POSTGRADUATE AND HONOURS RESEARCH PROJECTS 2020
The Monash Health Translation Precinct’s Translational Research Facility (TRF) is a purpose-built research space designed to foster innovation and health translation and the result of an $87.5 million investment in translational medicine.

Set across six levels, the TRF co-locates researchers from Monash University and Hudson Institute with clinicians from Monash Health to enhance collaboration and links between basic and clinical research and patient care to expedite translation of vital discoveries to the bedside.
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WHY DO YOUR GRADUATE RESEARCH AT THE MONASH HEALTH TRANSLATION PRECINCT (MHTP)?

1. **IGNITE PASSION:**
   Forever change the way you perceive the process of how medical knowledge is advanced. In some it will ignite the passion for a career in biomedical research.

2. **WORK WITH THE BEST:**
   Our supervisors have international reputations for excellence in their fields.

3. **SIZE IS IMPORTANT:**
   Thousands of research students have been successfully guided to completion, with a well-established infrastructure conducive to success.

4. **A CLINICAL FLAVOUR:**
   Many of our projects relate directly to disease and are supervised by clinician-scientists. However there is also plenty of opportunity for important basic science projects, studying fundamental mechanisms of disease.

5. **MAKE A DIFFERENCE:**
   Basic science projects and clinical studies focus on our disease. Use your knowledge and skills to improve human health.

NEXT STEPS

1. **MAKE THE DECISION**
   to do a research project.

2. **MAKE CONTACT**
   with a potential supervisor or the head of the unit in which you are interested.

3. **SELECT**
   a topic.

4. **ACT!**
   For research degree applications (PhD and Masters) go to Monash University Institute of Graduate Research:
   monash.edu/graduate-research/future-students/apply
   For Bachelor of Medical Science (Honours) applications go to:
   med.monash.edu.au/bmedsc-hons
   For Honours degree applications go to:
   study.monash/courses
   (Find more detailed information about the application process on following pages.)

TECHNOLOGY PLATFORMS

SCIENTISTS ARE SUPPORTED BY WORLD-LEADING TECHNOLOGY PLATFORMS AT THE MHTP AND AT MONASH UNIVERSITY, SO THAT THEY CAN PURSUE INNOVATIVE APPROACHES AND ADVANCES IN MEDICAL RESEARCH BY GENERATING EVIDENCE AND DATA.
The School of Clinical Sciences at Monash Health (SCS) is a health professional school and research centre of excellence based at campuses of Monash Health, Victoria’s largest hospital network.

SCS is at the forefront of clinical translational research with demonstrated strengths in cancer, cardiovascular disease, endocrinology, infectious and inflammatory diseases, neurosciences, nutrition, and women’s and children’s health. Our senior academic staff are mostly health professionals who work closely with colleagues in Monash Health, translating scientific discoveries into clinical practice in an innovative and collaborative environment. The Monash Health Translation Precinct (MHTP) consists of SCS, the Hudson Institute of Medical Research, and Monash Health, and provides exceptional collaboration opportunities.

SCS AT A GLANCE

- 750+ research publications annually
- 200+ PhD students
- $43M+ research income annually
- 700 researchers
- 100+ research groups
- 50+ physician scientists
- 200+ PhD students
- 700 researchers
- 100+ research groups
- 50+ physician scientists
HUDSON INSTITUTE OF MEDICAL RESEARCH

Progressing scientific knowledge into new treatments and cures Hudson Institute is a leading Australian medical research institute recognised internationally for research into cancer, inflammation, reproductive health and pregnancy, and infant and child health. Our medical research programs span discovery science and translational research, and clinical trials.

The Institute’s 475 scientists and students study human health and disease at a fundamental molecular and cellular level to discover how biological systems work and how disease can be prevented or treated.

Translational research requires the combined skills of scientists and clinicians taking laboratory discoveries through to clinical application, harnessing both scientific and clinical expertise to produce new drugs, devices or treatments that will improve patient lives.

