant



152
publications



9
successful grants



1
Fellowships and Scholarships



\$10.76m
total grant funding



6
research staff



29
research students

MESSAGE FROM THE CHAIR

CANCER SURGERY RESEARCH COMMITTEE

A/Prof David Gyorki

A commitment to research is central to the culture within the Division of Cancer Surgery at Peter MacCallum Cancer Centre. This includes clinical, translational and basic science research.

Over many years, strong links have been established with laboratory researchers in the research division at Peter MacCallum Cancer Centre as well as with other departments of the University of Melbourne and externally. Clinical collaborations exist across networks of hospitals in Australia and internationally. These collaborations allow surgeons at PeterMac to drive practice-changing research leading to improved outcomes for our patients.

The research output is facilitated by a strong team of research nurses led by Joanne Benhamu.

Some of this work and the associated high-impact publications are highlighted in this report.

PLASTIC & RECONSTRUCTIVE

PLASTIC & RECONSTRUCTIVE SURGERY

The Plastic and Reconstructive Surgery Unit have published and presented over 30 papers, including invited speakers to the Royal Australasian College of Surgeons Annual Scientific Meeting, and oversaw plastic surgery trainees throughout Victoria and Tasmania.

KEY RESEARCH AREAS

- Modern paradigm of treatment for cutaneous squamous cell carcinoma (SCC)
- Non-melanoma cutaneous malignancies in general
- Breast reconstruction.

RESEARCH PROJECTS

- Cutaneous SCC database established with funded research database assistant
- Multi-site BREAST-Q and breast reconstruction registry established.

COLORECTAL SURGERY

Our research program includes clinical and translational research across all the tumours dealt by the stream, with strong laboratory collaboration. It focuses on patient stratification, including prehabilitation augmented by key surgical outcome research.

KEY RESEARCH AREAS

- Rectal cancer – prognostication, response, and novel neoadjuvant therapy and genomics.
- Peritoneal disease- clinical outcomes and translational work across colorectal cancer, appendiceal cancer and pseudomyxoma peritonei.
- Anal cancer- translational models and optimisation of therapy.
- Colon cancer- vaccine study
- Prehabilitation and perioperative outcomes including sarcopenia
- Robotic training in colorectal surgery
- Implementation of advanced applications of Robotic Surgery for advanced cancers
- 3D modelling in surgical strategy
- Exenterative surgery outcomes

CURRENT RESEARCH COLLABORATORS

The Colorectal Unit published over 80 publications for the year in all areas of colorectal surgery with numerous research collaborators including:

- Prof Robert Ramsey (*Differentiation and Transcription*)- Rectal cancer prognostication; immune landscape colorectal cancer metastases; peritoneal disease; colorectal cancer vaccine and clinical trial.
- Prof Wayne Phillips, (*Surgical Oncology*) - Anal cancer.
- Prof Frederic Hollande (VCCC) - Molecular landscape for colorectal cancer liver metastases.

NOTABLE HIGHLIGHTS

- Dr Kasmira Wilson won the translational research prize at Peter MacCallum Cancer Centre, as well as the prestigious Mark Killingback research prize at the ASC 2022.
- Dr Michael Flood received a research grant from the Colorectal Society of Australia and New Zealand.

HPB SURGERY

KEY RESEARCH AREAS

- Pancreatic cancer outcomes
- Improving care for borderline resectable and locally advanced pancreatic cancer
- Molecular and immune landscape of colorectal cancer liver metastases
- Outcomes after trauma
- Development of operative autonomy in surgical training
- Improving education literacy to optimise learning in the operating room.

CURRENT RESEARCH COLLABORATORS

- Prof Frederic Hollande (VCCC) - Molecular landscape for colorectal cancer liver metastases; molecular landscape for pancreatic cancer.
- Dr Belinda Lee (*Walter and Eliza Hall Institute*) - Irreversible electroporation for locally advanced pancreatic cancer – clinical trial.
- Dr Hyun Soo Ko (*Radiation Oncology and Cancer Imaging*). Radiomic profile of colorectal cancer liver metastases; standardisation of radiology reporting for pancreatic cancer.
- Dr Julie Chu (*Radiation Oncology and Cancer Imaging*) - Stereotactic radiotherapy for pancreatic cancer – MASTERPLAN Phase II clinical trial.
- A/Prof Grace Kong (*Oncology*) - HepaSMART – Hepatocellular carcinoma imaging using PSMA PET/CT – A prospective pilot trial.
- Dr Keith Roberts (*University of Birmingham*) - PARANOIA (Pancreatic Anastomosis Audit) International Study Group.
- Dr Harry Spiers (*University of Manchester*) - An international multi-centre appraisal of the management of acute cholecystitis during the COVID-19 pandemic: The CHOLECOVID Audit.

OTHER ACADEMIC ACTIVITIES

- Senior Examiner, RACS (Prof Ben Thomson)
- Victorian Pancreatic Tumour Repeat Summit, Working Party member, 2021 (Mr Ben Loveday)
- Co-convenor, Surgical Education Section, 2021 Annual Scientific Congress of RACS (Mr Loveday)
- Moderator of Melbourne Regional HPB Surgery Journal Club (Mr Loveday).

UROLOGY HIGHLIGHTS

Despite the COVID pandemic, the Urology team at Peter Mac continued to grow its clinical and laboratory research program this past year with some standout highlights. With a small team of six part-time urologists and combined EFT of less than 2.0, the team has been incredibly productive, and highly impactful under the leadership of Prof Declan Murphy, Head of Urology and Director of GU Oncology at Peter Mac.

