

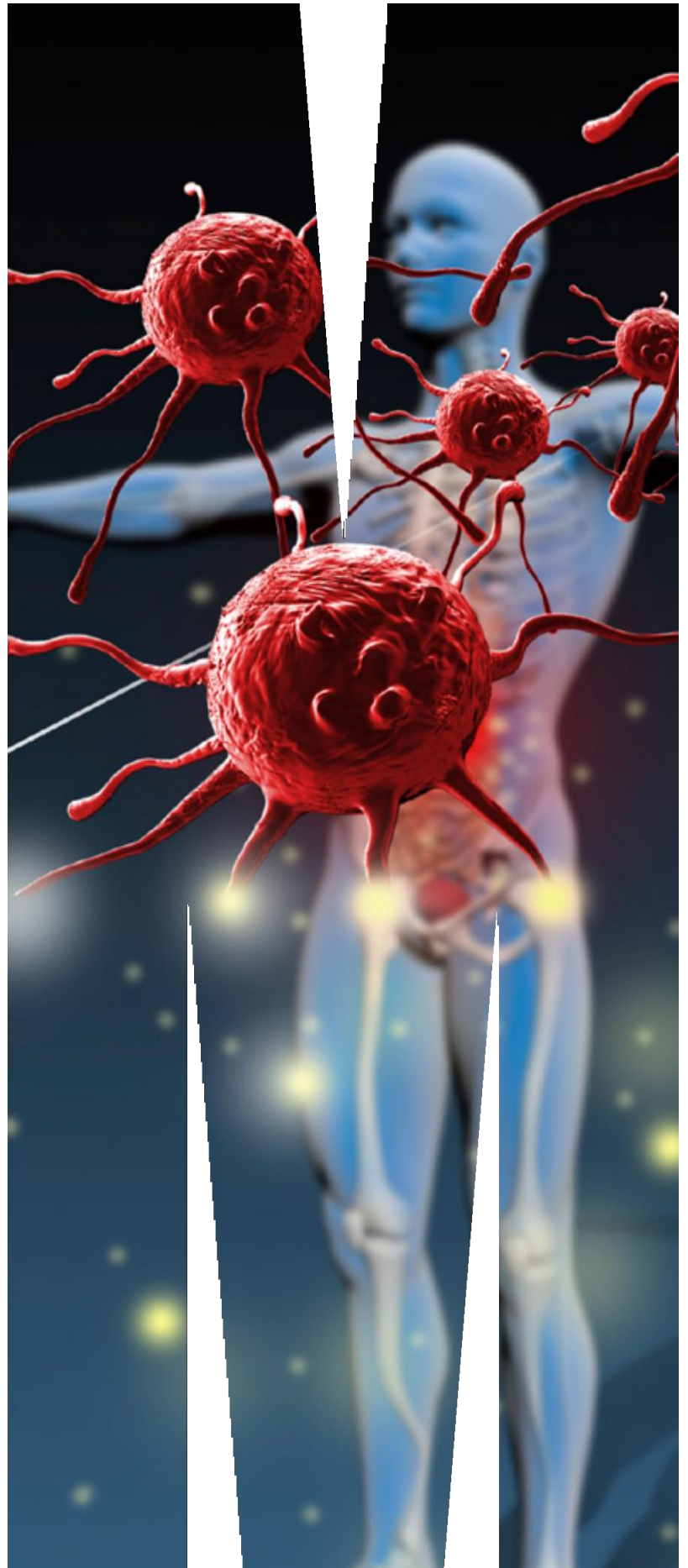
BACHELOR OF BIOMEDICAL SCIENCE HONOURS

2027

Course Guide

&

Research Project
Areas



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Clayton, Australia, 3800

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MONASH UNIVERSITY

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CONTENTS

What is the Structure of the Honours course?	2
What is the Honours Research Stream?	2
What is the Honours Industry Stream?	3
Who administers the Biomedical Honours Course?	4
How do I apply?.....	4
Monash Biomedicine Discovery Institute (School of Biomedical Sciences).....	6
Department of Anatomy and Developmental Biology	7
Department of Biochemistry and Molecular Biology.....	8
Department of Microbiology.....	9
Department of Pharmacology.....	10
Department of Physiology.....	11
Australian Regenerative Medicine Institute (ARMI).....	12
School of Translational Medicine.....	13
Australian Centre for Blood Diseases (ACBD).....	14
Department of Immunology.....	15
Department of Neuroscience.....	16
Department of Infectious Diseases.....	17
Respiratory Research@Alfred.....	18
Department of Medicine (Cancer Theme).....	19
Department of Psychiatry.....	20
Department of Surgery.....	21
Department of Diabetes.....	22
Department of Gastroenterology.....	23
Melbourne Sexual Health Centre.....	24
Baker Heart and Diabetes Institute.....	26
Burnet Institute.....	27
School of Public Health and Preventive Medicine.....	28
Department of Forensic Medicine.....	29
Department of General Practice.....	30
School of Rural Health.....	31
School of Clinical Sciences at Monash Health.....	32
Department of Nutrition, Dietetics and Food.....	36
Department of Psychiatry.....	37
Department of Surgery.....	38
Hudson Institute of Medical Research.....	39
Eastern Health Clinical School.....	43

THE BACHELOR OF BIOMEDICAL SCIENCE HONOURS COURSE

What is the structure of the Biomedical Honours course?

There are two streams for the Bachelor of Biomedical Science Honours program:

Research stream - is devoted almost entirely to undertaking a research project. The coursework is kept to a minimum so that your major focus (75% of total assessment) will be on your chosen research project. You will enrol into BMS4100 and BMS4200.

Industry stream - you will be placed with an industry partner to undertake a supervised placement working on a research question within the field. You will also undertake a coursework component which will complement the industry placement. You will enrol into BMS4300 and BMS4200.

What is the Honours Research Stream?

A full-time Bachelor of Biomedical Science Honours year gives students the opportunity to undertake a specific avenue of research selected from the range of research interests in any area of biomedical science.

The course is made up of a course work component and an independent research project. Students select and undertake an individual research project often working within a team or research group under close supervision.

Students undertake the coursework component in the department/school where they will be undertaking their research project. As part of the Honours course students receive training in oral communication, data analysis and advanced discipline related knowledge. At the end of the year students report their findings to academic staff and write a research thesis.

Individual Student Research Project (75%)

This can be undertaken at any approved location within the Faculty of Medicine, Nursing and Health Sciences at Monash University.

It must be conducted under the supervision of a member of the academic staff or research staff of the faculty who has had experience in supervising honours students.

The choice of project and supervisor will largely be left to you. You will need to identify the areas of research you are interested in and seek opportunities for projects in those areas.

Assessment of your research project will be through a literature review, seminars and the final thesis.

Discipline Specific Component (15%)

Your School/Departmental/Institute Honours coordinators will coordinate this component. This could take the form of critical literature analysis, advanced lecture series, poster presentation as some examples.

Biostatistics course (10%)

This component of your assessment will involve a biostatistics module which will provide an understanding of biostatistics and its use in biomedical research.

Research Stream comprises two units:

BMS4100 Biomedical Research Project (36 points)	Weighting
Literature Review	10%
Seminar 1	S or NS
Seminar 2	10%
Thesis	80%
Thesis Review	
Total	100%

BMS4200 Advanced Studies in Biomedical Science (12 points)	Weighting
Discipline-Specific component	60%
Biostatistics module	40%
Total	100%

Why enrol in Honours?

- Increase employment opportunities.
- Gain experience in research.
- Allows students to determine if they are suited to a career in biomedical research.
- Contribute new knowledge to medical science.

Choosing a research group?

The key to a successful and enjoyable Honours year is to select an interesting project, a compatible supervisor and a supportive research group. Students should take advantage of the various Honours information sessions run by individual Departments/Schools/Institutes to learn about potential projects and meet supervisors. Dates for Honours information sessions are publicised on the web. Students are also encouraged to visit Departments/Schools/Institutes and chat with staff about Honours projects.

This booklet provides you with information on the key research areas for the departments/schools/institutes where research projects can be undertaken.

What is the Honours Industry Stream?

You will spend the Honours year with an industry partner. At the beginning of your placement, you, in consultation with your line manager, will decide on a topic that you will research for the year. This topic will be the focus of your research report and literature review. You will also have a co-supervisor based at Monash University.

Students will also undertake a coursework component. As part of the Honours course students will complete training in data analysis, oral communication and advanced discipline related knowledge. At the end of the year students report their findings to academic staff and all industry partners that participate in the Honours cohort.

Individual Student Research Project (75%)

You will need to identify an area of research relevant to the industry setting and, in consultation with your industry supervisor, decide upon a research topic. Assessment of your research project will be through a literature review, seminars and the final report.

Discipline Specific Component (15%)

The BMS4300 Honours unit coordinators will be responsible for this component. This will take the form of advanced lecture series, poster presentation and enhancing employability skills.

Biostatistics course (10%)

This component of your assessment will involve a biostatistics module which will provide an understanding of biostatistics and its use in biomedical research.

Industry Stream comprises two units:

BMS4300 Biomedical Science Industry Research Project (36 points)	Weighting
Literature Review	10%
Seminar	10%
Reflective portfolio	10%
Research Report	70%
Total	100%
BMS4200 Advanced Studies in Biomedical Science (12 points)	Weighting
Discipline-Specific component	60%
Biostatistics module	40%
Total	100%

Why do the Honours Industry Stream?

Completing an Honours year within an industry setting offers a unique and highly valuable opportunity for students to bridge the gap between academic study and professional industry practice. It's a transformative experience that not only sharpens the academic research skills that you will develop but also immerses you in a dynamic, fast-paced work environment. The benefits of such a placement extend far beyond the laboratory, offering a wealth of personal and professional development that can shape your career trajectory.

One of the most immediate and impactful advantages is the development of industry-relevant work skills. Students in a pharmaceutical setting are exposed to real-world research and development processes, quality control standards, and regulatory requirements. Students will quickly learn to navigate standard operating procedures, data management systems, and Good Laboratory Practice (GLP), while also gaining hands-on experience. These are skills that employers highly value and are difficult to obtain outside of an industrial setting.

Beyond technical capabilities, an Honours year in industry fosters essential soft skills that are just as important in the modern workforce. Working within multidisciplinary teams, students develop communication and collaboration abilities, learning how to present findings clearly, respond to feedback, and contribute meaningfully to shared goals. Time management, problem-solving, and adaptability are naturally cultivated as students balance deadlines, adjust to company workflows, and handle the unpredictability of live research projects. These are competencies that enhance employability in any sector.

Finally, you will have the opportunity to build a professional network and gain mentorship from experienced industry professionals. This mentorship can provide career guidance, open doors to future employment opportunities, and give students a clearer picture of potential career paths within the pharmaceutical and healthcare sectors.

Industry Stream Placements

Industry partners include:

- ☐ PPD/ThermoFisher
- ☐ Novotech
- ☐ IQVIA
- ☐ ARCS
- ☐ Medpace
- ☐ Veritus
- ☐ Gilead Sciences

Placements will be run through the Department of Pharmacology at Monash University. Unit convenors will be able to share position descriptions for each of the available roles. You should meet with the Chief Examiner of BMS4300 prior to selection of your preferred placement. Students will need to interview with industry partners before any placements are offered. Students will likely require multiple interviews as there are limited places available.

Who administers the Biomedical Honours Course?



- Chief Examiner – Professor Tim Cole (Department of Biochemistry and Molecular Biology)



- Course Director (Research stream BMS4100 / BMS4200) & Chairperson, Management Committee – Associate Professor Nicholas Price (Department of Physiology)



- Chief Examiner (Industry stream BMS4300) – Dr Mark Del Borgo (Department of Pharmacology)



- Course Coordinator – Dr Shae-Lee Cox (Monash Biomedicine Discovery Institute)

The Biomedical Science Honours Course is managed by a Management Committee, which is comprised of staff and student representatives from: Monash Biomedicine Discovery Institute, School of Translational Medicine, Hudson Institute of Medical Research, School of Clinical Sciences, School of Public Health and Preventive Medicine, School of Rural Health, Australian Regenerative Medicine Institute; Eastern Health Clinical School, Department of Nutrition, Dietetics and Food.

How do I apply?

Research Stream

Students must complete the three steps in the application process by the due date (please check the website below for application due date). You must find a project and supervisor first and complete the project application form. You then need to register your project via the online form on the website and apply for the course (M3702) through MyApp.

The process and project application form (for the Research stream) can be found at the Monash Biomedicine Discovery Institute website:
monash.edu/discovery-institute/honours/so-how-do-i-apply

If you have a query about the Biomedical Science Honours program or the application process, please submit an enquiry online via [Monash Connect](#).

Industry Stream

If the Industry stream sounds like the right fit for you, contact Dr Mark Del Borgo (mark.delborgo@monash.edu). He will go through each of the placement options available. You will then need to list the placements from most to least preferred via the online form on the website and apply for the course (M3702) through MyApp.