Hudson Institute’s onsite partners, Monash Health and Monash University, are key to our discoveries. Our research programs are driven by medical need resulting in new preventative approaches, therapies and medical devices.

HUDSON INSTITUTE AT A GLANCE

- 296 Institute Staff
- 50 Research Groups
- 300 Research Publications Annually
- 179 Students
- 138 PhD
- 2 Masters
- 39 Honours Graduates
- 25 Students with Medical Training
- 74 Student First Author Publications (23% of all Institute Publications)
A MESSAGE FROM THE HEAD OF SCHOOL, PROFESSOR ERIC MORAND

The School of Clinical Sciences at Monash Health in the Faculty of Medicine, Nursing & Health Sciences comprises the Faculty’s academic departments based at Monash Health. It is the Faculty’s largest clinical school and also hosts its Nutrition & Dietetics department (based at Notting Hill). There is close integration between Monash Health clinical services and the departments including Medicine, Psychiatry, Surgery, Paediatrics, Obstetrics & Gynaecology, Imaging, and Nutrition and Dietetics. Moreover, the School has extensive laboratory-based research programs that are integrated with clinical research activities across multiple disciplines, and also hosts three major University Centres of Excellence: the Centre for Inflammatory Diseases, The Ritchie Centre (jointly with Hudson Institute), and the Monash Cardiovascular Research Centre. Many group leaders are recognised as international leaders in their fields.

There is a strong focus on both basic and translational research with real clinical issues driving research questions addressed in the laboratories. Similarly, laboratory-derived discoveries can be rapidly tested in relevant clinical settings.

The School has a strong track record of welcoming and supporting research students in productive graduate (Honours and Doctoral) programs. A growing number of gifted students have progressed from Honours or BMedSc through successful PhDs and Postdocs to become successful, independent researchers and biomedical professionals in the School and beyond.

SCS is proud of its partnership with Monash Health, Victoria’s largest and most comprehensive health service, and the Hudson Institute, and its basic and clinical research is equal to the best in the world. Somehow we manage to have a happy workplace culture too – I think this is because we all know we are doing good. So for research in a clinically-enriched environment, you will not find a more high-impact, or welcoming, place than SCS.

A MESSAGE FROM THE CEO AND INSTITUTE DIRECTOR, HUDSON INSTITUTE OF MEDICAL RESEARCH, PROFESSOR ELIZABETH HARTLAND

Hudson Institute medical research programs span the full spectrum, from discovery to translational research and clinical trials. While excellence in biomedical research is at our core, every scientist and student at Hudson Institute has the opportunity to see their research impact real-world change.

As part of a vibrant medical research hub, our scientists work alongside Monash Health clinicians and staff. This fundamental science-clinician connection means our scientific discoveries are informed by patient need and positioned for clinical development into new drugs, devices or treatments that improve the lives of patients. Our game-changing outcomes for Australian and global health are the result of those essential partnerships.

As a leading medical research institute, we have the welcome duty of training brilliant young minds to reach their full potential. Our students are valued and vibrant members of our more than 50 research groups. We believe every student has the potential to become a research leader - the people who will solve today's health problems and build tomorrow's industries.

As a member of a world-class research group, and through one-on-one supervision and mentorship, our students develop confidence, skills and thinking, necessary to pursue robust scientific discovery and thrive in an international research community. In 2018, Hudson Institute students were first authors on 74 or 25 per cent of our research publications.

Our training also equips students with a range of dynamic and transferable skills for careers in biomedical and clinical research and beyond, from commercialisation to the pharmaceutical industry.

Student retreats, mentorship programs, seminars, networking programs and a dynamic student society are a big part of student life at Hudson Institute. In addition, our academic partnership with Monash University, Australia’s largest university, ensures our students have access to comprehensive training programs and shared state-of-the-art research facilities.