Some highlights include:

- The PRIMARY trial, a prospective trial of PSMA PET/CT in the early detection of prostate cancer, was published in the world's highest ranked urology journal, *European Urology* (IF 24.9), and was also awarded their ultimate accolade of Scientific Paper of the Year. Five of the co-authors are from the Department of Urology at Peter Mac.
- The success of the PRIMARY trial has now led to a multicentre prospective randomised trial (PRIMARY 2) of PSMA PET/CT in with normal or equivocal MRI scans in whom there is a suspicion of prostate cancer. PRIMARY 2 is sponsored by Peter MacCallum Cancer and will recruit more than 650 men over the next three years.
- The eagerly awaited Lutectomy trial, a phase I/II study of 177Lutetium-PSMA prior to radical prostatectomy, has recently completed recruitment, with interim results being presented in the Practice-Changing Plenary session at the Annual Meeting of the European Association of Urology in Amsterdam in July 2022. Despite opening at the height of the COVID lockdown in May 2020, the trial recruited ahead of schedule and the emerging data has received much publicity.
- Another of our urologists has been promoted to full Professor at the University of Melbourne. Professor Nathan Lawrentschuk also took up his position as Head of Urology at the Royal Melbourne Hospital, while continuing his significant clinical and research activity at Peter Mac.
- Two of our urologists increased their h-index to new heights this year. Professor Declan Murphy now has a h-index of 57, and Professor Nathan Lawrentschuk has a h-index of 58. In 2021-2022 to date, they have achieved more than 8000 citations, eclipsing the academic performance of any other mid-career urologists in Australia.
- Professor Murphy and Professor Lawrentschuk are Chief Investigators on grants totalling more than \$10m which have been awarded in 2020-22.
- The Urology team have published more than 150 peer-review papers in this period, very many in very high-impact factor journals.
- They also have prolific editorial board involvement in the world's leading journals.
- In 2021, Professor Declan Murphy retained his title as the country's Top Researcher in Urology & Nephrology, based on his high impact publications and citations over the past five years.
- Professor Declan Murphy and Dr Renu Eapen, Urologists, have also started a very successful podcast, *GU Cast*, which has posted more than 80 episodes over the past year, with thousands of global listeners every month. They have also expanded to post on YouTube, and regularly engage with top key opinion leaders in GU Oncology.

Catch episodes of *GU Cast* [here](#) or see QR



GU Cast hosted by Prof Declan Murphy and Dr Renu Eapen



MELANOMA

NEOADJUVANT THERAPY

A recent advance in the management of melanoma patients has been in the neoadjuvant space. Surgeons in the melanoma service have been at the forefront of this. A/Prof Gyorki was a Principal Investigator in a trial utilising an injectable oncolytic herpes virus (T-VEC). This trial was open at the Austin Hospital which was the second highest recruiting site globally and the results were recently published (Dummer R, Gyorki DE et al. Nature Medicine 2021). Peter Mac investigators were also instrumental in the design and recruitment to the NeoTrio trial which was presented as an oral abstract at the recent American Society of Clinical Oncology meeting.

MELANOMA

MELANOMA MARGIN TRIAL

Peter Mac is one of the lead sites in this international trial supported by a \$2.7million NHMRC project grant led by Prof Michael Henderson. The last 12 months has seen a rapid escalation of recruitment as the trial has opened in a number of international sites. The trial is nearing 1000 patients recruited and is likely to define practice in the management of primary cutaneous melanoma.

MELANOMA

TRANSLATIONAL MELANOMA IMMUNOLOGY

A/Prof David Gyorki is working closely with the Gebhardt laboratory at the Peter Doherty Institute to investigate tumour dormancy and the behaviour of melanoma micrometastasis. This collaboration has seen publications over the last 12 months in the Journal of Experimental Medicine and Immunology and Cell Biology.

MELANOMA

MELANOMA GUIDELINES

A/Prof David Gyorki was the only Australian invited to join the American Society of Clinical Oncology Systemic Therapy for Melanoma guideline panel. Revised guidelines are currently being written to reflect the rapid progress in this exciting field.

MELANOMA

GLOBAL SENTINEL NODE COLLABORATION

Peter MacCallum is one a number of high-volume melanoma units internationally that have pooled their clinical resources to create a high quality dataset of patients with positive sentinel lymph nodes. This has allowed a number of recent high impact publications defining the contemporary management of this patient population with regards to the use of active surveillance (Broman KK et al. Cancer 2021), implementation of surveillance in clinical care (Broman KK et al. JACS 2021), international centre-level variation in practice (Broman KK et al. Ann Surg 2022).

SARCOMA

SARCOMA UPDATES

In 2021, the MRFF Rare Cancer and Disease of Unmet Need scheme funded the Australian participation in the global STRASS 2 trial studying the role of neoadjuvant chemotherapy for patients with retroperitoneal sarcoma at high risk of recurrence after primary surgery. Investigators at Peter Mac are leading two substudies including defining the role of FDG-PET scans as a biomarker of clinic response and understanding patient preferences for selection of treatment. The trial opened in early 2022 and the first patient was recruited soon after. A/Prof David Gyorki is the Australian lead investigator and a member of the global trial management committee.

Both A/Prof David Gyorki and Dr Hayden Snow are members of the Transatlantic Australasian Retroperitoneal Sarcoma Working Group and through this collaboration have contributed to global consensus guidelines for the Management of Locally Recurrent Retroperitoneal Sarcoma (Ann Surg Oncol 2022) and Management of Primary Retroperitoneal Sarcoma (Ann Surg Oncol 2021).

Academic Networks

Outside of the Department, various academic networks have formed over the past years as a need for connectivity, mentorship, research development and outreach arose. The need for connectivity particularly amongst DoS students has become more urgent as the health sector continues to be challenged in 2021.

Driven by students and upcoming talent, the Department of Surgery continues to support these home-grown initiatives.

VICTORIAN COLLABORATIVE FOR EDUCATION, RESEARCH, INNOVATION, TRAINING AND AUDIT BY SURGICAL TRAINEES (VERITAS)

High quality research informs practice. Trainee-led research collaboratives support surgical trainees to perform high powered clinical studies to answer important clinical questions. The research collaborative model draws together the resources of trainees based nationally and internationally to recruit large groups of patients. High profile successes of this model include the COVIDSurg studies coordinated by the GlobalSurg Collaborative based in the UK.

