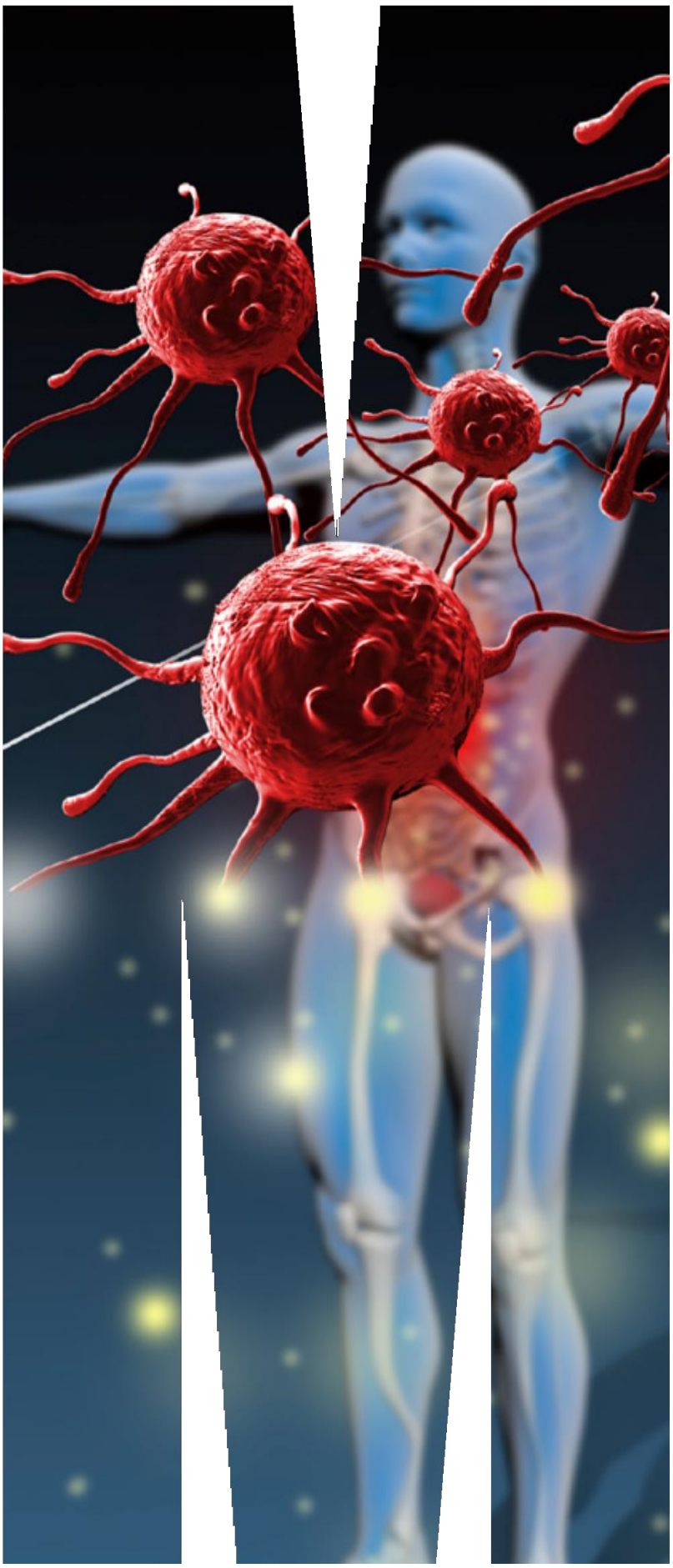
MONASH University

MONASH BIOMEDICINE DISCOVERY INSTITUTE

BACHELOR OF BIOMEDICAL SCIENCE HONOURS

2024

Course Guide & Research Project Areas



GROUP OF EIGHT AUSTRALIA

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Monash University
Clayton, Australia, 3800

CONTENTS

THE BACHELOR OF BIOMEDICAL SCIENCE HONOURS COURSE

What is the Honours year about?

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. 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 School or Departmental staff and write a research thesis.

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.

What is the structure of the Biomedical Honours course?

The Bachelor of Biomedical Science Honours program within the Faculty of Medicine, Nursing and Health Sciences is unique in that it is devoted almost entirely to the research project. We have kept coursework and examinations to a minimum so that your major focus (75% of total assessment) will be on your chosen research project.

The Biomedical Science Honours Course comprises two units

1. BMS4100 = 75% of overall course mark
2. BMS4200 = 25% of overall course mark

Component	Assessment	
BMS4100 Biomedical Research Project (36 points)		
Literature Review	10%	School/Department
Seminar 1	S or NS	School/Department
Seminar 2	10%	School/Department
Thesis	80%	School/Department
Total	100%	

BMS4200 Advanced Studies in Biomedical Science (12 points)		
Discipline-Specific component	60%	School/Department
Biostatistics course and assignment	40%	Faculty
Total	100%	

Individual Student Research Project (75%)

- This can be undertaken at any approved location, including all departments, affiliated institutes, and centres of the Faculty. Under some circumstances projects may also be undertaken in other Faculties
- Must be conducted under the supervision of a member of the academic 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 out 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 be responsible for this component. This could take the form of critical literature analysis, advanced lecture series, poster presentation as some examples.