Hudson Institute provides an outstanding environment for discovery and applied biomedical research. I am proud of the work of our incredible researchers and students, and know you’ll be warmly welcomed when contacting a Supervisor for advice at any stage.
COURSES AVAILABLE

HONOURS PROGRAMS

- Bachelor of Biomedical Science (Honours)
- Bachelor of Science (Honours) – including Bachelor of Biotechnology (Honours)
- Bachelor of Medical Science (Honours)
- Bachelor of Nutrition (Honours)
- Bachelor of Behavioural Neuroscience (Honours)

For further information about an Honours program contact:

Bachelor of Biomedical Science (Honours)
Professor Mark Hedger
E: mark.hedger@hudson.org.au
Dr Paul King
E: paul.king@monash.edu
Ms Roseline Acker
E: rosaline.acker@hudson.org.au
T: 03 857 22552

Bachelor of Medical Science (Honours)
Dr Tony White
E: anthony.white@monash.edu
Ms Pianca Schwarz
E: BMedSc.Hons.SCS@monash.edu
T: 03 857 22771

POSTGRADUATE RESEARCH PROGRAMS

- Doctor of Philosophy
- Doctor of Medicine
- Research Masters
- Master of Reproductive Sciences

For further information about Masters or PhD projects contact:

Professor Kate Loveland
Head of Postgraduate Studies
E: phd.scs@monash.edu

Postgraduate Enquiries
Postgraduate Research Programs Officer
E: scs.gradresearch@monash.edu
T: 03 857 22787

FOR A FULL PROJECT LIST, VISIT – MONASH.EDU/MEDICINE/SCS CLINICAL SCIENCES AT MONASH HEALTH - POSTGRADUATE AND HONOURS RESEARCH PROJECTS 2020
CONFERMENTS OF NON-MONASH STUDENTS)

Applications from external students (both international and Australian) are very welcome. In addition to the information in the following pages, you will need to provide details of courses you have studied and a certified transcript of your academic record so Monash University can give you appropriate credit.

HONOURS

The Honours courses aim to provide students with a higher level of experience in independent analysis and research in their chosen area of expertise. Each Honours course has its own requirements and deadlines. Therefore it is advisable to check the relevant Faculty and department websites and begin looking for potential research projects/supervisors early in second semester.

BACHELOR OF SCIENCE (HONOURS)

You must meet the requirements of the department in which you intend to undertake the coursework component of the degree. This is usually a Distinction-grade average (70%), or above, in 24 points of studies in relevant units at level three. The coursework component of your Honours year will be run by the department in which you enrol. This will be the one most appropriate to your research component, and need not necessarily be the one in which you undertook your level three major studies. Your research component can also be carried out at Hudson Institute.

The Honours application form can be downloaded from:

monash.edu/science/future-students

BACHELOR OF SCIENCE (HONOURS)

This one-year research program is available to students who have successfully completed at least 3 years of medical studies. There is also the opportunity to convert the BMedSci(Hons) to a PhD. This new initiative of MBBS/MD-PhD allows students to accelerate their research studies and complete a PhD in 2 rather than 3 years. Eligible students require a mark of H1 for their BMedSci(Hons) project and can apply for a scholarship to complete their PhD. Students interned from Medicine whilst pursuing this program. Students wishing to take this opportunity should discuss the possibility with their supervisor early in their BMedSci(Hons) year and also with the Director of Medical Student Research.

meghan.wallace@monash.edu

Students who are undertaking a medicine program at a university other than Monash must have completed equivalent studies corresponding to a minimum of 3 years of the Monash University undergraduate BMedSci/MD program. There is now the option of completing a BMedSci(Hons) after graduation with an Australian or New Zealand BMedSci/MD. Information regarding the program is available online:

monash.edu/medicine/som/bmedsc-hons

BACHELOR OF NUTRITION (HONOURS)

This program is for top-ranking graduates of a dietetic or nutrition science course. It will allow participants to develop their research skills and competencies, learn specific techniques and gain a deeper understanding of a selected aspect of human nutrition. The program consists of an individual major research project and a compulsory coursework component. The coursework is conducted in Semester One, and includes modules on literature review, study design, data collection, data analysis, scientific report-writing, and submitting work for peer review. In turn this contributes towards the successful completion of a research project.