The Austin Northern Surgical trainees Association (ANSA) is the representative body for surgical trainees at the Austin-Northern Training Hub (ANTH). To further research opportunities for trainees at ANTH, ANSA established a Victorian-based trainee-led research collaborative, VERITAS, to carry out the large population-based studies to better inform surgical practice. VERITAS engages with trainees across Australia as well as internationally to develop meaningful, impactful surgical research projects. Beginning with an institutional study on outpatient experience (SOS) to state and national (PROTECTinG, COVIDCare), and international collaborations (SUNRRISE, COVIDSURG, POSTVenTT, OPERAS). Large multi-centre studies such as POSTVenTT offer invaluable exposure to research by involving medical students and junior doctors in research teams. Of the more than 50 sites and 350 collaborators across five countries, VERITAS contributes to POSTVenTT through 14 Victorian centres with over 100 collaborators working towards recruiting 500 Victorian patients out of a total of 2000 patients. OPERAS has currently completed its final data collection period.

More recently, VERITAS is leading its own multi-centre study, POPPIES. A retrospective cross-sectional observation study looking at post-operative opioid prescription, POPPIES successfully collected over 5000 patient records from over 22 hospitals across metropolitan and regional Victoria and Tasmania over 4 months. Over 200 collaborators ranging from medical students to surgical registrars across the spectrum of surgery, anaesthesia and pharmacy supported the study.

In 2022, VERITAS is establishing its own educational arm. Trainees are leading the way by organising an inaugural Journal Club where presenters scrutinise landmark papers to their peers with the support from a supervising surgeon and will pave the way for more educational activities.

For further information, [visit here](#) or scan QR



EXECUTIVE MEMBERS

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Co-Chair

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Secretary & VERITAS Twitter Communications Lead

Dr Sharon Lee
Website Communications Lead

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Student Liaison Officer & Junior Consultant Advisor

Dr Krinal Mori
Junior Consultant Advisor & Northern Health Representative

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Senior Consultant Advisor



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MD1 Representative

SURGICAL STUDENTS' SOCIETY OF MELBOURNE (SSSM)

Surgical Students' Society of Melbourne (SSSM) was founded in 2009 by medical students eager to share their passion for surgery. Over a decade on, SSSM has grown into the peak surgical interest group at the University of Melbourne, representing over 1,400 students across metropolitan, regional and rural Victoria. Our society continues to work tirelessly to provide our students with high-quality surgical education, as well as a platform to enable communication between students, surgeons and other experts in the field.

The missions of our society broadly relates to three domains:

- Education – we aim to maximise access to quality surgical education for all Melbourne Medical School students, including a unique Rotating Lecture Series, practical workshops, mentoring programs and a podcast series.
- Research – the society aims to promote research amongst medical students in order to foster a passion for surgical academia from the very start of their medical journey.
- Advocacy – the society strives to represent and advocate for all of our students, to ensure that their surgical interests, skills and education are wholly fulfilled.

SSSM continually strives to achieve these missions in order to fulfil our vision of inspiring the next generation of world-class surgeons.

Looking back over the year, we are also humbled by the achievements and milestones that were attained by our SSSM predecessors. Some of the highlights include: The Surgical Careers Night, the annual Surgical Poster Competition, surgical workshops at all seven clinical sites around Melbourne and regional/rural Victoria, the Rotating Lecture Series, our podcast series, The Time Out, and the SSSM Charity Calendar. It is also worthwhile to mention SSSM's continuous involvement in national and international conferences such as MD Student Conference, Global Health Conference and the International Surgical Students Conference, holding surgical workshops and educational events.

For further information, [visit here](#) or scan QR



SSSM

TIME OUT PODCAST

In 2021, SSSM's flagship podcast, "The Time Out", expanded its horizons and completed 20 fantastic interviews, bringing a breadth of stories about surgeons and their journeys to the ears of a growing number of interested medical students, doctors, allied health staff and others. The team comprised Hosts Aidan Jackson & Ghanisht Juwaheer, Promotions Officer Chloe Jamieson-Grigg, and Editor Norine Ma.

Along the way, the team spoke to fascinating guests, including Australian of the Year Fiona Wood, President of RACS Sally Langley, Nobel Prize Winner Ruth Mitchell, leading osseointegration expert Munjed Al Muderis, and burns surgeon Warwick Teague. Their final two episodes focused on interviewing scrub nurses and theatre technicians about working in theatre, and a discussion between themselves about what they had learnt throughout the year.



iTunes [The Timeout Podcast](#)



Spotify [The Timeout Podcast](#)

SSSM

SURGICAL CAREERS NIGHT

Our 2021 Surgical Careers Night was a great success which built upon the structure used in 2020. This year, the event consisted of an opening keynote by A/Prof. Rhea Liang, discussing her accidental journey towards surgery, whilst offering some golden advice for students along the way. This was followed by 3 breakout rooms, each consisting of consultants and/or registrar representatives for 3 surgical specialties. Breakout rooms gave students the opportunity to ask surgeons any questions they had whilst being part of a stimulating discussion between our speakers which had to be extended due to amazing participation! Prizes, courtesy of our fantastic sponsors, were raffled to those with the most engaging questions. Approximately 180 students registered for the night, and speakers and audience members alike praised the success of the night.

SSSM

RESOURCES PORTAL

In 2021, SSSM launched their Surgical Resources Portal, with expansion and promotion ongoing in 2022 to bring it to even better heights. This portal comes as part of signing up to be an SSSM member and is targeted at medical students and junior doctors with a particular interest in surgery. The portal is a huge repository of surgical learning resources, including notes, videos, mock OSCE presentations, and more. It is being championed by Western Health's A/Prof Justin Yeung, and with lots more exciting and cutting-edge content to be added, will be a great resource for anyone with an interest in surgery.

SSSM

ST VINCENT'S HOSPITAL ACADEMY OF SURGEONS

In 2021, St Vincent's Hospital held their inaugural Academy of Surgeons Careers night, a launching pad for their mentorship program. It was an extremely popular event, with a hybrid format given the COVID-19 restrictions at the time; this saw 15 attendees online and over 70 students, residents, registrars, and surgeons attend the event in-person. This event was championed by St Vincent's Urologist Dr Lih-Ming Wong, and The Academy promises to be a great resource for those wanting to be inspired by surgery in the future.