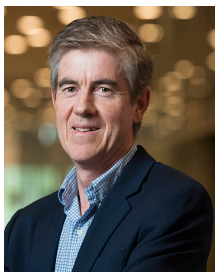
Biostatistics course (10%)

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

Who administers the Biomedical Honours Course?

The Biomedical Science Honours Course is managed by a Management Committee, which is comprised of:

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



- Unit Coordinator & Chairperson, Management Committee – Professor John Boyce (Department of Microbiology)

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

Staff and student representatives from: Monash Biomedicine Discovery Institute, Central Clinical School, 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.

Choosing a host research group for your Honours year

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.

How do I apply?

Students must complete the three steps in the application process (please check the website below for application due date. The process and project application form may be downloaded from 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 or call +61 3 9902 6011.

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, which will be sent out 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 my Honours project?

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

- Semester 1 intake - Monday **19 February 2024**
- Semester 2 intake - Monday **15 July 2024**

Students should not begin laboratory work until after the completion of the Orientation Program and Occupational Helath and Safety courses which are to be completed during Orientation week (week 0). Students may start earlier, but only if this arrangement is acceptable to their supervisor. An early start may involve reading recommended references, preparation of the project outline and commencement of the literature review.

KEY RESEARCH AREAS

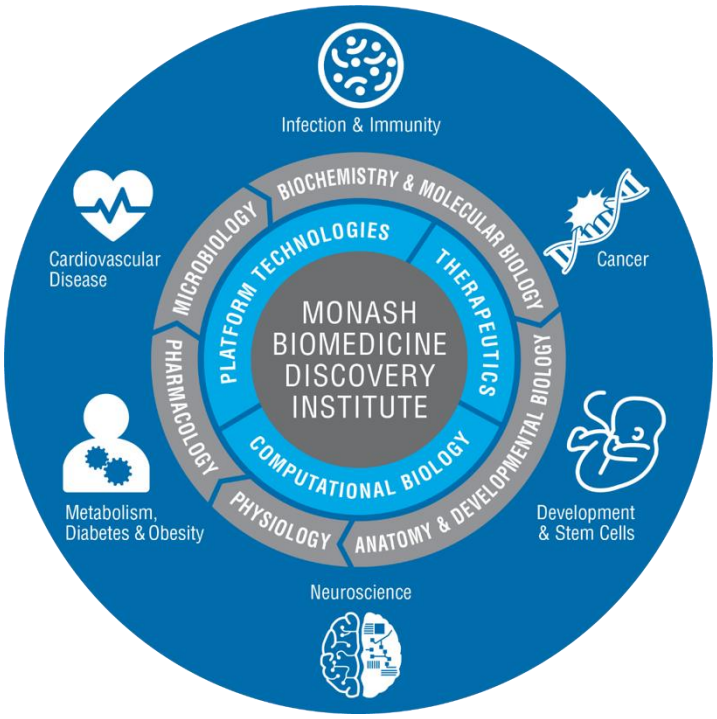
MONASH BIOMEDICINE DISCOVERY INSTITUTE / SCHOOL OF BIOMEDICAL SCIENCES

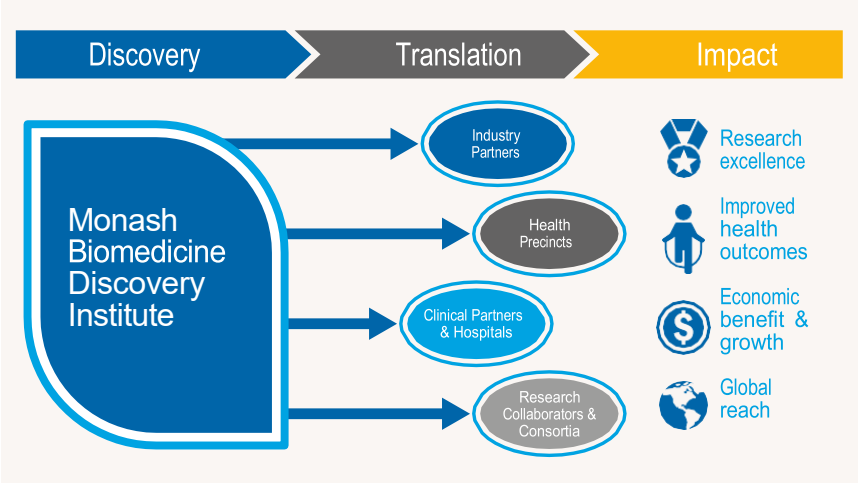
With more than 120 internationally-renowned research teams, the Monash Biomedicine Discovery Institute (BDI) is one of the largest and highest-quality biomedical research institutes in Australia. Monash BDI works with national and international collaborators on global health priority areas, including 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
- Infection & Immunity
- 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

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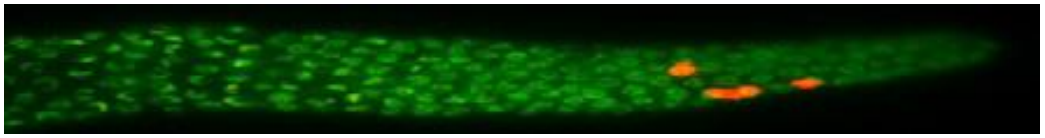
WEB	monash.edu/discovery-institute/departments/anatomy-and-developmental-biology