You will then be given interviews with three industry partners who will indicate their most preferred candidate(s). If a placement is popular, then the student WAM will be used to determine interviews and placements. Effort will be made to match students to their preferred industry partner but this is not guaranteed.

The process and online form can be found at the Monash Biomedicine Discovery Institute website:
monash.edu/discovery-institute/honours/so-how-do-i-apply

When will I know if I have a place?

All applications will be reviewed and students who meet the eligibility criteria will be informed of their success in obtaining an Honours place by email in late December. Students must then notify the Faculty and supervisor of their intention to accept or reject the place.

Students will be able to enrol into the Honours course via WES in January. Mid year entry students will be notified after semester 2 results are released.

When can I start?

The official commencement date for the Bachelor of Biomedical Science Honours is Orientation week of the semester:

- Semester 1 intake - Monday **23 February 2027**
- Semester 2 intake - Monday **19 July 2027**

Students should not begin laboratory work until after the completion of the Orientation Program and Occupational Health and Safety courses during Orientation week (week 0). An earlier start is only by arrangement with the supervisor and may involve reading research articles, preparation of the project outline and commencement of the literature review.

KEY RESEARCH AREAS



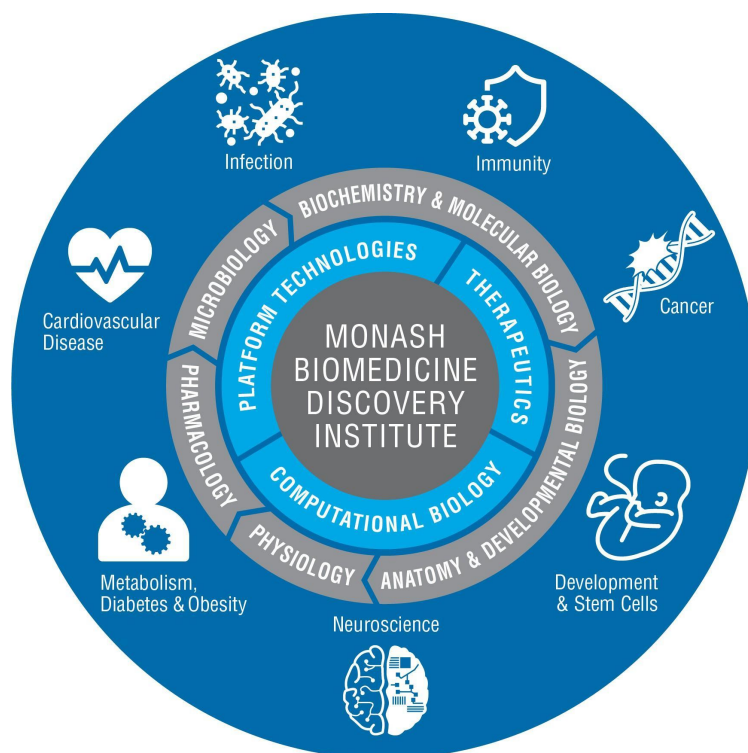
Monash Biomedicine Discovery Institute/ School of Biomedical Sciences

With more than 120 internationally-renowned research teams, the [Monash Biomedicine Discovery Institute \(BDI\)](#) is one of the largest and highest-quality biomedical research institutes in Australia. Monash BDI works with national and international collaborators on global health priority areas, including cancer, cardiovascular disease, development and stem cells, infection and immunity, metabolism, diabetes and obesity, and neuroscience.

Our discoveries accelerate the ability to prevent, diagnose and treat disease by leveraging our strong partnerships with researchers, health precincts and industry, together with our access to unparalleled, world-leading research infrastructure.

The Monash BDI encompasses the [School of Biomedical Sciences](#), and is part of Monash's Faculty of Medicine, Nursing and Health Sciences. The School of Biomedical Sciences delivers biomedical sciences education to more than 2,000 undergraduate students and 300 postgraduate students.

Based at Monash's Clayton campus, the Monash BDI is structured to include six health-focused discovery programs and five discipline-specific departments. This allows for the cross-pollination of ideas needed to tackle the big questions in biomedical research – it is at the intersection of these global health issues that truly innovative discoveries will be made.



DISCOVERY PROGRAMS

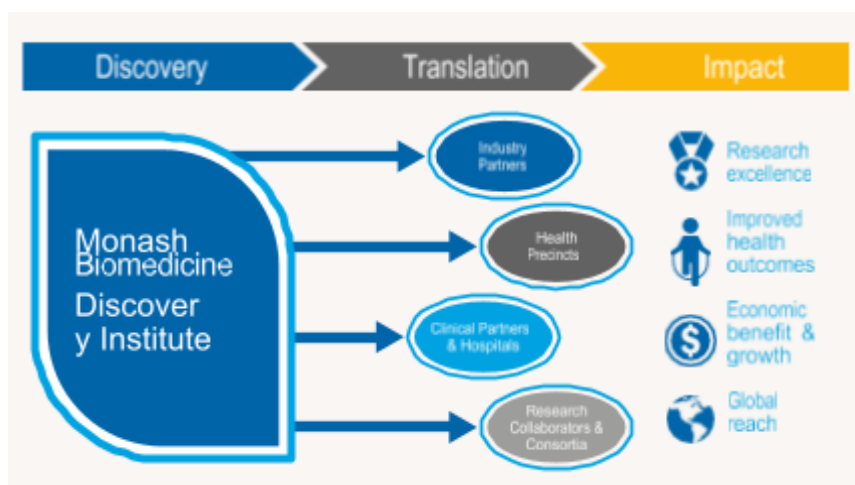
- Cancer
- Cardiovascular Disease
- Development & Stem Cells
- Immunity
- Infection
- Metabolism, Diabetes & Obesity
- Neuroscience

DEPARTMENTS

- Anatomy & Developmental Biology
- Biochemistry & Molecular Biology
- Microbiology
- Pharmacology
- Physiology

CENTRES

- Centre for Human Anatomy Education



Department of Anatomy and Developmental Biology

Associate Professor Tracy Heng

EMAIL adb-honoursteaching@monash.edu

LOCATION Clayton Campus

WEB monash.edu/discovery-institute/departments/anatomy-and-developmental-biology

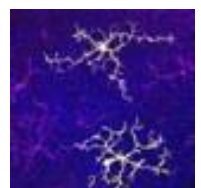
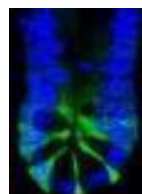
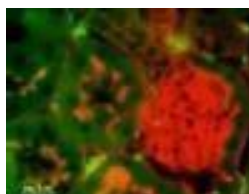


Key research areas

The Department of Anatomy & Developmental Biology at Monash University is very active in a variety of research areas. It boasts several of the world's leading research scientists in the field of Developmental biology and Anatomy.

Major areas of research include:

- Brain development, neuroplasticity and stem cells (Prof Roger Pocock)
- Cellular physiology (Dr Senthil Arumugam)
- Comparative development and evo-devo (A/Prof Craig Smith)
- Development and disease (Dr Alex Combes)
- Neuroglial development and repair (A/Prof David Gonsalvez)
- Education research (Prof Michelle Lazarus, A/Prof Chantal Hoppe)
- Epigenetics and reprogramming (Prof Jose Polo)
- Integrated morphology and palaeontology (A/Prof Justin Adams)
- Kidney development and disease (Prof Ian Smyth, Dr Denny Cottle)
- Kidney development, programming and disease (Prof John Bertram)
- Niche signaling, regeneration and cancer (Dr Thierry Jarde)
- Oocyte and embryo development (Prof John Carroll, Dr Deepak Adhikari)
- Organogenesis and cancer (Prof Kieran Harvey)
- Ovarian biology (Prof Karla Hutt, Dr Amy Winship)
- Palaeodiet research (A/Prof Luca Fiorenza)
- Prostate cancer research (Prof Gail Risbridger, A/Prof Mitchell Lawrence)
- Regulatory genomics and cell identity (Dr Anja Knaupp)
- Somatic - germline communication in development (Dr Wei Cao)
- Stem cells and cancer (Prof Helen Abud)
- Stem cells and translational immunology (A/Prof Tracy Heng)
- 3D cancer modelling (Prof Daniela Loessner)



Department of Biochemistry and Molecular Biology

Associate Professor Michelle Dunstone

EMAIL	biochemistry-honours@monash.edu	TELEPHONE	+61 3 9902 9269
LOCATION	Clayton Campus		
WEB	https://sites.google.com/monash.edu/monash-biochemistry-honours/home		



Professor Max Cryle

EMAIL	biochemistry-honours@monash.edu	TELEPHONE	+61 3 9905 50771
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/biochemistry-and-molecular-biology		



Key research areas

The Department of Biochemistry and Molecular Biology at Monash University is very active in a variety of research areas, has made significant contributions in these areas and is well respected internationally as a research centre.

Major areas of research in the Department of Biochemistry and Molecular Biology:

- CRISPR/Cas9 basic research and technology application
- Cell and immune system responses to COVID-19
- AI for de novo protein design
- Cancer: cytoskeletal rearrangement and cellular proliferation
- Cancer: Signal transduction and pathways
- Peptide biology and drug design
- Antibiotic biosynthesis and novel antibiotic development
- Nuclear protein transport in medicine and development
- Modelling cell signalling pathways and understanding adaptive resistance to therapies
- Structural biology (crystallography) of medically important proteins and therapeutic drugs
- Molecular analysis of the cause and expression of autoimmune diseases
- Diabetes and renal failure, mechanisms of proteinuria in the kidney
- The molecular neurobiology of Alzheimer's disease and related disorders
- Molecular analysis of platelet function in thrombosis and haemostasis
- Mitochondrial turnover, vacuolar ATPase function and autophagy
- Epigenetics and chromatin research
- Adrenal steroid signaling and actions in embryonic development, stem cells and endocrine control of obesity
- Mitochondria, oxidative stress and apoptosis in neurological disease and host-pathogen interactions
- RNAi and RNA processing mechanisms
- miRNA's and disease
- Microbial oncogenesis
- Structural virology
- Tumour immunology and dendritic cells
- Regulation of metabolism and metabolic disease

Department of Microbiology

Professor John Boyce

EMAIL	john.boyce@monash.edu	TELEPHONE	+61 3 9902 9179
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/microbiology		



Dr Meiling Han

EMAIL	meiling.han@monash.edu	TELEPHONE	+61 3 9902 9129
LOCATION	Clayton Campus		
WEB	https://www.monash.edu/discovery-institute/han-lab/home		



Key research areas

Research projects within the Department of Microbiology are aimed at unravelling the complex lifestyles of microbes and how they affect the natural world and human society. Many projects focus on characterising how specific bacteria, viruses or parasites interact with their animal hosts during both healthy and diseased states, and how we might use that knowledge to develop more effective treatment strategies. Other projects address the roles of microbes in modulating the global environment and how we can manipulate these organisms to reduce pollution and mitigate climate change. Other projects focus directly on development of new diagnostics or vaccines or the use of microbes in food production systems or for novel biotechnology applications. These projects will train you in a diverse range of cutting-edge techniques, including latest methods in microbial genetics, immunology, structural biology and biotechnology.

Specific research projects include:

- How does the host response to cytomegalovirus alter during aging
- The impact of short-and long-term warming on Antarctic soil microbes
- Unravelling the complex metabolic interplay between bacteria and their hosts
- Understanding antibiotic resistance in nosocomial pathogens using systems biology approaches
- Using phage as therapies for infections caused by multi-drug resistant *bacteria*
- Eat to complete: comparative and functional genomics to explore metabolism and competition between *Klebsiella* species
- Repurposing bacterial type VI secretion system toxins as novel antibiotics
- Investigating how circadian rhythms influence *Clostridioides difficile* infection
- Super-resolution analysis of virus-host interfaces
- Characterisation of how *Coxiella burnetii* effector proteins perturb host cell signalling
- Impact of antibiotic resistance on immune recognition of *Staphylococcus aureus*
- Chemotaxis as a new antimicrobial resistance mechanism
- Assessing how chromatin modifying enzymes regulate virus-specific CD8+T cell responses
- How the microbiome influences innate immune responses
- Faecal microbiota transplantation: why does it work and is it safe for your microbiome?
- Mechanisms of pathogenesis and immunity to malaria and dengue
- Single particle analysis of the bacterial protein import translocase
- Targeting host RNA interactions in bacterial infection
- Bat viruses and antiviral defences

Department of Pharmacology

Professor Jane Bourke

EMAIL	jane.bourke@monash.edu	TELEPHONE	+61 3 9905 5197
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/pharmacology		



Professor Robert Widdop

EMAIL	robert.widdop@monash.edu	TELEPHONE	+61 3 9905 4858
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/pharmacology		



Key research areas

Research involves diverse areas of pharmacology, in many cases in collaboration with Australian and/or international colleagues in academia and in industry. Major research activities within the Department are aimed at increasing our understanding of various therapeutic targets for the treatments of a range of diseases including cancer, hypertension, atherosclerosis, stroke, diabetes, heart, renal, liver and respiratory diseases. The Department also has an active research program focused on pharmacology education.