SSSM

TECHNOLOGICAL INNOVATION IN SURGERY

The Annual SSSM Technological Innovation in Surgery Prize ran for the second year in 2021. Supported by the Department of Surgery and the Department of Anatomy and Physiology (DOAP), the 2021 program was a great success. The videos were of high calibre and very well received by the judging staff including Prof Peter Choong, A/Prof Yeung, Prof Quentin Fogg, Prof Matthew Watt and Dr James May. General surgeon and guest speaker Mr Richard Gartrell, gave a riveting talk on his career and how surgical anatomy, research and innovation has influenced his pathway. Winner and runner up overall were decided by judges, and videos were also judged by audience members and a people's choice award was given.



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STUDENT ORTHOPAEDIC AND MUSCULOSKELETAL ASSOCIATION (SOMA)

SOMA is a Graduate Student Association affiliated group founded in mid-2019. Within the first two years, the association has rapidly expanded with over 100 members from MD, honours, Masters, PhD and other courses within the University of Melbourne. SOMA has secured more than \$3000 in grant funding from the GSA since its inception.

SOMA fosters peer-to-peer support between students from different locations, institutes, and backgrounds with a common interest in musculoskeletal and orthopaedic health. Students from all walks of life and areas of expertise are encouraged to participate to develop an inclusive and diverse network.

Throughout the year SOMA has organised three key events.

In May, SOMA hosted a Research Presentation Workshop focusing on the principles of the "3 Minute Thesis". This was a fantastic opportunity for students to fine tune their presentations skills facilitated by Simon Clews (writer, educator and former Director of the Melbourne Engagement Lab, The University of Melbourne), who has been heavily involved in the 3MT competitions from the outset.

In July, we organised "SOMA day", the first day of the 2021 OPUS forum, dedicated to students. This day saw experts from various disciplines nationally and internationally come together and share knowledge and experience around the theme "The Research Journey: From Idea to Impact".

Finally, in September SOMA hosted the second *SOMA Research Showcase*. This was an excellent opportunity for junior researchers to practice their presentations skills after lockdown. Congratulations to the winner of the 2021 showcase, Yusuf Hassan!

For further information, [visit here](#) or scan QR



SOMA

THE ORTHOPOD PODCAST

Tapping into the wealth of expertise available to students around the different Precincts and their networks, SOMA launched its own podcast, The OrthoPod.

Hosted by MD student and health economist, Liam Fernando-Canavan, the series dives into all aspects of orthopaedic and musculoskeletal health, engaging patients, surgeons, doctors, and industry as well as student life.



[iTunes The OrthoPod](#)



[Spotify The OrthoPod](#)



SOMA

LOOKING AHEAD

SOMA has secured more than \$1400 funding to create “HomeTheatre”, an online video repository of surgeries for students to access and learn about surgical procedures.

SOMA will also be organising and hosting the “Kneed to Know: How to perform joint replacement surgery” Workshop for the MD student conference in 2022. Facilitated by Stryker Corporation and the Head of Department of Surgery, Prof Peter Choong, MD students will have a hands-on training workshop performing hip and knee joint replacement on artificial bones. SOMA's ongoing collaboration with Stryker Corporation will also offer students the opportunity to have hands-on experience with the Mako robot.

SOMA

RESEARCH COLLABORATIVE

The Research Collaborative began in 2020 as a way for senior PhD students to partner with other graduate students to share knowledge and skills in different research methodologies by constructing, conducting and publishing their own systematic reviews.

Beginning with 10 graduate students, the Collaborative gained momentum in 2021, recruiting 15 students. In November, SOMA held the inaugural Research Collaborative Bootcamp, which brought together 10 members to finalise data extraction and risk of bias assessment for three of the ongoing reviews. These will be ready for publication in 2022.

To supplement the practical work in the Research Collaborative, SOMA also runs Methodology Workshops aimed to equip students with the skills budding researchers need: literature searching and tracking research impact, data cleaning and research presentation.

SOMA also collaborates with the SSSM to lead the orthopaedic block of the clinical skills workshop series.

Research Presentation Workshop with Simon Clews



surgical mentor

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SURGICAL MENTOR

Full of resources for the aspiring surgeon, the team behind Surgical Mentor have built a resource dedicated to inspiring and educating future surgeons in an easy-to-access platform.

With on-demand videos and resources, listen to Director of Orthopaedics A/Prof Susan Liew (*Alfred Hospital*) and Deputy Director of Orthopaedics Dr Alison Taylor (*Eastern Health*) about their journey to orthopaedics, read up on some key tips to pass the selection interview for SET and listen to a curated list of the best surgery-related podcasts.

Surgical mentor is run by surgeons for aspiring surgeons. Get in touch with the editors if you're interested in mentorship, continual education and fostering emerging surgeons in your workplace.

For further information, [visit here or scan QR:](#)



ST VINCENT'S ACADEMY OF SURGEONS

St Vincent's Academy of Surgeons was established in 2021 to build a strong connection between the Department and the surgeons of St Vincent's. The aim of the group is to create a cadre of surgeons who wish to pursue and grow their interest in surgical academia through research, teaching, training, mentorship and career development. Linking in with the PreSET Surgical Society at St Vincent's and the Surgical Student's Society St Vincent's, the Academy of Surgeons completes the spectrum of connections that the Department aims to foster to seed the next generation of surgeons and surgical researchers.

The Academy's mission is:

- To foster a community providing leadership, teaching, research, mentorship and fellowship for the practice of surgery at St Vincent's.
- To provide adequate representation of all surgical specialties, and the cross section of surgeons that practice within them.
- To provide an interface for surgeons at St Vincent's Hospital Melbourne with the Eastern Hill Clinical School, Pre-SET resident Society, St Vincent's Surgical Students Society, and the Department of Surgery.

The inaugural Academy of Surgeons Careers Night in 2021 hosted 102 attendees (surgeons, residents, students) both online and in-person. Facilitated by St Vincent's Urologist A/Prof Lih-Ming Wong, the event was a cross section of different stages of a surgical career were presented and specialty break out rooms enabled more focused dialogue in small groups. The fantastic turnout was a great indicator that the Academy is filling an unmet need for those wanting to be inspired by surgery in the future.