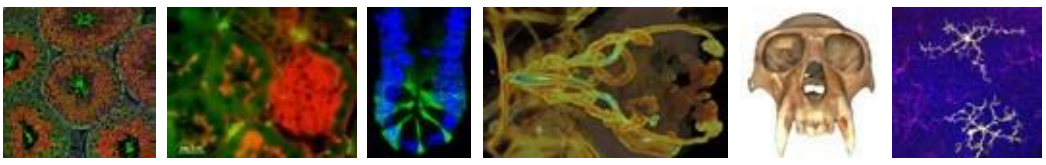
Key research areas

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:

- Aging and cancer (Dr Lochlan Fennell)
- Bone biomechanics, implant design, oral and maxillofacial trauma (Dr Olga Panagiotopoulou)
- Brain development, neuroplasticity and stem cells (Prof Roger Pocock)
- Cellular physiology (Dr Senthil Arumugam)
- Comparative development and evo-devo (A/Prof Craig Smith)
- Developmental neuroscience and multiple sclerosis (Dr David Gonsalvez)
- Development and disease (Dr Alex Combes)
- Education research (A/Prof Michelle Lazarus)
- Epithelial regeneration (Prof Helen Abud)
- Epigenetics and reprogramming (Prof Jose Polo)
- Integrated morphology and palaeontology (Dr Justin Adams)
- Kidney development and disease (Prof Ian Smyth)
- Kidney development, programming and disease (Prof John Bertram)
- Morphology, ontogeny and evolution (Dr Jason Massey)
- Neurogenesis and neuroregeneration (Prof Zhi-Cheng Xiao)
- Niche signaling, regeneration and cancer (Dr Thierry Jarde)
- Oocyte and embryo development (Prof John Carroll)
- Ovarian biology (A/Prof Karla Hutt)
- Organogenesis and cancer (Prof Kieran Harvey)
- Palaeodiet research (A/Prof Luca Fiorenza)
- Prostate cancer research (Prof Gail Risbridger and Dr Mitchell Lawrence)
- Stem cells and translational immunology (A/Prof Tracy Heng)
- 3D cancer model lab (A/Prof Daniela Loessner)





Department of Biochemistry and Molecular Biology

Associate Professor Michelle Dunstone

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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
- Cancer: cytoskeletal rearrangement and cellular proliferation
- Cancer: Signal transduction and pathways
- Proteases and their inhibitors and receptors in degenerative diseases
- 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
- Redox homeostasis and cell death
- 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
- Environmental causes of type 1 diabetes
- Protein tyrosine phosphatases in cancer and diabetes
- 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

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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
- Harnessing the rumen microbiome: redirecting methane production to combat climate change
- Manipulation of lectin-like protein antibiotics to treat bacterial infections
- Determining how *Helicobacter pylori* causes cancer
- Understanding antibiotic resistance in nosocomial pathogens using systems biology approaches
- Using phage as therapies for infections caused by multi-drug resistant *Staphylococcus aureus* (MRSA) and *Klebsiella pneumonia*
- Understanding the role of bacterial surface structures in horizontal gene transfer amongst enteric pathogens
- Characterising novel antibacterial toxins delivered by bacterial type VI secretion systems
- Defining mechanisms of toxin secretion in *Clostridioides difficile*
- Super-resolution analysis of virus-host interfaces
- Characterising *Coxiella burnetii* effector proteins that block human cell death pathways
- Functional genomics to understand bacterial virulence and adaptation
- How do bacteria sense environmental cues
- Signalling pathways controlling influenza-specific killer T cell immunity
- Immunomodulatory and oncogenic properties of bacterial extracellular vesicles
- How the microbiome influences innate immune responses
- Development of rapid field sequencing techniques
- Mechanisms of pathogenesis and immunity to malaria and dengue
- Bat antiviral defences

Department of Pharmacology

Associate Professor Jane Bourke

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Professor Robert Widdop

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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 hypertension, atherosclerosis, stroke, diabetes, heart and renal failure and respiratory diseases. The Department also has active research programs focused on the pharmacology and toxicology of a range of Australasian animals including snakes and jellyfish and pharmacology education.

The Department of Pharmacology provides projects involving a range of techniques from cellular and molecular pharmacology through tissue and classical organ bath pharmacology, to complex instrumentation of experimental animals to mimic human diseases.

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

- Cardiovascular & Pulmonary Pharmacology (focused on novel pharmacological and/or cell-based therapies to treat systemic and stroke, including immune mechanisms and stem cells)
- Fibrosis Pharmacology (novel antifibrotic mechanisms, including relaxin and stem cells)
- 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)
- Pharmacology Education (advanced education concepts in Pharmacology)
- Respiratory Pharmacology (focused on improved therapeutic strategies in chronic lung diseases, including asthma and pulmonary hypertension)
- Venoms and Toxins (including all Australian venomous creatures)
- Macro Therapeutics (engineering new nanomedicines with applications in cancer, stroke and liver disease)

Department of Physiology

Associate Professor Nicholas Price

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Associate Professor Craig Harrison

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Associate Professor Wendy Imlach

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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

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LOCATION	Clayton Campus		
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Jane McCausland

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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: 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 McGlinn, Dr del Monte Nieto, Dr Chow, Prof Eynon
- 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 Nillegoda
- Organ Engineering and Sythestic 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 Rossello-Diez, Dr Roman

CENTRAL CLINICAL SCHOOL

Australian Centre for Blood Diseases (ACBD)