The Department of Pharmacology provides projects involving a range of techniques from cellular and molecular through to tissue pharmacology, to complex instrumentation of experimental animals to mimic human diseases. The broad areas of research that are offered in the Department include:

- Cancer drug discovery and cellular ageing (identifying novel therapeutic approaches for brain cancers, understanding and targeting cellular senescence in ageing and age-related diseases).
- Cardiovascular & Pulmonary Pharmacology (novel pharmacological and/or cell-based therapies to treat systemic hypertension and stroke, including immune mechanisms and stem cells)
- Fibrosis Pharmacology (novel antifibrotic mechanisms and treatments, including relaxin and stem cells)
- Hepatology Research Laboratory (understanding of the central role of the RAS in the pathogenesis of liver disease including liver cancer, liver fibrosis/cirrhosis)
- Hypertension Research Laboratory gut microbiome and diet (including how they impact the cardiovascular and immune systems, and drug interactions from animal models to clinical trials and big data)
- Integrative Cardiovascular Pharmacology (Angiotensin II and its role in cardiovascular diseases, including hypertension, atherosclerosis, fibrosis and stroke)
- Kidney Regeneration & Stem Cell Research (application of iPS for the treatment of genetic kidney disease, stem cells to promote kidney self repair)
- Nanopharmacology (engineering new nanomedicines with applications in cancer, stroke and liver disease)
- Pharmacology Education (advanced education concepts in Pharmacology)
- Respiratory Pharmacology (improved therapeutic strategies in chronic lung diseases, including asthma, COPD, pulmonary hypertension and silicosis)
- Systems pharmacology (chemical biology and discovery of novel antibiotic drugs targeting extremely-drug resistant bacterial 'superbugs')
- IRAP Pharmacology (role of Insulation Regulated AminoPeptidase in cardiovascular diseases)

Department of Physiology

Dr Denuja Karunakaran

EMAIL	denuja.karunakaran@monash.edu	TELEPHONE	+61 3 7511 1858
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/physiology		



Associate Professor Claire Foldi

EMAIL	claire.foldi@monash.edu	TELEPHONE	+61 3 9905 9158
LOCATION	Clayton Campus		
WEB	monash.edu/discovery-institute/departments/physiology		



Key research areas

The Department of Physiology is a large, research-intensive unit, strongly supported by external research grant funding. There are ~60 scientists (academic and research) in the Department and their research programs attract over \$9 million in research support each year. Staff in the Department of Physiology and affiliated institutions offer an extensive range of exciting research projects and high-calibre supervision to students undertaking Honours in biomedical science. Research within the Department covers a wide range of integrative, cellular and molecular physiology, with particular strengths in sensory and autonomic neuroscience, cardiovascular and renal physiology, neuroendocrinology, obesity and metabolic physiology, muscle and exercise, stress, development, and smooth muscle physiology. The Department of Physiology provides projects involving an array of state-of-the-art techniques from cellular and molecular physiology, through tissue and organ culture to complex instrumentation of experimental animals, and human-based research. There is special emphasis on animal models of disease and the vertical integration of animal models with cellular and sub-cellular/molecular tools of investigation. Projects may also be conducted with co-supervision through other Monash Departments. The Department encourages students who wish to take integrated approaches to major health problems, using whole animal models in conjunction with the full range of investigative tools that are available at Monash and in affiliated institutions.

The broad areas of research that are offered in the Department include:

- Sensory and cognitive neuroscience
- Cardiovascular and renal physiology
- Membrane physiology and cellular signaling
- Neuroendocrinology
- Obesity and metabolic physiology
- Physiology of chronic pain
- Physiological genomics
- Reproductive physiology
- Sleep and sleep disorders physiology
- Cancer biology
- Muscle and exercise physiology

Australian Regenerative Medicine Institute (ARMI)

Dr Jan Manent

EMAIL	jan.manent@monash.edu	TELEPHONE	+61 3 9902 9723
LOCATION	Clayton Campus		
WEB	armi.org.au/study-education/honours-armi		



Jane McCausland

EMAIL	jane.mccausland@monash.edu	TELEPHONE	+61 3 9902 9607
LOCATION	Clayton Campus		
WEB	armi.org.au/study-education/honours-armi		

Key research areas

ARMI is Australia's first research centre dedicated to the important new field of regenerative medicine. It is based at the Clayton Campus of Monash University and boasts 11 research groups studying a variety of regenerative approaches.

Our key research areas include:

- **Heart and muscle development and regeneration:** Heart and muscle development and regeneration: ARMI researchers are studying animals with highly sophisticated and specific tissue regenerative qualities to develop cures for heart disease and other muscular disorders including dystrophies that can be translated to the patient bedside. Groups: Prof Currie, A/Prof McGlenn, Dr del Monte Nieto, Dr Chow, Prof Eynon, Dr Jaffré
- **Immunity and regeneration:** Soon after birth, our own immune systems mature and we lose capacity to respond to damage with scar free healing. ARMI scientists are exploring the relationships between immunity and regeneration in the animal kingdom to enhance tissue repair in patients with wounds or degenerative diseases. Groups: Prof Lieschke, A/Prof Martino
- **Stem cells and regeneration:** Stem cells are integral to the development of tissues in the embryo and persist in adults as essential building blocks for our bodies. ARMI studies embryonic stem cells as a window on the mechanisms of human development, and as an essential part of the tool kit of regenerative medicine. ARMI has devised methods for growing stem cells that can be used to repair damaged tissue, investigate particular diseases, test drug candidates for therapeutic safety and effectiveness, and develop ways to enhance the intrinsic mechanisms of stem-mediated repair. Groups: Prof Nilsson, Dr Zenker
- **Neural regeneration:** Unlocking the regenerative potential in the central nervous system so it can be harnessed to treat neurodegenerative disorders. ARMI scientists are tackling the fundamental obstacles in neural repair for diseases such as multiple sclerosis and Alzheimer's disease, by uncovering neural regenerative potential across the animal kingdom. Groups: Dr Kaslin, Dr Saurat
- **Organ Engineering and Synthetic Biology:** ARMI is exploring a number of innovative techniques to enhance function and form that is lost as a consequence of ageing and degenerative disorders. These techniques explore various aspects of tissue engineering including organoid and organ chip technology, bioactive biomaterials and biointerfaces that simulate the cellular microenvironment at the micro and nanoscale, functional biomaterials and synthetic and biological matrices for tissue engineering and transplant development. Groups: Dr Roman

School of Translational Medicine

Associate Professor Stuart McDonald

EMAIL	stuart.mcdonald@monash.edu	TELEPHONE	+61 3 9903 0203
LOCATION	Alfred Campus		
WEB	monash.edu/medicine/translational/education/honours		



Dr Zoe Ding

EMAIL	zhoujie.ding@monash.edu	TELEPHONE	+61 3 9903 0424
LOCATION	Alfred Campus		
WEB	monash.edu/medicine/translational/education/honours		



Key research areas

The school is co-located with the [Baker](#) and [Burnet](#) Institutes at A+ but activities extend across Peninsula Health as well as the Cabrini and Epworth hospital campuses. Strong links across the A+ consortia enable us to rapidly contribute to improved patient care. Our multidisciplinary research approach attracts elite researchers, teachers and students to our state-of-the-art laboratories and teaching facilities. The school partners with industry to translate research into practice by developing treatments and cures for a wide variety of diseases and conditions. To this end the school is currently participating in more than 330 active clinical trials.

Home to [eleven departments and five centres and institutes](#), STM connects leading medical and healthcare experts from a cross-section of specialisations. Our School encourages [multidisciplinary research](#) across separate fields and attracts elite students, researchers and teachers to its well equipped research laboratories and facilities. To contribute to the treatment and cure of several specific diseases the school incorporates its research products into clinical practice and joins with commercial ventures.

Australian Centre for Blood Diseases (ACBD)

Professor Harshal Nandurkar

EMAIL	harshal.nandurkar@monash.edu	TELEPHONE	+61 3 9903 0122
LOCATION	Commercial Rd, Melbourne		
WEB	monash.edu/medicine/translational/blood-disease		



Key research areas

The Australian Centre for Blood Diseases (ACBD) is the largest blood-focused research centre in Australia. We conduct world-leading research into malignant (blood cancers) and non-malignant (blood clots) haematology and work closely with a large network of haematologists to translate their laboratory research into clinical benefits. Our state-of-the-art facilities and high-calibre scientists and clinicians provide an excellent environment for undergraduate and higher degree research students.

Major areas of research include:

Non-malignant Haematology (Thrombosis & Haemostasis)

- Theranostics, molecular imaging & platelets in cancer (Dr Karen Alt)
- Molecular imaging, drug delivery, and nanotechnology (Prof Christoph Hagemeyer)
- Neurotrauma and haemostasis (Prof Rob Medcalf)
- Inflammation and thrombosis in vascular biology (Prof Harshal Nandurkar – Head of Department)

Malignant Haematology (Blood Cancers)

- Blood stem cells in haematological malignancies (Prof David Curtis)
- Acute leukemias (A/Prof Ross Dickins, Dr Claudia Bruedigam)
- Leukaemia epigenetics (Dr Omer Gilan)
- Genomics of myeloproliferative disorders (Prof Andrew Perkins)
- Multiple myeloma (Prof Andrew Spencer)

Clinical Research

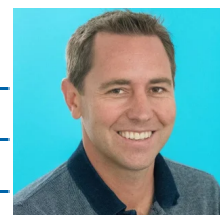
- Bone Marrow Transplant Program (Prof Andrew Spencer)
- The Ronald Sawers Haemophilia Centre (Prof Huyen Tran)

More: monash.edu/medicine/translational/education/honours

Department of Immunology

Professor Ben Marsland

EMAIL	benjamin.marsland@monash.edu	TELEPHONE	+61 3 9903 0383
LOCATION	Commercial Rd, Melbourne		
WEB	monash.edu/medicine/translational/immunology/education/honoursstudies		



Key research areas

The Department of Immunology is committed to excellence in discovery, translation and education in its discipline area. It is part of the School of Translational Medicine and Sub-Faculty of Translational Medicine and Public Health, and is located at the Alfred Hospital campus in Melbourne's inner south-east, opposite the beautiful Fawkner Park.

Together with our partner organisations in the Alfred Research Alliance, the department contributes to a world-class research consortium spanning fundamental and clinical research through to clinical and translational outcomes. We provide exceptional student mentorship and training, to foster the next generation of research leaders. Cutting-edge research is supported by onsite, state-of-the-art facilities and expertise spanning multiple disciplines.

The Department has an exceptional national and international profile with an outstanding record of success in research, competitive grant funding, and a world-leading program in undergraduate and postgraduate education in Immunology. We also train numerous post-doctoral fellows and provide unparalleled opportunities to young scientists for career development.

Our research spans fundamental immunology, cell biology and molecular pathology through to translational disease models, clinical immunology and the study of human diseases.