The Academy has also held a subspecialty focus group night for residents applying for surgical specialty programs and have assisted with Pre-SET surgical resident tutorials and the MDRS2 student program where interested students are matched to the appropriate surgeon mentors.

For further information, [visit here](#) or [scan QR](#)



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Nicole Winter
Deputy Supervisor Pre-SET Training

ST VINCENT'S MELBOURNE PRESET SURGICAL SOCIETY (SVM PSSS)

The St Vincent's Melbourne PreSET Surgical Society (SVM PSSS) was established in 2017 and serves to improve the education and opportunities for junior doctors interested in surgical training by:

- Surgical and peri-operative medicine teaching for St. Vincent's Hospital Melbourne staff
- Surgical skills workshops and symposia for St. Vincent's Hospital Melbourne staff
- Preparation courses for the Generic Surgical Sciences Examination - open to non-SVHM candidates
- Social events for junior surgical staff

The Society supports junior surgical trainees with a network of peers and regularly offers training programs for members working towards accredited training positions in the Royal Australasian College of Surgeons (RACS), Surgical Education and Training (SET) program.

The committee provides a tailored educational curriculum, including the popular and highly constructive GSSE Education program, interview training, research and volunteer opportunities to Pre-SET Surgical Residents, interns and medical students. The Society welcomes interns with an interest in surgery, students of the St Vincent's Clinical School and members of the wider surgical community at St Vincent's to many of the educational programs and social events such as the annual "Time Out" ball.

The past year has seen the Pre-SET Society transition to a new culture of work by re-engaging with the surgical community. The Society has strengthened its network through collaborations with St Vincent's Clinical School and Academy of Surgeons to bring fresh events such as a Careers Night, Sub-specialty Focus Groups, the Academy of Surgeon's Showcase Night and the TOP GUN competition.

For further information, [visit here](#) or scan QR



GENEYE

Founded in 2019 by Dr Jacqueline Beltz as part of the Eye and Ear Education, GENEYE is a surgical educational platform that integrates immersive educational strategies, high performance psychology and innovative surgical simulations to enable medical students and experienced consultants alike to continually improve their understanding and skills in surgery.

GENEYE carries core values of:

- Innovation
- Excellence
- Collaboration
- High Performance
- Sustainability
- Wellbeing

At the heart of GENEYE is a community of practice that seeks a positive, productive and innovative learning culture where surgeon wellbeing is promoted to ensure surgeons have the right attitudes required of high performing surgeons. The introduction of mind or mental training into the formal surgical skills program at the Eye and Ear has been groundbreaking as professionals guide trainees through the process of high-performance psychological training in surgery.

The microsurgical training program at the Eye and Ear was overhauled to incorporate virtual reality and other simulation platforms with a merit-based transition to live surgery in 2018. The enforced break from the pandemic saw the training program shift to a digital, virtual reality and live surgical course to safely return trainees back to surgery and the creation of the podcast series, GENEYE Pod.

New online learning programs have been created since such as the GENEYE Presbyopia Correction training module. With the resumption of on-site activity, GENEYE is continuing to create digital content while resuming live events particularly as the Eye and Ear Education Precinct opens in late 2022.

For further information, [visit here](#) or [scan QR](#)



EDUCATORS

Dr Jacqueline Beltz
Dr Ivo Ferreira Rios
Dr Rahul Chakrabarti
Dr Danielle Buck
A/Prof Diane Webster
Dr Bernardo Soares
Dr Mohamed El Nahrawy

Students

AUSTIN HEALTH

PhD

- A/Prof Laurence Weinberg – Impact of a surgery-specific goal directed therapy haemodynamic protocol in improving outcomes in patients undergoing hepatobiliary-pancreatic surgery
- Dr Andrew Casemento – The use of narcotic agents and adjuvant therapies in mechanically ventilated intensive care unit patients: effects on sedation, analgesic requirements, short and long-term neurocognitive outcomes
- Dr Andrew Silagy – Genomic studies in renal cell carcinoma
- Dr Christopher Wright – “Basic” sciences – what are they and what do medical students need to know about them?
- Dr Daniel Cox – Individualising the management of hepatocellular carcinoma using novel circulating biomarkers
- Dr Dora Lucia Vallejo Ardila – Renin-angiotensin inhibitors reprogram tumor immune microenvironment and influence anti-tumor immunity in colorectal cancer liver metastasis
- Dr Eunice Lee – Optimising donation after cardiac death (DCD) liver grafts for transplantation
- Dr Georgina Riddiough – Liver regeneration and the renin angiotensin system
- Dr Jack Crozier – Analysis of changing surgical techniques in the management of primary bladder cancer
- Dr Jasmine Misty Coles-Black – 3D Printing in abdominal aortic aneurysms
- Dr Kathryn McLeod – Helping our future surgeons: enhancing performance of urological surgical trainees and factors associated with underperformance
- Dr Marlon Lakmal Perera – Minimising renal injury using nephron preconditioning with zinc
- Dr Matthew Farag – A matched pair comparison of treatment outcomes after extracorporeal shockwave lithotripsy versus flexible pyeloscopy in management of renal calculi
- Dr Niranjana Sathianathan – Prostate cancer: Active surveillance and MRI-fusion biopsies
- Dr Rhea Wen Yee Liang – Intersectionality and the development of surgical identity
- Dr Sean Stevens – Exploring the challenges of surgical education and training in Timor-Leste
- Dr Sudharshan Christie (Dharshi) Karalappilai – Perioperative mechanical ventilation strategies and their influence on patient outcome
- Dr Tatenda Nzenza – 68Ga-PSMA PET/CT in prostate cancer
- Dr Varun Sharma – Metabolic and morphological tissue assessment and evaluation using multi-modal spectroscopy and computation
- Dr Vered Buchholz Harai – The cost burden of major upper gastrointestinal procedures from cost predictors assessment to resource allocation and intervention policy
- Dr Xuan Rui (Sean) Ong – Integrated pathological, imaging and genomic characterisation of localised prostate cancer
- Dr Yi (Ray) Ma – Determining the antitumoral effect of cannabinoids on pancreatic ductal adenocarcinoma through cell-line and murine models
- Mr George Loizou Kastrappis – Renin Angiotensin System (RAS) inhibitors combined with tumour resection in the treatment of colorectal cancer liver metastasis (CRCLM)
- Mr Nien-hung (Dean) Lee – Functions of CXC ligand family in pancreatic tumour microenvironment