Associate Professor Ross Dickins

EMAIL	ross.dickins@monash.edu	TELEPHONE	+61 3 9903 0424
LOCATION	Commercial Road, Melbourne		
WEB	monash.edu/medicine/ccs/blood-disease		

Key research areas

The Australian Centre for Blood Diseases (ACBD) is the largest blood-focused research centre in Australia. The ACBD conducts world-leading research into malignant (blood cancers) and non-malignant (blood clots) haematology and works 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 at the ACBD 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)
- Microfluidics platforms in thrombosis research and drug screening (Dr Warwick Nesbitt)

Malignant Haematology (Blood Cancers)

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

Clinical Research

- Bone Marrow Transplant Program (Dr Sharon Avery)
- ECRU Translational Research Division (A/Prof Anthony Dear)
- The Ronald Sawers Haemophilia Centre (Prof Huyen Tran)

Department of Immunology

Associate Professor Margaret Hibbs

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WEB	monash.edu/medicine/ccs/immunology/education/honoursstudies		

Key research areas

The Department of Immunology and Pathology is committed to excellence in discovery, translation and education in its discipline area. It is part of the Central Clinical School and Sub-Faculty for Translational Medicine and Public Health, located at the Alfred Hospital campus in Melbourne's south, 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. Within this context, the Department provides exceptional student mentorship and training, to foster the next generation of research leaders. Its 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. The Department also trains numerous post-doctoral fellows and provides unparalleled opportunities to young scientists for career development. The Department's research spans fundamental immunology, cell biology and molecular pathology through to translational disease models, clinical immunology and the study of human diseases.

Research in the Department is driven by world leading authorities in immunology and inflammation, and the main areas of interest are:

- B cells, immune memory and autoimmunity (Prof David Tarlinton – Head of Department)
- Signalling pathways in autoimmunity and chronic inflammation (A/Prof Margaret Hibbs)
- Leukocyte membrane proteins in inflammation and cancer (A/Prof Mark Wright)
- Allergy and clinical immunology (A/Prof Menno van Zelm and Prof Robyn O'Hehir)
- Lung fibrosis and lung transplantation (A/Prof Glen Westall)
- The microbiome, the gut-lung axis and immunology of respiratory diseases (Prof Ben Marsland and Prof Nicola Harris)
- Urology, nephrology, infection and immunity (Dr Malcolm Starkey)
- Immunology of vaccine responses (Dr Danika Hill)
- IgE biology (Dr Marcus Robinson)
- Controlling immune responses for preferred outcomes (Dr Isaak Quast)

Department of Neuroscience

Associate Professor Vilija Jokubaitis

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WEB	monash.edu/medicine/ccs/neuroscience		

Associate Professor Bridgette Semple

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WEB	monash.edu/medicine/ccs/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)
- Neurophamacology (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 Vilija Jokubaitis)
- Multiple Sclerosis and Neuroopthalmology (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

- Oculumotor system (A/Prof Joanne Fielding)
- Neuropsychology (A/Prof Rubina Alpitsis)
- 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 and 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)

Department of Infectious Disease

Professor Joseph Doyle

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LOCATION	Commercial Road, Melbourne		
WEB	monash.edu/medicine/ccs/infectious-diseases/education		

Key research areas

The Department of Infectious Diseases, Central Clinical School, and Alfred Health, is a premier 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 HIV infection
- 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

For more information on research areas within the Department of Infectious Disease, please visit webpage.

Respiratory Research@Alfred

Professor Anne Holland

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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 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 – Associate 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.

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

Department of Medicine

Professor Terrence O'Brien

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Key research areas

In close partnership with the Medical Oncology Unit at Alfred Health, our group seeks 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, cancer immunology and immune regulation, cancer genomics and cancer biomarkers. With the expected launch of the Paula Fox Melanoma and Cancer Centre (PFMCC) in 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 our research include:

Melanocyte Biology, Melanoma and Skin Cancers

- Melanocyte biology and melanocyte stem cells (Dr Fumihito Noguchi)
- Disorders of skin pigmentation (Dr Fumihito Noguchi)
- Cancer heterogeneity and evolution (Prof. Mark Shackleton)
- Oncoproteins (Dr Gamze Kuser-Abali)

Cancer Genomics

- Network regulation of gene expression in melanoma (Dr Miles Andrews)
- Relationship between mutational signatures and metastatic site in ncer (Dr Miles Andrews)

Cancer Immunology

- Cancer-extrinsic determinants – influence of sex and lipid hormones on cancer treatment response (Dr Miles Andrews)
- Mechanisms, predictors and models of immune-related adverse events (Dr Miles Andrews)
- Microbial drivers of response and toxicity to immune checkpoint blockade (Dr Miles Andrews)
- Circulating biomarkers of immunotherapy outcome (Dr Miles Andrews)

Translational Immunology

- Antigen-antibody discovery (A/Prof. Vivek Naranbhai)
- Immunoproteasome-targeting strategies for cancer immunotherapy (A/Prof. Vivek Naranbhai)

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 Ardalan)
- 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

Department of Psychiatry - Central

Associate Professor Caroline Gurvich

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Key research areas

The Department of Psychiatry Central is part of the Central Clinical School. 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 Monash Alfred Psychiatry research centre (MAPrc) and HER (Health Education Research) Centre Australia.

Collectively, 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.