Projects are chosen from either clinical or community/population nutrition areas or metabolism and are supervised by an experienced member of staff of the Department of Nutrition, Dietetics and Food.

More information is available here:

monash.edu/medicine/scs/nutrition/teaching/bnd-honours

BACHELOR OF BEHAVIOURAL NEUROSCIENCE (HONOURS)

The Honours year in Behavioural Neuroscience aims to extend research training in specialised areas of behavioural neuroscience, and to help students acquire sophisticated research skills. It is a course requirement that the research project component of the Honours year has significant ‘behavioural neuroscience content’ (students must gain course coordinator’s approval prior to the initiation of the research project).

Honours in the Bachelor of Behavioural Neuroscience is offered to students who have completed the undergraduate BBionic degree with 70% average or better in 24 credit points of core third year behavioural neuroscience subjects, as well as meeting entry requirements for their chosen program.

Information regarding the program is available from the Online Handbook:

med.monash.edu/psych

DOCTOR OF PHILOSOPHY (PHD)/ RESEARCH MASTERS DEGREES

Students wishing to complete advanced research training should enrol either a Research Masters or PhD degree. The pre-requisite for enrolment in these programs is a Honours degree H1A or above, or equivalent.

Introduced in 2015, the new Monash Doctoral Program includes a coursework or professional development component, setting the Monash PhD apart from all other Australian PhDs. There are three different programs available across the Faculty of Medicine Nursing and Health Sciences and students can tailor their program to suit their individual needs.

The minimum duration of PhD candidature enrolment is three years of full-time. Typically, a PhD candidate holds a scholarship, which provides support for a maximum of 3.5 years. Thesis assessment is made by examiners external to the department in which you are studying and selected because of their expertise in the candidate’s field of research.

Applications for PhD and Masters can be made any time throughout the year. It is essential to have obtained a supervisor before commencing the application process.

There are four scholarship rounds per year offered by Monash University. Closing dates are:

31 March – International Applicants
31 May – Domestic Applicants
31 August – International Applicants
31 October – Domestic Applicants

To apply for either candidature or a scholarship, please refer to:

monash.edu/graduate-research/future-students/apply

There may be departmental scholarships available. Contact individual supervisors for details of these.

Information regarding Monash University Research scholarships is available through the Monash University website:

monash.edu.au/scholarships

NEW GRADUATE CERTIFICATE AND DOCTORAL PROGRAM IN TRANSLATIONAL RESEARCH

Unique to Monash University, this program delivers the ‘know-how’ to bring your work from bench to bedside.

Topics include:

• Clinical trial, good clinical practice, bioethics
• Bioinformatics, bioprocessing, biobanking, bioimaging
• Phenomics
• Industry engagement, research commercialization, new biomedical technologies, intellectual property
• Dissemination of translational research

For more information:

med.monash.edu/cecs/education/translational/index.html

POSTGRADUATE STUDENT COMMITTEE

The Committee aims to ensure that each student is able to manage their workload, expectations, career development and any conflict issues that may arise. The Committee coordinates Graduate Research confirmations, progress reviews, final reviews seminars and PhD scholarship applications. It also runs instructional sessions on time management, thesis writing and scholarship applications.

Students are monitored annually and have the opportunity to present at the annual SCS/Hudson Institute Student Symposium.
RESEARCH THEMES

BONE AND MUSCLE HEALTH

The Bone and Muscle Health Group conducts clinical trials investigating the effects of new and current pharmaceuticals, calcium, vitamin D, and exercise on bone structure, body composition, physical function, falls, and fractures.