- B cells, immune memory and autoimmunity (Prof David Tarlinton – Head of Department – Dr Zhoujie Ding)
- Interactions between immune and vascular pathways in early-life lung disease (A/Prof Margaret Hibbs, Dr Evelyn Tsantikos)
- Leukocyte membrane proteins in inflammation and cancer (A/Prof Mark Wright)
- Lung fibrosis and lung transplantation (Profs Glen Westall and Ben Marsland)
- Pulmonary neuro-immune interactions in pulmonary fibrosis (Profs Ben Marsland, Nicola Harris and Glen Westall)
- Mechanistic mucosal immunology: Impact of diet and the microbiome on IBD (Profs Ben Marsland and Nicola Harris)
- Urology, nephrology, infection and immunity (Dr Malcolm Starkey)
- Immunology of vaccine responses (Dr Danika Hill)
- Allergy and humoral immunity (Dr Marcus Robinson)
- Bioinformatics and skin immunology (Dr Celine Pattaroni)
- Human B cell biology (Dr Prasanti Kotagiri)
- Primary immunodeficiencies and disease comorbidities (Dr Emily Edwards)
- COVID-19 and clinical immunology (Dr Paul Gill)
- Neuroimmune and metabolic regulation of mucosal immunity (A/Prof Cyril Seillet)

More: monash.edu/medicine/translational/education/honours

Department of Neuroscience

Professor Helmut Butzkueven

EMAIL helmut.butzkueven@monash.edu

LOCATION Commercial Road, Melbourne

WEB monash.edu/medicine/translational/neuroscience



Key research areas

The Department of Neuroscience, in strong partnership with the Alfred Health Department of Neurology, Neurosurgery, Radiology and Psychiatry, has 30 different research groups and over 200 staff and students. We do world-leading basic/fundamental and clinical neuroscience research and research training relevant to a broad range of neurological and related disciplines. Major areas of research in the Department of Neuroscience include:

Epilepsy

- Neuropharmacology (Prof Terry O'Brien)
- Personalised Medicine (Prof Patrick Kwan)
- Epilepsy and Behaviour (Prof Nigel Jones)
- Neuropharmacology (Dr Pablo Casillas-Espinosa & Dr Idrish Ali)
- Neuropharmacology (Prof Norman Saunders & A/Prof Kate Dziegielewska)
- Stem cell research (Dr Ana Antonic-Baker & Dr Ben Rollo)
- Biostatistics (Dr Ben Chen)
- Clinical (Dr Andrew Neal)

Neuroimmunological conditions

- Clinical and Translational (Prof Helmut Butzkueven)
- Genomics and Prognostics (A/Prof Viliija Jokubaitis)
- Multiple Sclerosis and Neuroophthalmology (A/Prof Anneke van der Walt)
- Neuroinflammation (Dr Mastura Monif)
- MS and Alzheimer's Disease (Dr Steven Petratos)

Body Image & Eating Disorders - (A/Prof Gemma Sharp)

Headache and Pain

- Peripheral Neuropathy, Headache, Pain (Dr Elspeth Hutton)

Stroke - (Prof Geoff Cloud)

Neuromuscular disorder

Human autonomic and somatosensory neurophysiology
(Prof Vaughan Macefield)

Movement Disorders

- Neuromuscular Disorders, Parkinson's Disease
(Dr Kelly Bertram)

Cognitive Neuroscience and Neuropsychology

- Oculomotor system (A/Prof Joanne Fielding)
 - Neuropsychology (A/Prof Rubina Alpitis)
- Imaging, cognitive neuroscience and neuropsychology
(Dr Lucy Vivash)
- Cognitive Health Initiative (including stroke) (Prof Amy Brodtmann)

Neurotrauma

- Neurorehab (including stroke and TBI) - (Prof Natasha Lannin)
- Pediatric and Epilepsy (A/Prof Bridgette Semple)
- Early life experiences, pain & epigenetics
(Prof Richelle Mychasiuk)
- Long term consequences of brain injury – (Prof Sandy Shultz)

Neuroimaging

- AI and Imaging Informatics (Prof Meng Law)
- Imaging – MRI, PET, CT, FLECT (Dr David Wright)
- Brain imaging, MRI, Neurodegeneration,
Cerebellar function (Dr Ian Harding)
- Brain imaging, MRI, Parkinson's Disease (Dr Ben Sinclair)
- Brain imaging, Pre-clinical PET and Addiction Neurobiology
(Dr Bianca Jupp)

More: monash.edu/medicine/translational/education/honours

Department of Infectious Diseases

Professor Anton Peleg

EMAIL	anton.peleg@monash.edu	TELEPHONE	+61 3 9076 8491
LOCATION	Commercial Rd, Melbourne		
WEB	monash.edu/medicine/translational/infectious-diseases/education		



Key research areas

The Department of Infectious Diseases, at the School of Translational Medicine and Alfred Health, is a premiere centre for clinical and biomedical research, offering undergraduate and postgraduate study programs. The clinical services work closely with research staff and laboratories are based within the Burnet Institute at the Alfred Hospital campus. The Department is therefore uniquely placed to be able to provide study opportunities that integrate clinical services with clinical and basic science research.

The department specialises in the following areas:

- COVID-19
- HIV-associated co-morbidity
- HIV Cure clinical research
- Prevention of HIVinfection
- Viral hepatitis
- Infections in the immunocompromised host
- Fungal infections
- Infections in the Intensive Care Unit
- Antimicrobial Stewardship
- Antibiotic usage and resistance
- Influenza
- Infection control and surveillance
- International health
- Health information technology
- The Victorian Spleen Service and Registry
- Bone and joint and surgical site infections
- Infections in CF and Burns
- Resistance in Staph aureus and Gram-negative bacteria
- Antimicrobial pharmacokinetic (PK) and pharmacodynamic (PD) *in vitro* modelling
- Antimicrobial Therapeutic Drug Monitoring
- Microbial Genomics
- Molecular Epidemiology and Evolution
- Infectious among people who inject drugs

More: monash.edu/medicine/translational/education/honours

Respiratory Research@Alfred

Professor Anne Holland

EMAIL	anne.holland@monash.edu	TELEPHONE	+61 3 9903 0214
LOCATION	Commercial Road, Melbourne		
WEB	monash.edu/medicine/translational/respiratory-research		



Key research areas

Respiratory Research@Alfred seeks to advance knowledge, clinical care and patient outcomes in respiratory disease. Our research expertise spans laboratory-based research, clinical research, clinical trials, epidemiology and registry-based studies, qualitative research and implementation of research into practice.

Our research interests span diverse patient groups including:

- Pulmonary fibrosis
- Chronic obstructive pulmonary disease (COPD)
- Asthma and allergy
- Pulmonary vascular disease
- Bronchiectasis
- Lung cancer
- Sleep disordered breathing
- Cystic fibrosis
- Lung transplantation

Our research groups include:

Respiratory Care (Head - Professor Anne Holland): Our research aims to improve the lives of people with chronic lung disease through novel non-drug treatments. Our work starts with understanding the supportive care needs of people living with lung disease, developing new non-drug treatments, testing these in clinical trials, and then implementing effective treatments into clinical practice. Our research and clinical trials have generated the evidence underpinning a range of important treatments for chronic lung disease including rehabilitation, exercise training, oxygen therapy and self-management.

Chronic Respiratory Disease (Head - Professor Natasha Smallwood): Our research develops new treatments and models of care for distressing symptoms associated with severe lung diseases, in order to optimise quality of life. Our research focuses on understanding how people experience symptoms like breathlessness, or psychological distress associated with severe lung disease. This allows us to investigate and test new treatments, management approaches or models of care to address symptoms and provide holistic, patient-centred care.

Respiratory Research@Alfred is patient-focused and multidisciplinary, linking senior clinician scientists, discovery scientists, allied health professionals, nurses, primary care physicians and the community.

More: monash.edu/medicine/translational/education/honours

Department of Medicine (Cancer Theme)

Professor Mark Shackleton

EMAIL	stm-cancer@monash.edu	TELEPHONE	+61 3 9076 3129
LOCATION	Paul Fox Melanoma and Cancer Centre, 545 St Kilda Road, Melbourne		
WEB	monash.edu/medicine/translational/medicine-alfred/research		



Key research areas

In close partnership with the Medical Oncology Unit and other collaborating clinical and research groups across Alfred Health and Monash University, our groups seek to improve outcomes for patients with cancer through improvements in diagnosis, treatment, and healthcare delivery supported by new discoveries in cancer biology and therapeutics. Members of the group have particular world-leading expertise in melanocyte biology and skin cancers (melanoma and non-melanoma), lung cancer, breast cancer, prostate cancer, cancer immunology and immune regulation, cancer genomics and cancer biomarkers. Since relocating to the newly-built Paula Fox Melanoma and Cancer Centre (PFMCC) on the Alfred precinct in mid-2024, our state-of-the-art facilities and clinical links will continue to foster world-leading research and student mentorship activities across a range of clinical, translational, and fundamental biology research questions. Major areas of research include:

Melanocyte Biology, Melanoma and Skin Cancers

- Modelling melanocyte and melanoma cancer cell dynamics in a 3D Human Skin Equivalent (Dr Adriana Sanna)
- Identification of progenitor melanocyte markers in human skin and characterization by engineered mouse models (Dr Adriana Sanna)
- Cancer heterogeneity and evolution (Prof Mark Shackleton)
- Oncoproteins and novel functions of epigenetic modifiers (Dr Gamze Kuser-Abali)

Cancer Genomics and Signalling

- Network regulation of gene expression in melanoma (Dr Miles Andrews)
- Relationship between mutational signatures and metastatic site in cancer (Dr Miles Andrews)
- Molecular interactions between steroidal hormone and MAPK pathway signalling (Dr Miles Andrews/Dr Douglas Gaskarth)

Cancer Immunology

- Cancer-extrinsic determinants of cancer outcomes: influence of sex and lipid hormones and microbial products (Dr Miles Andrews/Dr Douglas Gaskarth)
- Mechanisms, predictors and models of immune-related adverse events (Dr Miles Andrews)
- Microbiota as drivers of response and toxicity to immune checkpoint blockade (Dr Miles Andrews)
- Circulating biomarkers of immunotherapy outcome (Dr Miles Andrews)
- Elucidating the role of B cells and antibody production in cancer (Dr Jessica Da Gama Duarte)
- Characterising Tertiary Lymphoid Structures in solid tumours (Dr Jessica Da Gama Duarte)
- Harnessing immune reactivity against the tumour microbiome (Dr Jessica Da Gama Duarte/Dr Miles Andrews)

Translational Immunology

- Antigen-antibody discovery (A/Prof Vivek Naranbhai)
- Immunoproteasome-targeting strategies for cancer immunotherapy (A/Prof Vivek Naranbhai)
- TCR engineering in infectious and malignant disease (A/Prof Vivek Naranbhai)
- Biology of the proteasome system (A/Prof Vivek Naranbhai)
- Early detection and prognostication of cancers (Dr Jessica Da Gama Duarte)
- Prediction of clinical responses and toxicities to immunotherapy in cancer (Dr Jessica Da Gama Duarte)

Gastrointestinal Cancers

We are actively engaged in research on gastric cancer, including organoid modelling, therapeutic strategies, and functional genomics.

More: monash.edu/medicine/translational/education/honours

Department of Psychiatry

Professor Jayashri Kulkarni

EMAIL	jayashri.kulkarni@monash.edu
LOCATION	Commercial Road, Melbourne
WEB	monash.edu/medicine/translational/psychiatry



Key research areas

The Department of Psychiatry is part of the School of Translational Medicine. We carry out world-class research to help make a difference to the lives of people suffering from serious mental illnesses. Two research centres sit within the Department: the Multidisciplinary Alfred Psychiatry research centre (MAPrc) and HER (Health Education Research) Centre Australia.

The Department comprises a multidisciplinary team of over 100 staff and postgraduate students from medicine, nursing, psychology, engineering, allied health, neuroscience, molecular biology, and health information services.

Our research is extraordinarily diverse. Our projects range from neuroscience techniques recognised around the world for breakthrough insights into brain structure and function in health and illness, to innovative new treatments to boost the effectiveness of conventional medications, and evidence-based therapy for psychiatric illnesses. New and effective approaches being developed within our Department include estrogen as a treatment for schizophrenia, re-purposing medications to treat complex psychiatric conditions, identifying novel biomarkers, including blood and eye-tracking for mental ill health and cognitive disorders, and novel biological treatments for eating disorders.

Headed by Professor Jayashri Kulkarni, the HER Centre Australia is one of the few research centres worldwide focusing on women's mental health via a psychoneuroendocrinology approach. Our projects incorporate a biopsychosocial model, combined with novel interventions to improve outcomes for people with mental ill health.

- Women's Mental Health Division (Prof Jayashri Kulkarni and Dr Eveline Mu)
- Cognition and Hormones Group (A/Prof Caroline Gurvich)
- Trauma & Psychopathology (Prof Jayashri Kulkarni, A/Prof Caroline Gurvich, Dr Eveline Mu)

More: monash.edu/medicine/translational/education/honours and monash.edu/medicine/her-centre

Department of Surgery

Professor Wendy Brown

EMAIL	wendy.brown@monash.edu
LOCATION	Commercial Road, Melbourne
WEB	monash.edu/medicine/translational/surgery-alfred/education



Key research areas

The Department of Surgery at The Alfred Hospital's research programme spans across all surgical disciplines, with the broad aim of improving patient outcomes. This is achieved by a diverse research platform which includes: prospective patient databases recording outcomes of care, projects focused on better understanding the underlying basic science of the diseases we treat, randomised controlled trials and prospective cohort studies comparing therapies as well as innovative therapies and devices.