Master of Surgery

- Dr Chun Hin (Angus) Lee – Optimising modifiable risk factors in colorectal surgery
- Dr Dominic Bagguley – Prostate cancer risk calculators – still relevant in the mpMRI/PSMA-PET era?
- Dr Elena Galiabovitch – Ultra low risk prostate cancer results from active surveillance in the Victorian Prostate Cancer Outcomes Registry (PCOR)
- Dr Ellen O'Connor – Establishment of a pilot bladder cancer registry to examine current practice and outcome of bladder cancer in Victoria
- Dr Osamu Yoshino – Mitochondrial DNA and damage associated molecular pattern (DAMPs) in liver transplantation
- Dr Thomas Kiong Sien Tiang – Tumour markers in colorectal cancer
- Dr Vladimir Bolshinky – The use of prehabilitation in colorectal cancer surgery

Doctor of Medical Science

- Dr Jessica Rahme – Robotic colorectal surgery: an examination of learning paradigms and adoption of new techniques

EPWORTH HEALTHCARE

PhD

- Cam Fary – Critical analysis of enabling technologies in total knee replacement
- Khashayar Ghadirinejad – Predictive machine learning models for identifying prostheses with higher than anticipated rates of revision
- Christopher Wall – The impact of obesity on outcomes of primary total knee arthroplasty in Australia

Master of Surgery

- Richard Hannon – The outcomes of cemented femoral stems for THR using the French Paradox: A review of the data from the Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR)

Master of Clinical Research

- Dirk van Bavel – Wearable technology for monitoring rehabilitation and return to function following joint replacement surgery. A Pilot Study Completed

PETER MACCALLUM CANCER CENTRE

PhD

- Cori Behrenbruch – Personalising treatment in patients with metastatic colorectal cancer
- Toan Pham – Cancer vaccines and colorectal cancer
- Kasmira Wilson – Immunotherapy and rectal cancer
- Jiasian Teh – Establishment and characterisation of a panel of penile squamous cell carcinoma cell lines representing a spectrum of disease stage and treatment response
- Atandriela Das – Genomic and immune landscape of colorectal liver metastases
- Michael Flood – Refinement of care for peritoneal malignancy

PETER MACCALLUM CANCER CENTRE

PhD

- Wei Lim – The immunological landscape of perineal squamous cell cancers
- Tamara Vu – Radio-labelled Girentuximab as a theranostic agent in metastatic colorectal cancer
- Carlos Cabalag – Potential clinical utility of a targeted circulating tumor DNA assay in esophageal adenocarcinoma
- Emily Hapgood – Identifying patients at increased risk of melanoma in primary care and understanding patients experiences of using mobile apps to self-monitor their skin for melanoma between appointments
- Renu Eapen – The immune landscape of primary prostate cancer following luteium PSMA therapy
- Sean Ong – Circulating tumour cells in prostate cancer
- Michael Bozin – Fluorescent and molecular imaging-guided surgery in oesophagogastric cancer

Master of Surgery

- Vlad Bolshinsky – Prehabilitation and preoptimisation of GI cancer patients
- Angus Lee – Exercise and optimisation for surgery
- Nick Smith – Pelvic exenterative surgery
- Ben Cribb – Lateral pelvic sidewall lymph nodes in rectal cancer
- Courtney Hall – Breast reconstruction
- Dale Jobson – First case-controlled study to identify whether patients with treated CLL have worse melanoma outcomes in terms of overall survival
- Gideon Ptasznik – Prostate Cancer Outcomes Registry
- Andrew Zhang – The “no zone” approach in the management of penetrating neck injuries – An Australian major trauma service experience
- Ruffi Chen – Quality of life of patients post total thyroidectomy with permanent hypoparathyroidism

Master of Philosophy

- Julie Flynn – Learning curve in robotic colorectal surgery
- Tomas Larach – Technical aspects of robotic colorectal cancer surgery
- Jean Wong – Sarcopenia and lower gastrointestinal cancer
- Ryan Gosavi – Management of advanced and recurrent colon cancer
- Ashraf Tokhi – Optimising quality of life and support post treatment for oesophageal cancer

Master of Surgical Education

- Alexander Papachristos – Learning in the operating theatre: A thematic analysis of opportunities lost and found

Doctor of Medical Science

- Dominic Bagguley – Bladder and prostate cancer

ROYAL MELBOURNE HOSPITAL

PhD

- Kyle Brooks – Clinical ultrasound training for medical students
- Sing Ken Chow
- Ximena Cid Serra – The impact of point of care ultrasound in general medical patients
- Marija Dinevska – Signalling-specific mechanisms regulating brain tumour cell invasion
- Adilson Fonseca Teixeira – Assessment of exosomal TGF-beta as the major mediator of epithelial-mesenchymal transition in breast cancer cells
- Andrew Gogos – Yap signalling regulation in glioma
- Anis Hamid – Identification and validation of biomarkers predictive of response to systemic therapy in prostate cancer
- Jordan Jones – Circulating biomarkers in glioma
- Ruth Anne Mitchell – Improved therapeutic targeting of glioma
- Muhammad Murad
- Jiashu Ren – Total arterial revascularisation
- Sarah Stuart – The role of IL-11 signalling in glioblastoma progression

ROYAL MELBOURNE HOSPITAL

PhD

- Andrew Wang – Impact of point-of-care ultrasound on patient outcome after high-risk surgery
- Clarissa Whitehead – Evaluating the role of invadopodia in glioma invasion and response to therapeutics
- Samuel Stefanus Widodo – Deciphering immunomodulatory mechanisms in brain cancer