Research within the Department of Psychiatry is extraordinarily diverse. Our projects range from neuroscience techniques that are recognized around the world for the breakthrough insights they provide 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. Estrogen as a treatment for schizophrenia, Transcranial Magnetic Stimulation for depression and cognitive disorders, and novel biological treatments for eating disorders are examples of new and effective approaches that are being developed within our Department.

The HER (Health Education Research) Centre Australia is headed by Professor Jayashri Kulkarni and is one of the few research centres worldwide that focuses on women's mental health adopting 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)
- Cognition and Hormones Group (A/Prof Caroline Gurvich)
- Trauma & Psychopathology (Prof Jayashri Kulkarni, A/Prof Caroline Gurvich, Dr Eveline Mu)
- Brain Stimulation (Dr Leo Chen)

Department of Surgery

Professor Wendy Brown

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Roxana Ruiz

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Key research areas

The Department of Surgery at The Alfred Hospital's research programme spans across all of the surgical disciplines. The broad aim of all of our research is to improve 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 overseas) 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.

For more information on research areas within the Department of Surgery, please visit our website.

Department of Diabetes

Professor Merlin Thomas

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Key research areas

The Department of Diabetes at the Central Clinical School 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 into the future.

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 of Diabetes is divided into separate programs, each overseen by clinical scientists and outstanding researchers in basic sciences.

Our current programs include research that is focused 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, equally our diverse research programs look at everything from head to toes, and from the molecular to the population level. We do clinical trials and we do molecular biology. So whatever your skill set or preferences, there is research that ca 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 the largest animal houses in Australia at the PAC site, that 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 CCS 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.

Melbourne Sexual Health Centre (MSHC)

Associate Professor Eric Chow

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Key research areas

The Melbourne Sexual Health Centre (MSHC) is a specialised unit for the diagnosis and treatment of sexually transmissible infections (STI) and HIV in Victoria. More than one million people globally each day are infected with an STI and STIs are rising at an alarming rate in Australia. The emergence of antimicrobial resistance in some STI pathogens is of global significance as this will render these STIs increasingly difficult or impossible to treat. As a research unit within the Central Clinical School, MSHC is a world-leading and recognised centre that integrates expert clinical service with translational research. Our centre publishes over 150 publications annually and all of our students and researchers are supported to publish their research projects. We conduct epidemiological, public health, qualitative, clinical and medical artificial intelligence research aimed at improving the efficiency of health services, developing novel interventions to prevent HIV and STIs, addressing antibacterial stewardship, and evaluating public health programs and policies. Our research is highly translatable and informs national and international guidelines and policies.

Major areas of research at the MSHC include:

Antimicrobial Resistance – monitoring the emergence and rate of antimicrobial resistance in sexually transmitted pathogens, and developing and implementing novel approaches to reduce antibiotic use and address antibacterial stewardship for their treatment.

Behavioural Economics – co-creating ‘nudges’ with the community to optimize sexual health, for example, being aware of and using pre-exposure prophylaxis.

Behavioural Research – conducting studies to explore individuals’ sexual practices to understand the risk of sexually transmissible infections acquisition.

Bioinformatics – analysing next generation sequencing data to determine 1) the contribution of the genital microbiome to sexual and reproductive health outcomes, and 2) the genetic diversity and antimicrobial resistance mechanisms in sexually transmitted bacteria.

Clinical Trials – using the most scientifically rigorous method to test the effectiveness of an intervention.

Epidemiology – using robust epidemiological methodology to understand the transmission dynamics of sexually transmitted infections, this includes clinical epidemiology, spatial epidemiology, applied epidemiology and genomic epidemiology.

Health Economics – conducting economic evaluations for sexual health interventions in Australia and overseas. For example, determining the cost-effectiveness of HPV vaccination, anal cancer screening.

Health Service Research – reducing the burden of public sexual health services.

Mathematical Modelling – using sophisticated mathematical models to investigate the transmission pattern of STIs, project epidemiological trends and evaluate the impact of interventions for HIV/STIs. Future investigation will see the integration of mathematical modelling and artificial intelligence techniques in epidemic projection.

Medical Artificial Intelligence – using cutting-edge artificial intelligence techniques to assess the risk of HIV and sexually transmitted infection and identify STI-related lesions to assist clinical diagnosis.

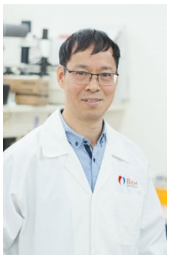
Policy – performing high-quality of systematic reviews for leading health organisations (e.g. World Health Organization) to inform guidelines and polices.

Public Health – evaluating the effectiveness and impacts of public health programs (e.g. HPV vaccination programs).

Qualitative Research – conducting qualitative and mixed-methods studies which provide insights into the subjective experiences, perspectives, and social contexts of patients, healthcare providers, and other stakeholders to contribute to our holistic understanding of sexual health, healthcare practices and experiences of HIV and STIs.

BAKER HEART AND DIABETES INSTITUTE

Associate Professor Bing Wang



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Leonie Cullen

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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.

Atherothrombosis — identifying and treating blockages in the vascular system with imaging and novel therapeutics.

Bioinformatics Discovery and Translation — analysis of data and cross-omic integration from diverse technologies.

Cardiac Biology and Disease — laboratory and patient-based research for earlier detection and prevention of diseases of the cardiovascular system.