Our current programme includes:

- Burns - The Alfred is the State adult burns unit and hosts the national Burns Registry. Current research projects focus on examining and benchmarking acute burn care practices (against other units in Australia and internationally) and monitoring patient outcomes
- Cardiothoracic - The Alfred is the State Heart and Lung transplant service as well as one of the busiest general cardiothoracic units.
- Endocrine surgery - The Alfred hosts the Monash University Endocrine database, a large population based resource with over 5000 participants.
- ENT - The Alfred has a large head and neck and otolaryngology unit. Research projects focus on the management of head and neck cancer and hearing loss.
- Hepatobiliary - The Alfred hepatobiliary unit is one of the busiest in the state. They have maintained a prospective database of cancer patients for 10 years and also have an interest in the management of hepatic trauma.
- Colorectal surgery - The Alfred Colorectal unit participates in the national colorectal audit and is currently undertaking randomised controlled trials as well as observational studies exploring ways of improving outcomes from Colorectal surgery
- Neurosurgery - The Neurosurgery unit has a clinical interest in brain injury as well as vascular disease.
- Orthopaedic surgery - provides the full range of general and sub-specialised orthopaedic clinical services across the breadth of the specialty.
- Plastic surgery - The Plastics unit at the Alfred has a major interest in reconstruction and trauma.
- Trauma - The Alfred is one of the State's level 1 trauma centres and is the host of the Victorian Trauma Registry.
- Upper Gastrointestinal - The Upper GI unit at the Alfred has a large prospective database of all cancer patients treated through the unit as well as those undergoing reflux surgery and bariatric surgery.
- Urology - The Urology Unit maintains a large prospective database of transperineal prostate biopsy and there are several projects utilising this resource.

Department of Diabetes

Professor Mark Cooper

EMAIL	mark.cooper@monash.edu
LOCATION	Commercial Road, Melbourne
WEB	monash.edu/medicine/translational/diabetes/education



Key research areas

The Department of Diabetes is Australia's first Department of Diabetes, recognising the global pandemic of diabetes that now afflicts over a half a billion people across the globe, and will continue to rise.

A third to a half of all Australians will develop diabetes during their lifetime, mostly driven by high rates of obesity. Diabetes is now the leading cause of kidney disease, blindness and amputations in Australia. It is also one of the top five causes of mortality in Australians.

Understanding and containing the impact of diabetes and its complications is the priority of our Department. The Department is divided into separate programs, each overseen by clinical scientists and outstanding researchers in basic sciences.

Our current programs include research on:

- Reducing oxidative stress in diabetes using novel antioxidant approaches
- Reducing inflammation in the kidneys
- Understanding how diet and the microbiome influence diabetic complications
- Modulating signaling by microRNA
- Blocking activation of complement cascade
- Using antisense oligonucleotides to inhibit pathogenic signaling
- Delivering peptides to enhance weight loss and reduce appetite
- Defining new biomarkers to detect kidney damage early in diabetes
- Reducing the development and progression of atherosclerosis in diabetes

As diabetes affects every organ in the body, our diverse research programs look at everything from head to toes, and from the molecular to the population level. We conduct clinical trials and we do molecular biology. So whatever your skill set or preferences, there is research that can be done with us.

The Jreissati Family Translational Research Laboratory is a state-of-the-art, purpose-built facility on Level 3 of the Alfred Centre, with dedicated facilities including dedicated cell culture, imaging, q-PCR, gel, next generation sequencing and transfection rooms. We also access one of the largest animal houses in Australia at the PAC site, which has expertise in animal models of diabetes.

The Meydan Family Translational Research Hub located on Levels 5 and 6 of the Alfred Building at 99 Commercial Road provides a large open-plan office space for our students, alongside our researchers and postgraduate students. All our students regularly interact with other students within the School of Translational Medicine to share knowledge, training and assessments. Joining us to explore the challenge of diabetes is a great way to start your career in biomedical research. Please visit Supervisor Connect monash.edu/medicine/research/supervisorconnect for a full list of our department's research projects, and use the filter "Diabetes".

More: monash.edu/medicine/translational/education/honours

Department of Gastroenterology

Professor Alex Boussioutas

EMAIL alex.boussioutas@monash.edu

LOCATION Commercial Road, Melbourne & Paul Fox Melanoma and Cancer Centre, Melbourne.

WEB monash.edu/medicine/translational/medicine-alfred/research

Key research areas

The Department of Gastroenterology covers research into all aspects of gastroenterology, hepatology and gastrointestinal endoscopy. Research projects are currently available within the:

- Gastrointestinal Translational Research Laboratory which investigates the clinical, genomic and immunological facets of gastrointestinal cancers and their premalignant conditions. The main goal of the lab is to translate these findings into diagnostics, therapeutics and biomarkers of early detection.
- Translational Nutrition Group which focuses on gut disorders and identifying and developing diet modulated interventions. This team is known worldwide for the development of the FODMAP diet which involves restricting certain poorly absorbed short chain carbohydrates they have named FODMAPs (which stands for Fermentable Oligo-saccharides, Disaccharides, Mono-saccharides and Polyols) from the diet of patients with IBS. Recently the group has become interested in developing dietary related interventions to improve the symptoms associated with Long COVID.

Major areas of our research include:

Gastrointestinal Cancers

- Modelling gastric cancer progression using organoids - (Prof Alex Boussioutas/Dr Rita Busuttil)
- Developing improved therapeutic strategies targeting gastric cancer (Prof Alex Boussioutas/Dr Rita Busuttil)
- Functional characterization of candidate genes involved in the progression of gastric cancer (Prof Alex Boussioutas/Dr Rita Busuttil)
- IOCC - Retrospective review of ICI colitis and characterisation of features to predict outcome (Prof Alex Boussioutas/Dr Zaid Ardan)
- Gastrointestinal Risk Management Clinic (GIRMC) (Prof Alex Boussioutas)
 - Health services research into genetic risk for clinically diagnosed hereditary patients – Examining clinical correlates of risk in patients with high risk genetic predisposition of GI cancers

Translational Nutrition

- Investigating the immunomodulatory and clinical effects of fermentable fibre intervention to reduce symptoms of Long COVID (Dr Paul Gill/ Dr Jane Varney)

More: monash.edu/medicine/translational/education/honours

Melbourne Sexual Health Centre

Professor Jason Ong

EMAIL jason.ong@monash.edu

TELEPHONE +61 3 9341 6200

LOCATION 580 Swanston Street, Carlton VIC

WEB mshc.org.au

Key research areas

Melbourne Sexual Health Centre (MSHC) is Australia's largest public sexual health service and a world-leading research centre in sexually transmitted infections (STIs) and HIV. Affiliated with the School of Translational Medicine at Monash University and Alfred Health, MSHC offers a rich translational research environment where Honours students can work with multidisciplinary teams of clinicians, public health experts, epidemiologists, and biomedical researchers.

MSHC's research aims to improve the prevention, diagnosis, management, and surveillance of STIs and HIV. Projects use epidemiological, clinical, behavioural, health economics, infectious disease modelling, machine-learning and health services research methods. Many projects are policy-relevant, client-centred, and directly linked to improving clinical care. Honours students will be mentored by experienced clinician-researchers and contribute to impactful studies with direct clinical relevance.

Major areas of research include:

- HIV prevention (PrEP, PEP)
- Sexual health in priority populations (e.g. men who have sex with men, sex workers, trans and gender diverse people)
- Syphilis, gonorrhoea, chlamydia, *Mycoplasma genitalium*, bacterial vaginosis and emerging STIs (e.g. mpox)
- HPV-related disease and vaccine uptake
- Health promotion and digital health interventions
- STI testing innovation and service delivery models
- Antimicrobial resistance and treatment optimisation
- Global sexual health and implementation research



Baker Heart and Diabetes Institute

Contact

EMAIL	study@baker.edu.au
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LOCATION	Commercial Road, Melbourne
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WEB	baker.edu.au/students
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Key research areas

The Baker Heart and Diabetes Institute is an independent, internationally renowned medical research facility with a focus on the diagnosis, prevention and treatment of diabetes and cardiovascular disease. The comprehensive range of research undertaken to target these deadly diseases, combined with the flexibility and innovation to respond to changing health and community needs, is unique and sets the Baker Institute apart from other health and research Institutes.

With over 300 scientists, clinicians, research nurses and students, the Baker Institute provides a collaborative, stimulating and supportive environment for students to develop the skills and the confidence to launch their careers. Research projects are offered for Doctorate, Masters and Honours students across cardiovascular and diabetes research with a bench-to- bedside approach.

The Institute's research programs draw together teams of researchers to tackle key areas and apply their talents, expertise and technology.

Heart Attack

Cardiovascular disease (CVD) is the leading cause of death globally. That's why our work in this area is so critical. We want to find out who is at risk of developing blocked arteries which will allow us to predict heart attack and stroke, and develop new treatments. We're also conducting trials of anti-inflammatory, anti-diabetic and lipid-lowering drugs in people who have experienced a heart attack with the aim of reducing damage to the heart and preventing further heart attacks.

Heart Failure

Heart failure occurs when the heart stops pumping blood as well as it should. There is no cure for heart failure, it can significantly increase the risk of stroke, and both conditions are strongly linked to diabetes. By leveraging strengths in molecular biology using cutting-edge technologies, bioinformatics, heart imaging and clinical insights, we want to understand the pathways that underpin heart failure. This will allow us to develop new therapies to reverse heart failure, reduce the risk of death and deliver better quality of life for people with heart failure.

Diabetes

Diabetes is the fastest-growing chronic condition in the world. We aim to improve the lives of people with diabetes by identifying risk factors for complications, and national and global trends in diabetes complications. Our work is focused on developing more tailored prevention strategies, and identifying biomarkers to help us understand disease progression. We're also establishing clinical trials of new technologies and treatments, and we remain firmly focused on developing potential cures for diabetes.

Obesity and Cardiometabolic Disease

Obesity is recognised as a global epidemic. One in eight people live with obesity, and it's associated with multiple conditions like type 2 diabetes and heart disease. By bringing together clinical, public health and bench-top researchers with expertise in molecular profiling, animal models, clinical trials and implementation studies, we aim to tackle the significant health challenges driven by the obesity epidemic.

More: baker.edu.au

Burnet Institute

Dr Raffi Gugasyan

EMAIL education@burnet.edu.au

LOCATION 85 Commercial Road, Melbourne

WEB burnet.edu.au/the-institute/studying-at-burnet

Key research areas

The Burnet is Australia's leading research institute that is focused on infectious diseases of global significance. Our unique blend of medical research and public health programs are aimed at reducing the impact of diseases such as HIV, hepatitis, malaria, tuberculosis, influenza and cancer in vulnerable communities. Burnet's activities are carried out within three major disciplines: Life Sciences; Public Health and International Development.

Burnet plays an important role in education, providing training in laboratory and public health research at both undergraduate and postgraduate levels. Laboratory based research occurs principally within the Life Sciences Discipline with an emphasis on infectious diseases, autoimmunity, cancer and vaccine development and diagnostics. The Discipline of Public Health studies the molecular epidemiology of malaria, the epidemiology and surveillance of infectious diseases in Australia and overseas, health issues relating to alcohol and other drugs, sexual health and behaviour, health promotion and policy, and is a Centre of excellence into injecting drug use research. The Discipline of International Development responds to health problems in developing countries through the provision of technical advice and support, organisational capacity- building, applied research, policy analysis and development, and training and education programs. The Centre's expertise spans HIV prevention and care, women's and children's health, sexual and reproductive health, drug use, primary health care, strengthening national health systems, and education across these fields.



School of Public Health and Preventive Medicine

Kelly Allen

EMAIL kelly.allen@monash.edu

LOCATION St Kilda Road, Melbourne

WEB monash.edu/medicine/sphpm/study/honours



Key research areas

A year doing Honours with the School of Public Health and Preventive Medicine will take you outside the laboratory and introduce you to a different form of research, one that harnesses data and people. It'll contextualise your biomedical knowledge within broader health systems and large-scale health challenges, and provide a stepping stone into health and medical research, including serving as a direct pathway to PhD.

The foundational skills and knowledge you'll gain across public health and research, together with invaluable job-readiness skills, can be applied to every medical discipline. Our program of masterclasses will guide you through the entire life cycle of a research project, from conceptualization to analysis. You'll simultaneously put this in action, in a real-life supervised project that interests you, one that may result in publication.

For students transitioning to medical careers, it'll arm you with the know-how to critically assess medical literature and clinical guidelines, and make your own contributions to medical knowledge.