We conduct observational studies into determinants and consequences of osteoporosis and sarcopenia in older adults. We also investigate the ethnic differences in musculoskeletal health to gain a better understanding of the prevalence of osteoporosis and sarcopenia.

We offer diagnostic tools to support a comprehensive platform for bone health and body composition assessment including DXA (Dual-energy X-ray Absorptiometry), used primarily to evaluate bone mineral density and total body composition, and high-resolution peripheral quantitative computed tomography, which assesses peripheral bone mineral density, geometry and microarchitecture.

PUBLICATIONS ARISING FROM STUDENT PROJECTS


AVAILABLE PROJECTS

Dr Roger Zebaze Djoumessi
roger.zebaze@monash.edu

Secondary theme(s): Endocrinology and Metabolism
- Assessing the Effects of Ageing, Diseases and Treatments on Bone Material and Structural Composition in Clinical Settings Beyond Bone Mineral Density

Associate Professor Frances Milat
francs.milat@hudson.org.au

Secondary theme(s): Bone and Muscle Health, Endocrinology and Metabolism, Women’s Health
- Optimising Osteoporosis Management in Chronic Disease

Dr David Scott
david.scott@monash.edu

Secondary theme(s): Endocrinology and Metabolism
- Exercise for Reducing Risk Factors for Falls in Obese Older Adults
- Vitamin D Supplementation for Enhancing Exercise Responsiveness in Obese Older Adults
- Wearable Activity Trackers for Monitoring Physical Activity and Mobility in Older Adults

Dr Ayse Zengin
ayse.zengin@monash.edu

Secondary theme(s): Cardiovascular, Endocrinology and Metabolism
- Ethnic differences in body composition and the effects on bone health in ageing adults from The Gambia and India
- Ethnic differences in bone geometry in men and women from India and The Gambia
- Study of Indigenous Muscle & Bone Ageing (SIMBA): why fall and fracture risk increased
- Understanding interactions between vascular-bone health in ageing South African men and women
CANCER

Cancer, a disease that can develop within almost every part of the human body and affects hundreds of thousands of Australians every year, results from the abnormal and uncontrolled proliferation of cells to form a tumour which can then spread to distant parts of the body, a process called metastasis. Cutting edge research is vital to finding a cure to this devastating disease and cancer researchers are at the forefront in tackling the most pressing challenges in understanding, diagnosing and treating both adult and childhood cancers.

They undertake basic and translational research into the molecular mechanisms underlying the development, growth and metastasis of tumours, as well as the relationship between the adaptive immune system and the tumour. The goal is to explain the fundamental mechanisms of tumour biology and to use research discoveries for the development of novel cancer therapies and biomarkers of cancer.

AVAILABLE PROJECTS

Dr Maree Bilandzic
maree.bilandzic@hudson.org.au
Secondary theme(s): Women’s Health
- Targeting Ovarian Cancer Leader cells

Dr Jason Cain
jason.cain@hudson.org.au
Secondary theme(s): Fetal, Infant and Child Health
- Defining the roles of epigenetic dysregulation in Diffuse Intrinsic Pontine Glioma (DIPG)
- Improving Childhood Sarcoma Risk Stratification and Outcomes for Recurrent Disease

Dr Simon Chu
simon.chu@hudson.org.au
Secondary theme(s): Endocrinology and Metabolism
- Elucidating novel functions of Magmas signaling in ovarian cancer progression and chemoresistance
- Molecular pathogenesis of granulosa cell tumours of the ovary
- Role of XIAP in Endocrine Cancer (Ovarian and Thyroid)

Associate Professor Preci Ron Firestein
ron.firestein@hudson.org.au
Secondary theme(s): Genetic Diseases, Precision Medicine
- Functional genomic screens to identify new therapeutic targets for bowel cancer
- Transcriptional regulators as cancer targets: new models and therapeutic approaches
- Understanding cancer resistance to chemotherapy