Diabetes Complications — reducing the burden of diabetic complications through research and clinical trials.

Inflammation and Immunometabolism — exploring novel pathways and inter-organ communications in cardiovascular and metabolic diseases.

Obesity and Lipids – identifying and validating metabolic pathways associated with chronic disease to develop improved interventions, therapies and clinical procedures.

Physical Activity – developing and employing new approaches to physical activity to prevent and manage the incidence of chronic disease.

BURNET INSTITUTE

Dr Herbert Opi and Dr Raffi Guyasyan

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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 3 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 at the Burnet 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

Associate Professor Joanne Ryan

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Key research areas

The School of Public Health and Preventive Medicine is at the forefront of healthcare improvement research and teaching, underpinned by expertise in large scale clinical trials, epidemiological studies and biostatistics. Please visit www.monash.edu/medicine/sphpm/research for more information. Major areas of research in the School include:

Critical Care Research

- Intensive Care Research Centre
- Australian & New Zealand College of Anaesthetists
- Pre-hospital, Emergency & Trauma
- Perioperative Medicine
- Transfusion Research

Cancer Research

- Prostate Cancer
- Gynae-Oncology
- Melanoma

Major Disease

- Cardiovascular disease
- Diabetes and Vascular Medicine
- Musculoskeletal Epidemiology
- Neuropsychiatry and Dementia
- Infectious Diseases Epidemiology

Health Data Science Analytics

- Cochrane Australia
- Biostatistics
- Modelling
- Health Economics

Clinical Trials in Preventative Interventions

- STAREE Clinical Trial
- Aspirin in Reducing Events in the Elderly (ASPREE) RCT
- Healthy Ageing
- Public Health Genomics

Clinical Registries

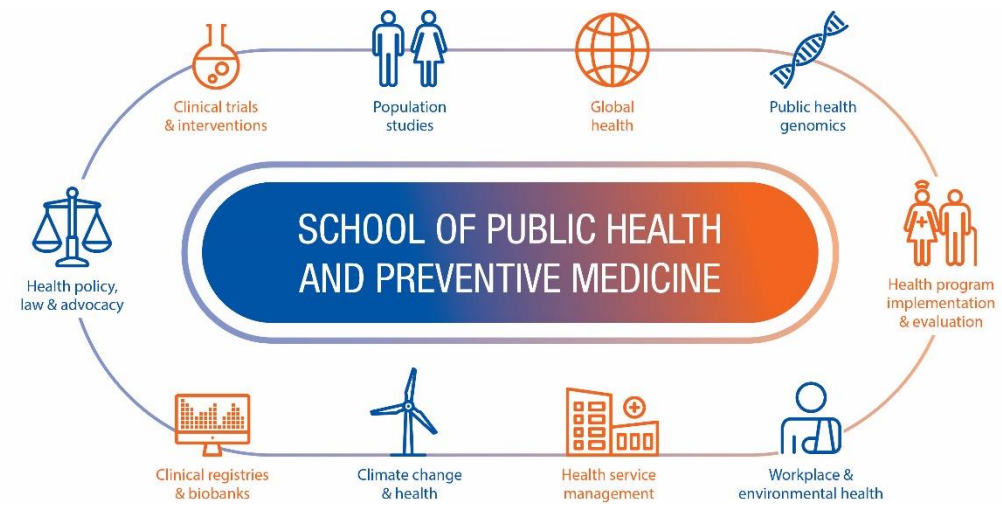
- Cardiac Outcomes Registry
- Burns Registry of Australia & New Zealand
- Australia Cystic Fibrosis Data Registry
- Many others (30+ registries)

Global and Population Health

- Global Health
- Women's Health Research
- Insurance Work and Health
- Occupational, Environmental and Climate Health

Monash Centre for Health Research and Implementation

- Women and Children's Public Health Research
- Chronic Disease, Diabetes and Metabolic Health
- Healthcare Improvement and Implementation
- Data-Driven Healthcare Improvement



Department of Forensic Medicine

Associate Professor Richard Bassed

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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

Dr Chris Barton

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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 (MTOP) 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 (MTOP) 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

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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 metamphetamine 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 PSYCHOLOGICAL SCIENCES

Dr James Coxon

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Key research areas

The School of Psychological Sciences/Turner Institute for Brain and Mental Health offers a range of 4th year research projects, which are supervised by staff members who conduct neurosciences related research across our three overarching themes – Developing Well, Living Well, and Ageing Well.

Projects are organized in six integrated research programs:

- Addiction and Mental Health
- Ageing and Neurodegeneration
- Brain Injury and Rehabilitation
- Brain Mapping and Modelling
- Neurodevelopment
- Sleep and Circadian Rhythms

SCHOOL OF CLINICAL SCIENCES AT MONASH HEALTH

Dr Paul King

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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.