As the biggest producer of public health research in the Asia-Pacific region, our scope of Honours projects is incredibly broad, in terms of both clinical subjects and methodologies. We offer projects aligned with our School's three major research themes:

Effective and high value prevention and clinical care

Public health contributes evidence that supports clinical decision-making, along with health-related policy and programs aimed at treatment and prevention. It helps us deliver care that is safe, effective, cost-effective, and acceptable to patients. We provide projects relevant to the following range of key clinical domains and health settings:

- Acute and Critical Care
- General Practice
- Age-related Conditions
- Cancer
- Cardiovascular and metabolic diseases
- Musculoskeletal Conditions
- Women's Health

Healthier and safer communities and environments

Public health considers how we can stop people from becoming ill in the first place. For those that require treatment, it asks how we can improve care and build services that better align with their needs. It explores how we can use levers like education, urban design, technology, community programs, workplaces and climate adaptation to positively influence health, around the world. We provide projects relevant to the following range of key clinical domains and health settings:

- Behavioural and Social Epidemiology
- Forensic Medicine
- Global Health
- Mental Health and Wellbeing
- Planetary Health
- Public Health Genomics
- Social and Cultural Determinants of Health

Trusted evidence for practice, policy and service delivery

Public health uses a variety of data types and research methods to answer complex questions about health. Some of these techniques require strong computer and numeracy skills; others rely firmly on communication and interpersonal skills, to incorporate the richness of human experience, perception and behaviour into health research. We provide projects relevant to the following range of techniques, technologies and settings:

- Biostatistics and Modelling
- Clinical Registries and Real-World Data
- Clinical Trials
- Consumer and Community Involvement
- Digital Health and AI
- Evidence Synthesis and Guidelines
- Health Economics
- Health Services and Implementation

Department of Forensic Medicine

Professor Richard Bassad



EMAIL	richard.bassed@monash.edu	TELEPHONE	+61 3 9684 4444
LOCATION	St Kilda Road, Melbourne		
WEB	monash.edu/medicine/sphpm/forensic		

Key research areas

Research projects are focused on improving our understanding of medical, scientific and legal issues associated with the practice and applications of forensic medicine. Topics include adverse medical treatment related events, issues reporting of deaths to the coroner, development of more efficient procedures for nuclear DNA analysis, development of DNA technology for genetic-linked diseases that lead to sudden death, new applications drug detection methods in forensic toxicology, application of segmental hair analyses to establish drug histories in drug dependent persons and in persons dying from drug toxicity, investigation of drug uptake and release in tissues of deceased persons, estimation of the relative mortality of drugs, traffic medicine (effect of drugs on driving skills, hemianopia and driving skills, ageing drivers), sexual assault (drug facilitated assault, outcomes of paediatric and adult cases, injury patterns), and wound interpretation.



Department of General Practice

Associate Professor Chris Barton

EMAIL	chris.barton@monash.edu	TELEPHONE	+61 3 9902 4495
LOCATION	Notting Hill		
WEB	monash.edu/medicine/sphpm/general-practice		



Key research areas

As an honours student in the Department of General Practice you will have supervision and mentorship from internationally and nationally recognised leaders in academic primary care, and will work and study within a supportive and collaborative research environment. You will also participate in our primary care research education program which uniquely addresses the gap between general research training and the skills and knowledge needed to effectively conduct research and impact upon policy and practice in the primary care setting.

Prevention and Management of Complex and Chronic conditions

- Exploring Consultations for Low-Income Patients with obesity
- Measuring the therapeutic alliance in general practice
- Understanding what patients need and want when they engage with health professionals as part of asthma care
- Reducing alcohol related harm among vulnerable Victorians

Guideline Development and Implementation in primary care

- Exploring behaviour change guidelines in general practice using a realist lens
- Knowledge, attitudes and practices of GPs towards work related mental health conditions
- What are the challenges faced by people of a refugee background when moving to Australia?

Women's Health

- Understanding GP models of care for intrauterine device (IUD) insertion
- Improving contraceptive health literacy among Australian women from culturally and linguistically diverse backgrounds
- Contraception provided over the counter by pharmacists: What do pharmacists think?
- Do medical termination of pregnancy (MTP) services, delivered through general practice, successfully reach women from refugee and culturally and linguistically diverse (CALD) backgrounds?
- Identification of women at high risk of poor pregnancy outcomes in general practice
- Medical termination of pregnancy (MTP) services delivered through general practice: What do GP registrars and medical students think?
- Self administration of injectable contraception: What are the views of Australian women?

Vulnerable populations

- Helping OPTIMISE primary care for refugees in Australia
- Improving Enduring Access to Primary Health Care for Vulnerable Populations
- Making a difference to systems for primary health care delivery to Australian refugees and asylum seekers
- Improving trans and gender diverse health care
- Quality of life and mental wellbeing in family carers of people with dementia during the transition period to residential aged care

School of Rural Health

Dr David Reser

EMAIL david.reser@monash.edu

TELEPHONE +61 3 9902 7393

LOCATION Churchill

WEB monash.edu/medicine/srh



Key research areas

One in three Australians live outside a major metropolitan centre. Generally, rural populations experience poorer health and poorer access to healthcare than metropolitan populations. The School is committed to the health of rural communities and developing a sustainable rural health workforce.

Our Honours projects are based at our rural sites and are supervised by supportive research staff. We offer a range of projects where you may work in Melbourne for the duration of the project, be based at one or our rural sites for the project, or spend time in both Melbourne and a rural site.

We have a range of projects on offer for Bachelor of Biomedical Science (Hons) students. These include:

- The impacts of methamphetamine use on individuals, families and community services
- Examination of the impacts of climate change on health and medical education
- Exploring rural health care outcomes in relation to a number of issues, such as: mobile perinatal monitoring or chronic pain management, or accessing community health services, or de-prescribing medications in the elderly
- Rural health workforce recruitment and capacity building
- The development of health professionals as educators
- The impact of university community engagement on rural children's career aspirations
- Healthcare and the Arts

Visit Supervisor Connect www.monash.edu/medicine/research/supervisorconnect for more detailed information about our projects and supervisors. We welcome candidates to contact us to further discuss your research interest.



School of Clinical Sciences at Monash Health

Dr Paul King

EMAIL	paul.king@monash.edu	TELEPHONE	+61 3 9594 5525
LOCATION	Monash Medical Centre		
WEB	monash.edu/medicine/scs		



Key research areas

The School of Clinical Sciences at Monash Health (SCS) is composed of four main hospital campuses, Monash Medical Centre (Clayton and Moorabbin), Dandenong Hospital, Kingston Centre and Casey Hospital. The SCS represents the largest hospital network in Australia and covers all medical specialties (medicine, surgery, psychiatry, obstetrics and gynaecology and paediatrics). The SCS offers a comprehensive range of research projects from patient based projects to basic science. Our main emphasis is on translational projects that combine both basic science and clinical medicine. Reflecting on the SCS's strengths in discovery and translational research, the School has an established track-record in the training of basic and clinician scientists both at undergraduate and postgraduate (PhD) levels. Opportunities for formal research training exist within all departments of the School. The administration is based at Monash Medical Centre.

Key research areas

The School of Clinical Sciences has groups working in key areas of biomedicine:

Immune and Inflammatory Diseases

The Centre for Inflammatory Diseases (CID) runs active programs in key areas of inflammation with an emphasis on translational research. Using state of the art clinical and laboratory-based experimental techniques, researchers in CID explore the basic mechanisms of inflammatory injury in important human diseases, and relate these to unmet needs in patient treatment and management. Current research in CID includes:

- Mechanisms of autoimmune kidney disease and vasculitis
- Antigen presentation and immune tolerance
- Inflammation and treatment of systemic lupus erythematosus (SLE)
- Macrophage cell biology in inflammation
- Immune cell trafficking and behaviour in inflamed skin and kidney
- Modulation of host immune responses following neuroinflammation
- Mechanisms of liver and gut inflammation and fibrosis
- Inflammation in Type 2 diabetes and diabetic kidney disease
- Clinical microbiology, infectious diseases and infection control
- Respiratory infection and immunity, and mechanisms of inflammation in asthma

Stroke and Ageing

Group Directors: Professor Amanda Thrift (Research Lead) and Professor Thanh Phan (Clinical Lead)

The group offers research projects related to cerebrovascular disease and brain ageing within the following divisions:

Clinical trials, Imaging and Informatics Division

Research in this division is centred on clinical trials in acute stroke and secondary stroke prevention, advanced imaging studies in stroke, and novel techniques of computational analyses using BIG data.

The CTI group is linked with the Department of Neurology at Monash Health. The Neurology Department at Monash Health provides neurological care for Stroke and General Neurology patients. The service has a catchment of one-third the size of Melbourne. It is the largest teaching hospital of Monash University. As a result, it is able to cover all aspects of Neurology including sub-specialties, eg dementias, functional neurology, chronic neurodegenerative diseases (motor neuron disease, Huntington's disease, Friedreich's Ataxia etc), movement disorders (including Parkinson's disease), multiple sclerosis, migraine, neuro-otology, neuro-ophthalmology and stroke.

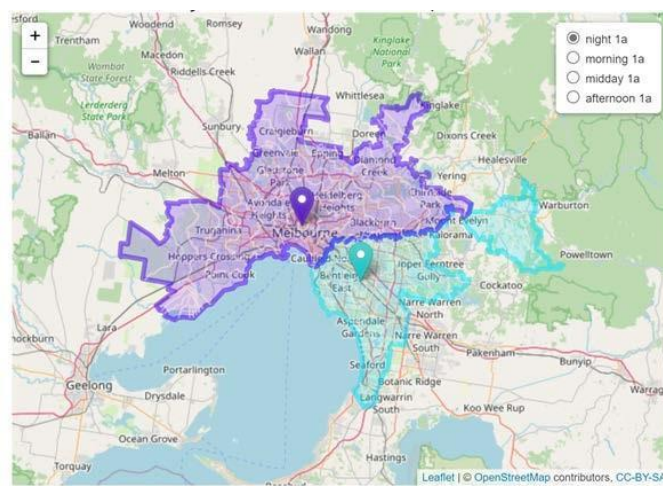
The Department of Neurology has a research laboratory which specialises in neuroimaging analysis, data science and health service research. It is linked with [Stroke and Aging Research Group](#) and [Geospatial Analysis](#).

Prof Henry Ma is the Director of Neurology and Prof Thanh Phan is Head of Neuroscience Research at Monash Health. There are a large number of available PhD and Honours projects in the Department and only some are listed [here](#) and at Monash University [Supervisor Connect](#) under Prof Thanh Phan or A/Prof Udaya Seneviratne.

Potential projects include:

- Impact of social network on health
- Ham and spam analysis of medical records to classify stroke versus non-stroke cases
- Discovering themes in Twitter activity related to neurological disorders
- Learning clinical features from patterns on PET scan in patients with dementia
- Mapping topography and network of brain injury in patients with disorders of consciousness
- Phenotyping patients with neurological disorders using machine learning
- Cost-effectiveness analysis of clot retrieval services
- Using Google maps to identify regions for service delivery
- Evaluation of 3D printing of carotid artery anatomy
- Mapping salvageable brain tissue using multimodality CT

Map of catchment of clot retrieval services in Melbourne



Contact persons: Prof Henry Ma (henry.ma@monash.edu) Prof Thanh Phan (thanh.phan@monash.edu)

Translational Public Health and Evaluation Division and National Stroke Data Linkage Program

Students will have an opportunity to undertake health services research on patients with stroke using data obtained from the Australian Stroke Clinical Registry, clinical trials and data linkage. Potential projects include:

- Data linkage to generate evidence to understand adherence to primary prevention medications and support provided by general practitioners for the management of stroke
- Cost-effectiveness of implementing new models of care in stroke – acute and chronic therapies
- Randomised controlled trials in goals setting, eHealth and recovery support including mindfulness interventions
- Observational studies to investigate how quality of acute stroke care and risk factors affect patient outcomes
- Development and evaluation of community health education programs to raise awareness of stroke
- Improving clinical coding and documentation for stroke

Contact persons: Prof Dominique Cadilhac (dominique.cadilhac@monash.edu); A/Prof Monique Kilkenny Head: National Stroke Data Linkage Program (monique.kilkenny@monash.edu); Dr Jan Cameron (jan.cameron@monash.edu); Dr Joosup Kim (joosup.kim@monash.edu)

For more information go to monash.edu/medicine/scs/medicine/research/star

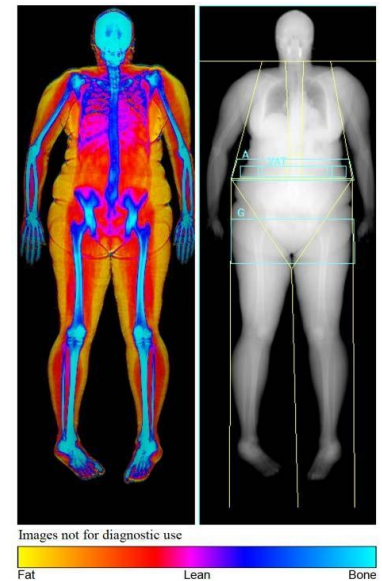
Bone and Muscle Health Research

Centre Head: Professor Peter Ebeling and Dr Ayse Zengin

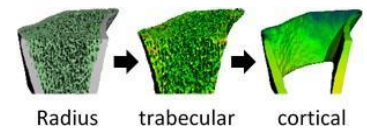
The Bone and Muscle Research Group conduct clinical trials of new and current pharmaceuticals on muscle and bone, the effect of calcium, vitamin D and exercise on musculoskeletal health, and population-based studies of osteoporosis, sarcopenia and obesity in older age in ethnic and underserved populations.