Dr Sophia Frentzas
sophia.frentzas@monash.edu
- Immunochemical characterisation of FN-E and associated factors as biomarkers for gynaecological malignancies
- Omic changes in serial biopsies of patients with colorectal and ovarian cancer on anticancer therapy
- Presence and distribution of IFN-E in solid tumours

Dr Sameer Greenall
sameer.greenall@monash.edu
- Inducing microsatellite stable (MSS) to microsatellite instable (MSI) genotypic switch in tumours using unique drug combination therapies.
- Utilising targeted drug approaches to sensitize tumours to immunotherapy.

Professor Paul Hertzog
paul.hertzog@hudson.org.au
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
- Innate immune responses regulating breast cancer metastases
- The role of a novel cytokine in endometrial and cervical cancer

Dr Gwo-Yaw Ho
gwo-yaw.ho@monash.edu
Secondary theme(s): Precision Medicine
- DNA methylation in predicting cancer outcomes

Professor Graham Jenkin
graham.jenkin@monash.edu
Secondary theme(s): Infectious Diseases, Precision Medicine
- Elimination of cancer stem cells using chimeric antigen receptor T cells
- Novel derivation and gene editing of human haematopoietic stem cells and differentiation to immune cell types
- Re-engineering the function of natural killer cell receptors via CRISPR/Cas9: a new approach for ‘off-the-shelf’ immunotherapy

Professor Eva Segelov
eva.segelov@monash.edu
- Barriers and enablers of establishing clinical trial centres in regional Australia
- Metabolic drugs as an anticancer therapy for neuroendocrine tumours
- Examination of biomarkers of aspirin sensitivity in the Phase III ASCOLT trial of adjuvant aspirin for Stage II and III colorectal cancer

Professor Melissa Southey
melissa.southey@monash.edu
- CHEK2 genetic variants and breast cancer predisposition & time to clinical translation?
- Do missense variants in PALB2 predispose to breast cancer?
- Genomic susceptibility to invasive lobular breast cancer
- Heritable DNA methylation marks associated with prostate cancer risk.

Dr Andrew Stephens
andrew.on.stephens@hudson.org.au
Secondary theme(s): Precision Medicine, Women’s Health
- Identifying New Drug Targets in Ovarian Cancer Stem-like Cells
- Photosensitizer Development for Ovarian Cancer Therapy (collaboration with Invion Ltd)

Dr Kate Webber
kate.webber@monash.edu
Secondary theme(s): Precision Medicine
- Real-time PROMS and PREMS
- Immunology

Dr Ee Ming Wong
eeming.wong@monash.edu
Secondary theme(s): Women’s Health
- Investigating a potential novel therapy for the treatment of ovarian cancer

Dr Sue Xiang
sue.xiang@monash.edu
- An integrative approach to narrow gaps understanding of Immunosuppression in tumor-microenvironment

Dr Dakang Xu
dakang.xu@monash.edu
- HER2 genetic variants and breast cancer predisposition & time to clinical translation?
- Do missense variants in PALB2 predispose to breast cancer?
- Genomic susceptibility to invasive lobular breast cancer
- Heritable DNA methylation marks associated with prostate cancer risk.

Dr Andrew Stephens
andrew.on.stephens@hudson.org.au
Secondary theme(s): Precision Medicine, Women’s Health
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kate.webber@monash.edu
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eeming.wong@monash.edu
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Dr Sue Xiang
sue.xiang@monash.edu
- An integrative approach to narrow gaps understanding of Immunosuppression in tumor-microenvironment