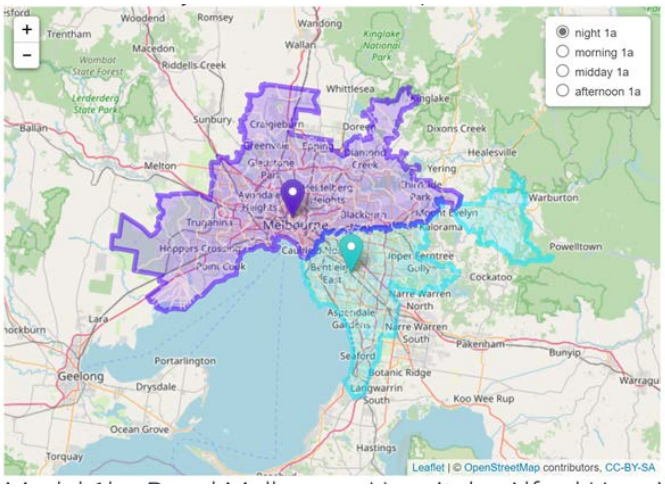
The Department of Neurology has a research laboratory which specialises in neuroimaging analysis, data science and health service research. It is linked with Stroke and Aging Research Group and Geospatial Analysis.

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

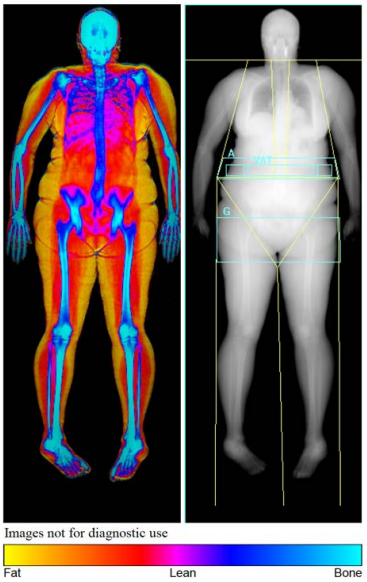
Bone and Muscle Health Research

Centre Head: Professor Peter Ebeling and Dr Ayse Zengin

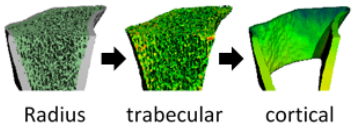
The Bone and Muscle Research Group conduct clinical trials of new and current pharmaceuticals on muscle and bone, the effect of calcium, vitamin D and exercise on musculoskeletal health, and population-based studies of osteoporosis, sarcopenia and obesity in older age in ethnic and underserved populations.

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



SIMBA

TrAFFiC Transcontinental Atypical Femoral Fracture Consortium

THOR The Haemophilia Osteoporosis Registry

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

Department of Oncology, Monash Health

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

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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 (Dr 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 & Dr 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.
Professor Gary Williamson and his team are discovering the mechanisms underlying the health benefits of phytonutrients naturally present in plant-based foods, using both mechanism-based cell and molecular approaches and human intervention studies, to address the urgent need for preventive action against type 2 diabetes and, more recently, COVID-19.
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 evidence-based advice
- Improve understanding of role diet and food triggers in disorders of gut-brain interaction

Department of Psychiatry

Professor Suresh Sundram

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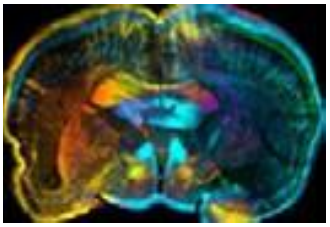
Key research areas

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.

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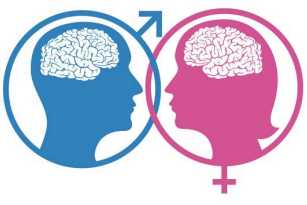
The Sex Chromosome Neurobiology laboratory uses a combination of molecular, pharmacological, and behavioural approaches to investigate the contribution of sex chromosome genes in brain sex differences in health and disease. Seminal work from our group demonstrates that the Y-chromosome gene, SRY, directly 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.

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Department of Surgery

Professor Julian Smith

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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

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Hudson Institute of Medical Research continues to grow as it attracts talented scientists from Australia and overseas. Husdon'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.

Current key areas of interest include:

- Links between innate immunity, inflammatory processes and cancer – role of embryonic signalling pathways in cancer the targeting of these pathways with novel therapies
- Cell signalling pathways involved in tumour survival and growth, and the development of monoclonal antibodies to treat glioma and other cancers
- Role of integrin-linked kinase in cell migration and oncogenesis
- Molecular pathways involved in the metastasis of tumours, including colorectal, ovarian, prostate and bladder cancers
- Role of steroid hormones and nuclear receptors in breast cancer development and progression
- Role of peptidase activity on inflammatory signalling and tumour microenvironment in ovarian cancer
- Molecular links between obesity, oestrogens and cancer, and therapies aimed at breaking the linkage
- Role of the microenvironment in tumour progression, chemo-resistance, and metastasis
- Cancer precision medicine, including childhood brain cancer and solid tumours

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

Centre for Innate Immunity and Infectious Diseases

Centre Head: Professor Richard Ferrero

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 (women's health, cancer, infectious diseases)
- Cytokine Signalling in Cancer and Inflammation (cancer, inflammation, gastrointestinal and lung disease)
- Pattern Recognition Receptors and Inflammation (infectious, inflammatory 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 and inflammatory diseases)
- Host-Pathogen Interactions (infectious, inflammatory and gastrointestinal diseases)
- Innate Immune Responses to Infection (infectious, respiratory and gastrointestinal diseases)
- Microbiota and Systems Biology (infectious, inflammatory and gastrointestinal diseases)
- Molecular Immunity (cancer, inflammatory and inflammatory diseases)
- Nucleic Acids and Innate Immunity (cancer, infectious and inflammatory diseases)
- Viral Immunity and Immunopathology (infectious and respiratory diseases)

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

Centre for Reproductive Health

Centre Head: Associate Professor Patrick Western

Hudson Institute of Medical Research is internationally recognised for its outstanding research into reproduction, which spans more than 40 years. The Centre for Reproductive Health's current reproductive health research program is strongly based in both basic and translational science. Reproductive Health is now a key global challenge, with impacts of the environment and changes in societies strongly impacting not only on both male and female reproduction but also on the long-term health of their offspring. The latter detrimental changes are established both in the sperm and egg, and during early development of the conceptus.