Master of Surgery

- Daniel Costello
- Richard Hannan
- Venetia Hoe

Master of Philosophy

- Britt Haller

Doctor of Medical Science

- Nicole Tham – Investigating the social and geographic determinants of colorectal cancer resection outcomes at a state-wide level in Victoria utilising administrative data and novel data linkages

ROYAL VICTORIAN EYE AND EAR HOSPITAL (OPHTHALMOLOGY)

PhD

- Suganya Selvarajah – The eyeDiP Project: A study of eye health problems of refugees in Australia
- Marc George Sarossy – New approaches to the photopic negative response of the electroretinogram
- Felicia Widyaputri – Optimising the management of diabetic retinopathy in pregnant women with pre-existing diabetes in Australia (completed 2021)
- Janan Arslan – Seeing is believing: Towards an artificial intelligence application to predict the rate of growth in geographic atrophy of age-related macular degeneration
- Heather Machin – Eye banks, exports and Australian opinion: Exploring national utility of human corneal tissue donation (completed 2021)
- Ke (Doris) Cao – Identifying indicators involved in keratoconus and its progression
- Tu Thanh (Crystal) Nguyen – Using cellular reprogramming to develop a therapy for retinal regeneration
- Daniel Urrutia Cabrera – Development of a regenerative therapy for photoreceptor loss using cellular reprogramming technology
- Hsiang-Chi (Roxanne) Liou – Direct conversion of photoreceptors from Müller glia and its application
- Himeesh Kumar – Deep learning and multi-modal imaging to detect sight-threatening complications in age-related macular degeneration
- Catherine Jan – AI-assisted diagnosis as an innovative tool to standardise practice for optometry service
- Mayinuer Yusufu - A pragmatic cluster randomised trial to assess the impact of artificial intelligence based automated eye disease screening service in remote primary care settings
- Wenyi Hu - Deep learning risk assessment on cardiovascular events using ocular image biomarkers
- Sanil Joseph - Integration of artificial intelligence technology with Teleophthalmology
- Attiqa Chaudhary - The role of Hypoxia in Age Related Macular Degeneration (AMD)

ROYAL VICTORIAN EYE AND EAR HOSPITAL (OPHTHALMOLOGY)

Master of Philosophy

- Roshan Karri – Colocalisation correction between infrared reflectance imaging and optical coherence tomography for potential applications in the prognostication of age-related macular degeneration
- Gizem Hasimoglu – Non-invasive hyperspectral retinal imaging in Parkinsons disease
- Phillip Rothschild – Artificial intelligence in ophthalmology: Uses in screening and treatment, barriers to implementation, and clinical preparedness
- Kai Lyn Goh – Novel phenotypes in the early stages of age-related macular degeneration

Honours

- Helen Zhang – A global approach to combat keratoconus
- Bryn Loneragan – Interferon response and mitochondrial metabolism
- Zoe Pasvanis – Preventing glaucoma blindness through a novel approach to antifibrosis

ROYAL VICTORIAN EYE AND EAR HOSPITAL (OTOLARYNGOLOGY)

PhD

- Tohidul Islam – Deep learning for three dimensional multimodal medical image processing: From classification to segmentation
- Jared Panario – Detecting the presence of inner hair cells within the cochlea using electrocochleography
- Tayla Razmovski – Improving the preservation of acoustic hearing for cochlear implant recipients
- Ella Sutton – Cochlear implant electrode trajectory through the mastoid and cochlea and its impact on trauma
- Yuansan Lui – Robust AI for guidance of a cochlear implant procedure
- Bridget Copson – Extending the application of virtual reality simulation in temporal bone anatomy and advanced surgical training
- Luke Campbell – Intraoperative monitoring during cochlear implantation and correlations to preservation of hearing
- William Shute O Hearing Preservation in Cochlear Implantation Surgery
- Jesslyn Lamtara - Development of Temporal Bone Surgery Virtual Simulator Curriculum

Master of Surgery

- Eren Tan – Four-point impedance measurements during and after cochlear implantation, and correlations with clinical outcomes
- Sepiuta Lopati – Prevalence of ear disease and its associated hearing loss among primary school children in Tonga: Urban versus rural
- Arvind Kumar – Application of optical fiber Bragg grating sensors in transverse force and pose detection in cochlear implants

ST VINCENT'S HOSPITAL, MELBOURNE

PhD

- Simon Maciburko – Characterising neural lymphatics and their role in human disease
- Jason Trieu – The clinical and cost effectiveness of total joint replacement
- Samantha Koschel – Utility of PSMA-PET as an imaging technique in the diagnosis and management of prostate cancer
- Sharmala Thuraisingam – Predicting outcomes for people with knee osteoarthritis in general practice
- Ayesha Rosdah – Novel mitochondrial Drp1 inhibitors for cardioprotection
- Penny O'Brien - Laying the foundations of culturally secure osteoarthritis research for Aboriginal and Torres Strait Islander people

ST VINCENT'S HOSPITAL, MELBOURNE

PhD

- Myles Davaris – The role of preoperative evaluation and health literacy in predicting clinical outcomes, complications and satisfaction in total joint replacement, in the context of reducing the health economic burden
- Daniel Gould – Optimising preoperative decision-making in total joint arthroplasty using a machine learning approach
- Cade Shadbolt – Discontinuing opioids prior to elective surgery: Is it a feasible and effective strategy to reduce postoperative complications?
- Siddharth Rele – The cost-effectiveness of reducing length of stay for total joint arthroplasty on long-term health outcomes
- Brooke Conley – How culturally appropriate are physiotherapy information and education resources for Aboriginal and Torres Strait Islander Australians with osteoarthritis, rheumatoid arthritis and systemic lupus erythematosus?
- Elise Naufal – Building an evidence base for the treatment of prosthetic joint infection through international collaboration
- Yushy Zhou – Predicting patient outcomes after knee replacement surgery
- Leonard Shan – The patient reported outcomes and economic evaluation of elective arterial surgery
- Henry Badgery – The use of machine learning to prevent complications in laparoscopic cholecystectomy
- Rita Kinsella – Prevalence and impact of greater trochanteric pain syndrome in individuals undergoing total hip arthroplasty
- Amanda Nikolic – Do synbiotics reduce infections in foregut surgery?