Key areas include:

- **Study of Indigenous Muscle and Bone Ageing (SIMBA):** identifying risk factors for increased falls and fractures in Indigenous Australians
- **The Haemophilia Osteoporosis Registry (THOR):** identifying mechanisms of bone loss in haemophilia
- **Transcontinental Atypical Femur Fracture Consortium (TrAFFiC):** investigating risk factors and identifying causes of atypical femoral fractures for prevention
- The effects of changes in ground reaction forces and muscle power on bone mineral density with age in West African adults
- Associations between cardiovascular risk factors and bone mineral density in older adults
- The effects of lifestyle differences on musculoskeletal health in ethnic populations
- Do retired elite rowers have better bone mineral density due to extensive training in their youth? (ProAFHeart -collaboration with The Alfred/Baker)



For more information go to
monash.edu/medicine/scs/medicine/research/bone-muscle/student-opportunities



SCS Oncology Research

Translational Laboratory

Major themes: improving response to immunotherapy, ctDNA and blood biomarkers, genomic adaptation, Immunological adaptation and response, neoadjuvant therapies, Tumour immunogenicity

Cancer services Implementation Sciences

Major themes: Oncology teletrials; PREMS and PROMS (patient reported outcomes measures and patient reported experience measures); Survivorship; AYA services (Adolescent and Young Adult Services).

Projects:

- Interferon epsilon and the inflammatory microenvironment as biomarkers for gynaecological malignancies: Prof Eva Segelov/Dr Sophia Frentzas/Prof Paul Herzog
- Use of a targeted multigene mutation panel on circulating tumour DNA to predict relapse in patients with high risk early colorectal cancer enrolled in the ASCOLT study: Prof Eva Segelov/Dr Sophia Frentzas
- Establishing human xenograft model platform for “Live Cancer Biobanking” – Dr Gwo Ho
- DNA methylation in predicting cancer outcomes – Dr Gwo Ho
- Barriers and enablers of establishing clinical trial centres in regional Australia – Prof Eva Segelov
- Implementation of real time PROMS and PREMS – Dr Kate Webber and Dr Olivia Cook
- Understanding impact of diet on microbiome of patients undergoing cancer immunotherapy – Prof Eva Segelov and Prof Helen Truby
- Novel cellular targets for new anticancer therapies – Dr Sam Grenall and Dr Ashlyn Watt

monashhealth.org/services/services-o-z-monash-health/oncology-monash-health/

Clinical Medicine

A large number of areas are available including critical care, emergency medicine, haematology, imaging, supportive and palliative care and surgery.

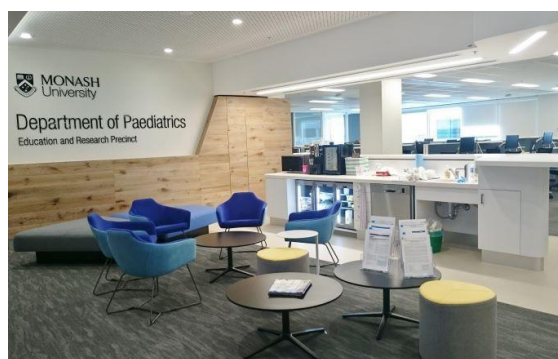
Department of Paediatrics

The Department of Paediatrics, within the School of Clinical Sciences at Monash Health, is based at Monash Children's Hospital, part of the largest health service in Victoria. Monash Health is the principal teaching hospital of Monash University. Research in the [Department of Paediatrics](#) spans basic laboratory discovery research through to clinical and population health research, and covers the age spectrum from conception to adolescence.

We offer many research projects, catering to the needs of students with an interest in both basic, clinical and translational research. Issues related to the health of infants and children drive our research questions that are addressed in a variety of clinically relevant settings. Our laboratory-derived discoveries can be rapidly tested in relevant clinical settings.

Research Themes

- Cerebral Palsy and Neurology
- Clinical Pharmacology and Trials
- Complex Autism and Neurodevelopment
- Digital Health and Informatics
- Infection, Inflammation and Immunity
- Newborn Research
- Simulation
- Sleep and Respiratory
- Surgery and Acute Care



Head to our [website](#) for more information. To learn more about our projects head to [Supervisor Connect](#).

Department of Nutrition, Dietetics and Food

Dr Meaghan Christian

EMAIL meaghan.christian@monash.edu

TELEPHONE +61 3 9902 4270

LOCATION Notting Hill, Clayton

WEB monash.edu/medicine/scs/nutrition/research



Key research areas

Department Head Professor Judy Bauer

Judy Bauer is Professor and Discipline Lead of Nutrition & Dietetics within the Department Nutrition, Dietetics and Food. Judy is recognised internationally for discovery and translational research in nutrition screening, assessment, innovative nutrition intervention programs and development of evidence-based practice guidelines particularly in oncology and malnutrition.

Clinical Nutrition (A/Prof Zoe Davidson & Professor Judy Bauer)

Aims to generate high quality evidence of effective interventions to improve nutritional status, clinical and patient related outcomes across a range of clinical conditions and age groups including clinical nutrition and dietetics research within maternal and women's health, paediatrics, chronic disease, oncology, gastrointestinal disorders, malnutrition, and aging. We have expertise with patient-level interventions and systems-based interventions for food services in hospital and aged care settings. We actively translate new evidence that arises from these studies into practice and our teaching.

Metabolism (Dr Aimee Dordevic & A/Prof Nicole Kellow)

Aims to generate understanding of how foods and nutrients can influence molecular and physiological mechanisms to improve health and reduce disease. Nutrition is integral to good health and disease prevention and recovery.

Prof Maxine Bonham's research group focuses on meal timing and circadian rhythms and the consequences of eating at unusual times on metabolic health outcomes. In particular, the group are working with shift workers to develop novel dietary strategies that will improve biomarkers for type 2 diabetes and cardiovascular disease.

A/Prof Ricardo Costa research investigates the impact of exercise stress with and without other stressors on gut health, and role of nutrition in attenuating or exacerbating stress induced perturbations to gut health.

Public Health Nutrition (A/Prof Julie Brimblecombe)

Our research focuses on modifying our food environments to improve everyone's health, especially Indigenous populations. A/Prof Julie Brimblecombe and her team's research interest includes Indigenous food systems, real-world systems approaches to improving population level nutrition, addressing social inequities in food access, modifying food environments to support healthier food choices, capacity building for evidence informed decision-making and capacity building in research conduct.

Education (Dr Janeane Dart)

Aims to discover and evaluate innovative ways to educate nutrition and dietetic professionals to be exceptional leaders in practice, with capability to lead multi-disciplinary teams which are required to manage the complex nutrition problems our communities face.

Key research areas

- Better metabolic health for shift workers
- Novel dietary strategies to improve biomarkers of type 2 diabetes and cardiovascular disease
- Better gut health for ultra-endurance athletes through optimal nutrition and hydration
- Reduction in inflammation through dietary patterns
- Improved fertility and pregnancy outcomes for women
- Novel bioinformatic and molecular to understand complex nutrient-metabolism interactions
- Enhanced food environments which make the healthy choice the easy choice
- Reduce inequities in food supply and improve food security for all Australians
- Optimal nutrition interventions for the elderly population
- Optimal nutrition interventions for children with chronic disease
- Novel nutrition interventions to improve disease related malnutrition and sarcopenia
- Ensure options for those seeking weight management from youth through to adulthood have access to proven effective evidence-based advice
- Improve understanding of role diet and food triggers in disorders of gut-brain interaction



Department of Psychiatry

Professor Suresh Sundram

EMAIL	suresh.sundram@monash.edu	TELEPHONE	+61 3 9594 1479
LOCATION	Monash Medical Centre, Clayton		
WEB	monash.edu/medicine/scs/research/research-themes/neuroscience-psychiatry		



Key research areas

Psychiatry encompasses a wide range of subspecialties. The Department of Psychiatry offers a range of 4th year research projects, which are supervised by staff members who conduct research in a wide range of areas from laboratory-based research to clinical interventions.

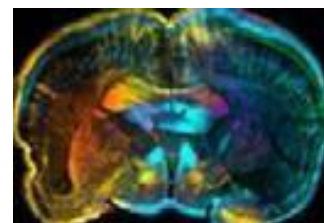
Translational Psychiatry Research Program

The Translational Psychiatry program aims to develop disease modifying novel treatments for psychotic disorders, in particular, schizophrenia using a broad translational approach. Starting from clinically derived insights and samples, we probe the cellular and molecular characteristics of post-mortem human and animal brain relevant to psychotic disorders. From these laboratory studies we investigate animal behaviour (in collaboration with the behavioural neuroscience laboratory) using transgenic models of psychosis, identifying relevant neuronal signalling pathways.

These laboratory based findings can then be re-applied to investigate new biomarkers in clinical samples using genetic, protein, and electrophysiological measures.

We have established a clinical trials research group evaluating new treatments that arise from this pipeline of translational research and currently have 4 active clinical research projects within this group.

Contact person: Prof. Suresh Sundram. Email: suresh.sundram@monash.edu



The Behavioural Neuroscience laboratory uses pre-clinical animal models to better understand the pathophysiology of severe psychiatric illnesses such as schizophrenia, so that we may design and test novel therapeutic strategies. Genetic and environmental risk factors are modelled in mice to better understand their impact on the brain and behaviour. Novel treatments are then designed and tested in these preclinical models to trial their efficacy. The lab uses a number of innovative techniques, including mouse touchscreen-based behavioural testing, molecular biology, and vivo electrophysiology.



We are currently offering a range of PhD, Masters and Honours projects assessing the impact of specific genetic variants, and environmental insults (such as infection) on the development and function of critical brain circuits associated with psychiatric disorders. The Behavioural Neuroscience laboratory work closely with the clinical trials research group to translate preclinical findings to new treatment strategies.

Contact person: A/Prof. Rachel Hill. Email: rachel.hill@monash.edu

The Sex Chromosome Neurobiology laboratory uses a combination of molecular, pharmacological, and behavioural approaches to investigate the contribution of sex chromosome genes in brain sex differences in health and disease. Seminal work from our group demonstrates that the Y-chromosome gene, SRY, directly exerts male-specific actions in adult dopamine neurons and that SRY dysregulation may underlie male preponderance to disorders such as PD and ADHD.

The principal goals of our research are:

- to understand how sex chromosome genes influence brain function and behaviour
- to understand why males and females are differentially vulnerable to neurodegenerative and neurodevelopmental disorders such as Parkinson's disease, autism, and ADHD.
- identify sex-specific risk or protective factors to develop more effective therapies for each sex.



We utilise a variety of experimental techniques including animal models of neurodegenerative (PD) and neurodevelopment disorders (ADHD), genetic manipulation, animal and human post-mortem brain histology, molecular biology and drug screening in primary, secondary and human inducible pluripotent stem (hiPSC) cell lines.

Contact person: Dr. Joohyung Lee. Email: joohyung.lee1@monash.edu

Department of Surgery

Professor Jullian Smith

EMAIL	julian.smith@monash.edu	TELEPHONE	+61 3 8572 2563
LOCATION	Monash Medical Centre, Clayton		
WEB	monash.edu/medicine/scs/surgery/research		



Key research areas

The Department of Surgery at The School of Clinical Sciences at Monash Health has research activity within all surgical specialties. There are strong collaborations within the Monash Health Translation Precinct. There exist opportunities in basic surgical sciences, laboratory, clinical, database, surgical simulation and health services research.

Particular areas of strength are:

- Breast Surgery – Large patient database, patient reported outcomes, intra-operative radiotherapy, breast cancer trials
- Cardiothoracic Surgery – Less invasive and robotic assisted cardiac surgery, cardiopulmonary bypass and perfusion, acute kidney injury after cardiac surgery, studies arising from the ANZSCTS Database
- ENT/Head & Neck Surgery – Monash Health has the large services covering all facets of the specialty at all ages; head and neck cancer, laryngology & otology projects available
- Upper Gastrointestinal/Hepatobiliary Surgery – Large patient database, strong interest in oesophageal and pancreatic cancer; access to large biobank of tumour tissue
- Colorectal Surgery – national database; inflammatory bowel disease and colorectal cancer research
- Neurosurgery – particular interest in neurovascular and spine research
- Orthopaedic surgery – large patient load, adult and paediatric, major joint surgery; strong interest in shoulder, upper limb and hand research
- Plastic surgery – breast reconstruction, trauma, hand surgery, microsurgery
- Paediatric Surgery – Based at Monash Children's Hospital; projects available within all subspecialties (General, Urology, Orthopaedic, Thoracic, Neurosurgery, Plastic) across all paediatric age groups; links to Hudson Institute and Ritchie Centre
- Urology – strong interest in prostate cancer research and in benign urological conditions
- Vascular Surgery & Transplantation – very active in endovascular intervention and renal/pancreas transplantation research
- Surgical Simulation – based at Monash Children's Hospital in a state of the art facility; projects across multiple surgical specialties

Hudson Institute of Medical Research

Associate Professor Simon Chu

EMAIL	simon.chu@hudson.org.au	TELEPHONE	+61 3 8572 2545
LOCATION	Monash Medical Centre, Clayton		
WEB	hudson.org.au/students/student-projects		



Hudson Institute of Medical Research continues to grow as it attracts talented scientists from Australia and overseas. Hudson's research into preterm babies, stem cells, cancer, inflammation, male reproduction, women's health and paediatric sleep has changed the way diseases are understood and treated.