With a rapidly increasing world population, the need for new contraceptive options has never been greater. Furthermore, translation of advances in reproductive sciences also impacts on cancer biology, animal food production, and conservation of endangered species. In addition, proteins involved in the regulation of reproduction also have wider actions influencing inflammation and tissue repair in a wide variety of organs. Our research areas include:

Our research areas include:

- **Male Reproductive Health:** Male factory infertility; male reproductive cancer; immunobiology in male reproductive health
- **Uterine Biology:** Disorders affecting female fertility; endometrial receptivity
- **Reproductive Developmental Biology:** Offspring health; environmental exposures
- **Molecular Biology of Reproduction:** Germline genetics and epigenetics; RNA biology

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

The Ritchie Centre

Centre Head: Professor Suzanne Miller

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.

The Centre aims to improve the health of women and children through innovative research that informs better healthcare. The Ritchie Centre has over 150 research staff and students, including fetal physiologists, immunologists, stem cell biologists, neonatologists, paediatricians, obstetricians, gynaecologists, and radiologists.

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:

- Characterising novel targets for the treatment of endometriosis
- A novel non-invasive diagnostic for endometriosis/adenomyosis
- Reducing stillbirth in Victoria
- New therapies for preeclampsia
- NICU emergencies: frequency, risk factors, causes and potential treatments
- What role does the uterine environment have in cardiovascular disease?
- Imaging the entry of air into the lungs at birth
- Improving breathing of preterm newborns exposed to inflammation during pregnancy
- Improving functional deficits associated with fetal growth restriction
- Obstructive sleep apnoea in children with Down syndrome
- Targeting IL-1β for prevention of inflammation-induced brain injury in premature infants
- Evaluation of a Novel Allosteric IL-1R Inhibitor (Rytvela) in a Spiny Mouse Model of Infection in Pregnancy – a Study of Offspring Behavioural Outcomes
- Novel Anti-inflammatory Approaches for Currently Untreatable Diseases of the Preterm Baby
- Isolation and Banking of Cord Blood Stem Cells and Placental Tissues for Future Clinical Therapies
- Do Cord Blood Stem Cells Reduce Cerebrovascular Brain Injury?
- Bioengineering strategies to enhance stem cell therapeutics for vascular regeneration
- Angiogenesis potential of exosomes

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

Centre for Endocrinology and Metabolism

Centre Head: Professor Peter Fuller

The complex endocrine system impacts all aspects of health and disease. As a preeminent centre for endocrinology research originating from Prince Henry's Institute, laboratories in the Centre for Endocrinology and Metabolism at Hudson Institute of Medical Research undertake basic and clinical research.

The centre's goal is to improve the understanding of the role of hormones in human biology and disease to tackle key health challenges facing Australian and global communities, including reproductive health, bone health and cancer metastasis, cardiovascular disease, endocrine cancer and obesity. Clinical translation of these findings to improve diagnosis, therapeutic intervention, and prevention of disease remains a key focus for the centre.

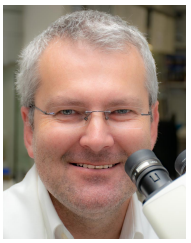
Current key areas of interest:

- The identification of novel pathways to promote bone growth and limit bone destruction, to improve treatment and management of bone disease such as arthritis and osteoporosis and the spread of cancer to bone
- The TGF-β family and the mechanisms that govern its regulation and impact on biological activity, including wound healing, immune function, fibrosis and tumour progression
- The investigation of reproductive hormones in men, such as testosterone and their role in maintaining health and fertility and management of ageing, and treatment and prevention of disease such as cardiovascular disease, and diabetes
- Cardiovascular disease and the Mineralocorticoid Receptor MR), primarily how the MR controls fibrosis and inflammation in the heart muscle and immune cells (macrophages).
- The role of reproductive hormone in regulating processes within the body, particularly the impact of interactions between the pituitary and ovary on reproduction and fertility regulation and the impacts of ageing including menopause
- The role and regulation of reproductive hormones in obesity and breast cancer, particularly the impacts of obesity (adiposity) and its links to an increased risk of breast cancer development in menopausal women. Improved understanding of the impacts of ageing on fat distribution and the development of Metabolic Syndrome is also a key interest
- The role of steroid hormones and their interactions with intracellular nuclear receptors (regulators of gene expression) in the development, treatment, and prevention of serious health challenges including breast cancer and cardiovascular disease. Other investigations include a collaborative thyroid cancer study and ongoing research to understand the underlying activating mechanisms of nuclear receptors and reproductive hormones secreted by the ovary

More information at hudson.org.au/research-centre/centre-for-endocrinology-and-metabolism/

EASTERN HEALTH CLINICAL SCHOOL

Dr Pavel Sluka



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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

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