Masters

- Thomas Whish-Wilson – Multiparametric MRI in prostate cancer diagnosis and management
- Oliver Miles – Characterisation of sensory corpuscles and mesenchymal stem cells in the injured scapho-lunate ligament
- Benjamin Cribb – Management of lateral pelvic lymph nodes in rectal cancer treatment
- Vy Tran – A prospective single arm paired comparison of ability to diagnose and locate prostate cancer between multiparametric MRI and 18F-PSMA-PET/CT
- Amy Wong – Surgical outcomes of extracapsular dissection parotidectomy for benign parotid tumours and correlation with imaging and histopathological findings
- Tajanka Mladenovska – Innovation, applications and commercialisation of '3D- printed' surgically implantable orthopaedic medical devices

Honours

- Annabelle Choong – Sex differences driving infection and response to treatment after total knee joint replacement

WESTERN HEALTH

PhD

- Irene Deftereos – Investigating current evidence and practices for improving the nutritional status and outcomes of patients undergoing resection for upper gastrointestinal cancer

Master of Surgery

- Richard Gartrell – The influence of body composition in rectal cancer

Master of Science (Surgical Science)

- Aisha Arayne – Comparison of CT derived body composition at the thoracic and lumbar levels and the implications of sarcopenia in the outcomes of patients with colorectal cancer

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Excellence at the Department of Surgery would not be possible without the contributions of honorary staff who work tirelessly to participate in high quality research and train the future of Australia's medical workforce.

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Bill Karanatsios, *Fellow, Western Health*

HONORARY TITLES TO LEVEL A

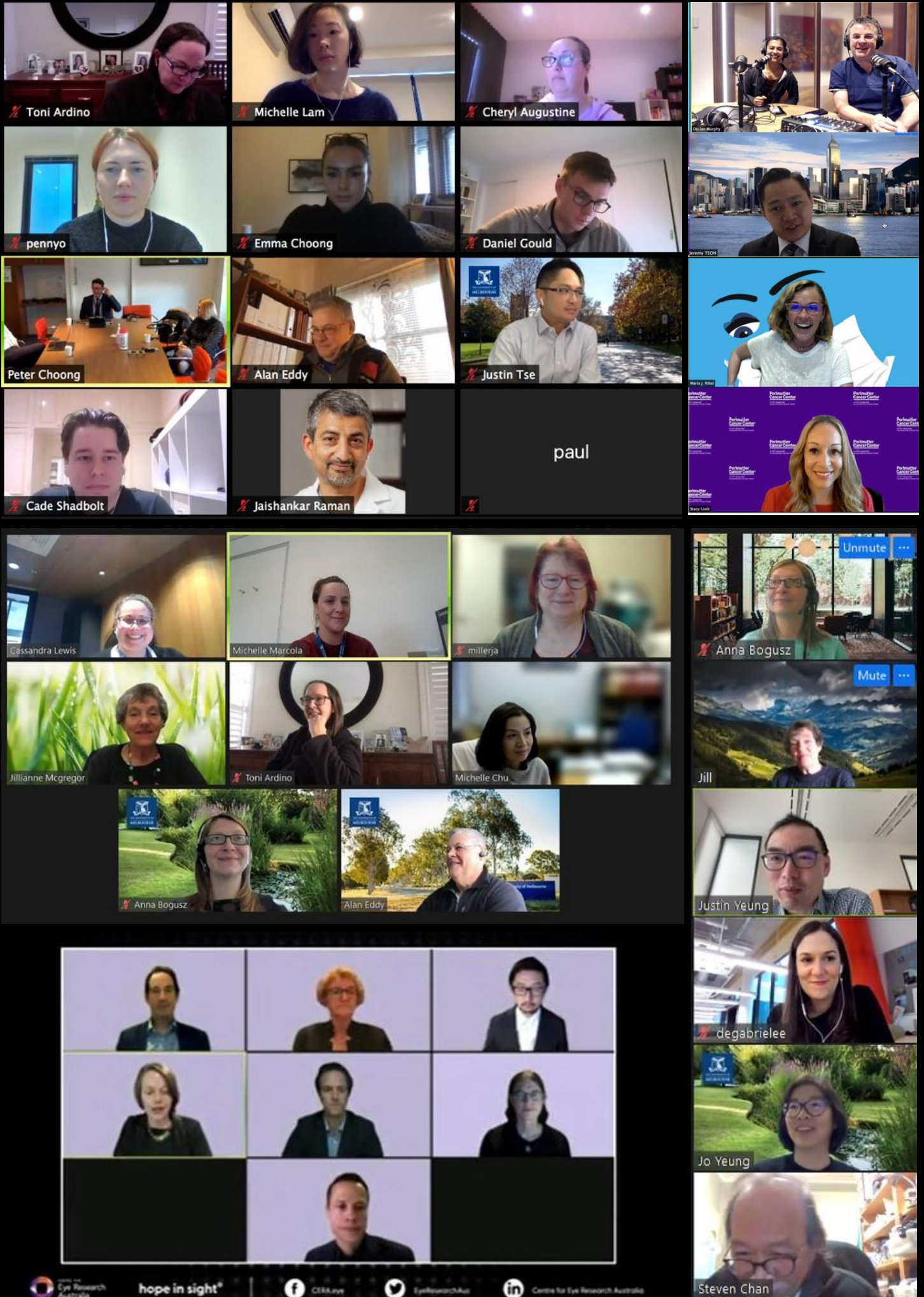
Jonathan Goh, *Clinical Tutor, Ophthalmology*
Tegan Fink, *Clinical Tutor, St Vincent's Hospital*
Aisha Arayne, *Clinical Tutor, Western Health*
Luke Fairweather, *Clinical Tutor, Western Health*
Michelle Smigielski, *Clinical Tutor, Western Health*

Working from Home

Adapting to working from home has been one of the strengths of the Department, made easier by the wide-spread use of Zoom at the University. Here's a snippet of our grainy Zoom chats across the Department over the years.

Where's the *unmute* button?!







An electronic version of this report is available at:
medicine.unimelb.edu.au/school-structure/surgery

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