Key research areas

Centre for Cancer Research

Centre Head: Professor Ron Firestein

Scientists working in the centre undertake basic research into the molecular mechanisms underlying the development, growth and metastasis of tumours, as well as the relationship between the innate immune system and cancer. The discovery and development of novel therapies for the treatment of cancers is also an important aspect of the team's work.

Key research areas

- Using functional and integrated genomic approaches to understand the basic underpinnings of cancer
- Seeking to understand the mechanisms of metastasis and chemoresistance, with the goal of pioneering new treatments
- Studying how aberrant activation of embryonic signalling pathways contribute to the initiation, growth, and self-renewal of cancer
- Studying the mechanisms driving Acute Myeloid Leukaemia development, with the goal of identifying and developing new treatments for this devastating disease
- Directly identifying biologically and clinically relevant antigens and translating these insights into actionable targets for next-generation immunotherapies
- Defining how disruption to innate immune signalling pathways alters the onset, progression and metastasis of lung cancers
- Understanding how dysregulated iron metabolism, inflammation, and immune signalling reshape the haematopoietic microenvironment and contribute to diseases such as myelodysplastic syndromes (MDS), multiple myeloma, β -thalassaemia, sickle cell disease, and other bone marrow failure syndromes
- Investigating how inherited mutations disrupt telomere function and promote melanoma development to identify new therapeutic strategies for familial melanoma
- Integrating AI-driven multi-omics data and large-scale functional screening to systematically uncover genetic dependencies, prioritise therapeutic targets, and enable precision oncology in childhood brain cancer
- Identifying the next wave of paediatric cancer-targeted therapies through a comprehensive, child-centric approach that includes generation of novel models, multi-omics characterisation, functional genomic screens, and leveraging the [Childhood Cancer Model Atlas](#)

More information at hudson.org.au/research-centre/centre-for-cancer-research

Centre for Innate Immunity and Infectious Diseases

Centre Head: Professor Seth Masters

The Centre for Innate Immunity and Infectious Diseases (CiiiD) researches the molecular regulation of the innate immune response. This early immune response determines how the body responds to infection or the presence of cancer cells, providing immediate protection and sculpting the ensuing adaptive (sustained) immune responses. It initiates the inflammatory response and can modulate the development of inflammatory diseases. Our aim is to understand the molecular pathways that regulate these processes as well as their normal physiological roles. In this way, CiiiD scientists aim to develop new approaches to preventing, diagnosing and treating infections such as influenza, herpes and HIV, inflammatory diseases such as gastritis and chronic obstructive pulmonary disease, and cancers of the stomach, lung and breast.

Staff and students working in CiiiD have collective multidisciplinary expertise in molecular biology, signal transduction, protein interactions, cell biology, immunology, infectious disease, functional genomics and bioinformatics and transgenic techniques for generating and characterising gene knockout and transgenic mice as models of human disease. The multidisciplinary teaching and training environment within CiiiD provides students with a strong range of skills in biomedical research that will be recognised internationally for a research career. The Centre students include UROP, Honours degrees, Masters and PhD.

Research projects available in the Centre for Innate Immunity & Infectious Diseases are offered in the following research areas:

- Regulation of Interferon and Innate Signalling (cancer, inflammatory, infectious, neurodegenerative and respiratory diseases)
- Gastrointestinal Infection and Inflammation (infectious and gastrointestinal diseases, cancer)
- Respiratory and Lung Research (respiratory, infectious and inflammatory diseases)
- Cell Death and Inflammatory Signalling (infectious, inflammatory and respiratory diseases)
- Innate Immune Responses to Infection (infectious, respiratory and gastrointestinal diseases)
- Microbiota and Systems Biology (infectious, inflammatory and gastrointestinal diseases)
- Nucleic Acids and Innate Immunity (cancer, infectious and inflammatory diseases)
- Viral Immunity and Immunopathology (infectious, respiratory and inflammatory diseases)
- Neuroinflammation and Neurodegeneration (neurodegenerative, inflammatory and respiratory diseases)
- Innate Immune and Autoinflammatory Disease (inflammatory and neurodegenerative diseases, cancer)
- RNA Biology and Innate Immune Sensing (inflammatory and neurodegenerative diseases, cancer)
- Structural Biology of Inflammation and Cancer (cancer, inflammatory and gastrointestinal diseases)

More information at hudson.org.au/research-centre/centre-for-innate-immunity-infectious-diseases/

The Ritchie Centre

Centre Head: Professor Suzanne Miller

The Ritchie Centre at Hudson Institute of Medical Research is a collaborative research centre that brings together the Monash University Department of Obstetrics and Gynaecology and Department of Paediatrics within the School of Clinical Sciences at Monash Health. The Centre is also a key research partner of Monash Children's Hospital and Monash Women's Services at Monash Health. The Ritchie Centre at Hudson Institute of Medical Research is a research centre jointly with Monash University Department of Obstetrics and Gynaecology and Department of Paediatrics at the School of Clinical Sciences at Monash Health, and is a research partner of Monash Children's Hospital and Monash Women's Services at Monash Health.

Dedicated to improving the health and wellbeing of women, babies and children, The Ritchie Centre conducts innovative, world-leading research that advances knowledge and informs better healthcare. The Centre is home to more than 150 researchers and students, representing a diverse range of disciplines, including fetal physiology, immunology, stem cell biology, neonatology, paediatrics, obstetrics, gynaecology and radiology. This multidisciplinary approach enables collaboration across the full spectrum of women's, pregnancy, newborn and children's health research.

There are six Research Themes in The Ritchie Centre:

- Women's Health
- Fetal and Neonatal Health: Respiratory and Cardiovascular
- Fetal and Neonatal Health: Brain Injury and Neurodevelopment
- Infant and Child Health
- Infection, Inflammation and Immunity
- Cell Therapy & Regenerative Medicine

Honours and PhD Projects are available in all of these themes and some projects involve more than one theme. Some examples of projects are listed here:

- Improving functional deficits associated with fetal growth restriction
- Neural stem cell therapy for preterm brain injury
- Phase-contrast neuroimaging for early detection of brain injury at birth
- Trialing corticosteroid prodrugs to reduce lung diseases of preterm birth
- Reducing the risk of pulmonary hypertension in infants with a congenital diaphragmatic hernia
- Transition to life after birth
- Is creatine the nutritional key to boosting uterine receptivity and successful pregnancy?
- Targeting IL-1 for prevention of inflammation-induced brain injury in premature infants
- Advancing fetal surveillance for early detection of fetal distress: using AI and novel physiological sensing
- Development of face perception in preterm infants (The Baby Face Study)
- Extracellular vesicles in endometriosis
- Revisiting origin of endometriosis
- Identification of new treatment targets for endometriosis
- Investigating the impact of endometriosis on fertility and the uterine environment
- Combating Maternal Childbirth Injury with Cellular Therapies
- Exploring the morphometric properties and immunobiology of Human Fascia Lata as a biological graft in pelvic reconstructive surgery
- Testing Novel Therapies for Neonatal Seizures
- Novel Anti-Inflammatory Approaches for Currently Untreatable Diseases of the Preterm Baby
- Analysing the effects of a novel anti-inflammatory approach for currently untreatable diseases of the preterm baby using data from Anakinra Pilot, the first clinical trial of its kind
- Exploring a new frontier: The immune system of the premature infant, its interplay with the microbiome, and their relevance in the pathophysiology of major diseases of prematurity
- Engineered extracellular vesicles to treat preterm brain injury

More information at hudson.org.au/research-centres/the-ritchie-centre

Centre for Endocrinology and Metabolism and Reproductive Health

Co-Centre Heads: Professor Peter Fuller and Professor Patrick Western

The Centre for Endocrinology and Reproductive Health brings together leading researchers and clinicians. Through collaborative research, we strive to uncover fundamental mechanisms driving endocrine and reproductive functions and translate these discoveries to improve health outcomes across the lifespan. This is achieved by co-locating researchers with clinicians, using state-of-the-art technologies and capitalising on our clinical trials centre. The Centre is closely aligned with specialist clinics in the Endocrinology Unit at Monash Health, providing opportunities to explore key research questions of clinical importance.

Our areas of research cover a range of aspects of endocrine and reproductive functions, both physiological and pathological. We seek to understand mechanisms of hormone action and cellular signalling, genetic and epigenetic effects in development and errant cellular functioning leading to malignancies

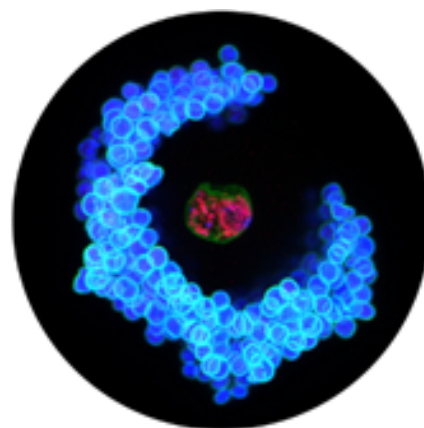
Current research areas include:

- Steroid hormone actions, focusing on the evolution, structure and transcriptome of nuclear receptors particularly the mineralocorticoid, glucocorticoid and estrogen receptors
- Endocrine hypertension, including diagnosis, disease mechanisms, treatment and health economics of primary aldosteronism in primary care and underserved populations; adrenal biology; characterisation of low-renin hypertension; and aldosterone dysregulation in pregnancy and women's health
- Endocrine-related cancer biology and development of novel therapeutic strategies, focusing on ovarian granulosa cell and thyroid cancers
- Bone diseases, including osteoporosis and spina bifida, as well as in thalassemias
- Sex development, including genetics of sex determination, disorders/differences of sex development (DSD) conditions, gender incongruence and sex differences in health and disease
- Male reproductive health, including cancers, immunobiology and testosterone actions
- Molecular biology of reproduction, including germline genetics and epigenetics, RNA biology and inflammation
- Reproductive development biology, including epigenetic inheritance and offspring health, and the effects of environmental exposures
- Female reproductive health, including ovarian function and fertility, as well as epigenetic regulation of ovarian function

For more information, see:

hudson.org.au/research-centre/centre-for-endocrinology-and-reproductive-health/

hudson.org.au/students/student-projects/



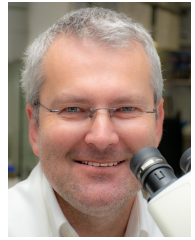
Oocyte and surrounding cumulus cells captured by a CERH PhD student



Eastern Health Clinical School

Dr Pavel Sluka

EMAIL	EHCS.HDR@monash.edu	TELEPHONE	+61 3 9902 0857
LOCATION	Box Hill		
WEB	monash.edu/medicine/ehcs/graduate-research		



Eastern Health Clinical School is home to a vibrant research community with an enviable record of research achievements that make a positive difference to our community.

We offer a stimulating environment with supervision and mentoring from world class physician researchers and educators, specialising across a broad range of clinical and public health areas. Our students and staff enjoy research training within a supportive and collaborative environment, with individual one to one mentoring, regular team meetings and academic seminars.

In addition to supporting hundreds of clinical trials, Monash Doctors and researchers at EHCS are involved in a broad range of clinical and lab-based research activities in collaboration with Eastern Health and many other health and research institutes. Our research addresses the epidemiological and clinical features of disease, current treatments, challenges and future treatment prospects, focusing on evidence-based approaches to health care. Our biomedical research activities address the genetic, molecular and cellular basis of diseases across areas including immune and inflammatory diseases, cancer biology, cardiovascular biology, diabetes, obesity and neurological diseases.

Key research areas

EHCS has active research programs across the following areas:

- Anaesthetics
- Addiction Research
- Cardiology
- Dermatology
- Endocrinology
- Gastroenterology
- Geriatric Medicine
- Haematology
- Intensive Care Medicine
- Infectious Disease
- Mental Health
- Nephrology
- Neurology
- Oncology
- Paediatrics
- Pathology
- Respiratory Medicine
- Rheumatology
- Urology
- Surgery and Surgical sub-specialities
- Colorectal, Orthopaedics
- Psychiatry
- Public Health and bioethics
- Women's Health

More information please see monash.edu/medicine/ehcs

FURTHER INFORMATION

Dr Shae-Lee Cox
Course Coordinator
Monash Biomedicine Discovery Institute
Email: shae.cox@monash.edu

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