Dr Dakang Xu
dakang.xu@monash.edu
- HER2 genetic variants and breast cancer predisposition & time to clinical translation?
- Do missense variants in PALB2 predispose to breast cancer?
- Genomic susceptibility to invasive lobular breast cancer
- Heritable DNA methylation marks associated with prostate cancer risk.
Monash Cardiovascular Research Centre (MCRC) is the research entity of MonashHeart. MCRC coordinates a very active program of clinically orientated research with an international reputation for first-in-human studies and novel percutaneous techniques for structural heart disease. Areas of particular strength include Transcatheter aortic valve implantation, intra-coronary imaging, testing of novel coronary stent designs, arterial function and coronary CT imaging. There is a very active training program for registrars and fellows, as well as generally 2-3 PhD candidates and 1-2 BMedSc(Hons) students. If you are interested in BMedSc(Hons) or other postgraduate research opportunities in the cardiology field, please contact Professor James Cameron, Director of MCRC at: james.cameron@monash.edu.

At Hudson Institute, we undertake basic research to improve outcomes from cardiac conditions. We have a world-leading men’s health initiative, as well as a focus on women’s health, including heart disease. We are researching the role of the MR in peripheral blood heart failure. In addition to its effects in cardiomyocytes, (MR) reduce symptoms and improve survival in patients with heart failure. In a randomized controlled clinical trial, Cardiotoxicity Reversal Med. 2018 Oct; NoV-197: P1(837-844). doi: 10.1016/j.jcrt.2018.03.025. Epub 2018 Apr 3. PubMed PMID: 29658358.

We are seeking to determine the mechanisms by which antagonists and coregulators of the mineralocorticoid receptor receptors in heart disease and other metabolic conditions. We are seeking to determine targets for clinical therapies to reduce heart disease and inflammation with minimal side effects. Please contact Dr Morag Young at morag.young@hudson.org.au to discuss projects for Honours, Masters and PhD degrees.

available projects

Dr Monique Kilkenny
monique.kilkenny@monash.edu
Secondary theme(s): Stroke
- Risk factors for patients with stroke developing acute coronary syndrome in Australia

Dr Gina Kusuma
gina.kusuma@hudson.org.au
- Bioengineering strategies to enhance stem cell therapeutics for chronic wounds
- Novel formulations of stem cell-derived exosomes for vascular regeneration

Emeritus Professor Ban-Hock Toh
ban-hock.toh@monash.edu
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology, Stroke
- Immune inflammatory mechanisms in Atherosclerosis-based heart attacks and strokes

Dr Morag Young
morag.young@hudson.org.au
Secondary theme(s): Endocrinology and Metabolism
- A search for new biomarkers and therapeutic targets in heart failure
- Identification of mineralocorticoid receptor signaling pathways in macrophages; a role in heart disease
- Understanding the signaling mechanisms for MR regulation of cardiomyocyte function in heart disease

Dr Sarah Zaman
sarah.zaman@monash.edu
Secondary theme(s): Women’s Health
- Gender related differences in prescription, management and outcomes following acute coronary syndromes
- Prevention and treatment of heart disease in women

Monash Cardiovascular Research Centre (MCRC) is the research entity of MonashHeart. MCRC coordinates a very active program of clinically orientated research with an international reputation for first-in-human studies and novel percutaneous techniques for structural heart disease. Areas of particular strength include Transcatheter aortic valve implantation, intra-coronary imaging, testing of novel coronary stent designs, arterial function and coronary CT imaging. There is a very active training program for registrars and fellows, as well as generally 2-3 PhD candidates and 1-2 BMedSc(Hons) students. If you are interested in BMedSc(Hons) or other postgraduate research opportunities in the cardiology field, please contact Professor James Cameron, Director of MCRC at: james.cameron@monash.edu.

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We are seeking to determine the mechanisms by which antagonists and coregulators of the mineralocorticoid receptor receptors in heart disease and other metabolic conditions. We are seeking to determine targets for clinical therapies to reduce heart disease and inflammation with minimal side effects. Please contact Dr Morag Young at morag.young@hudson.org.au to discuss projects for Honours, Masters and PhD degrees.

available projects

Dr Monique Kilkenny
monique.kilkenny@monash.edu
Secondary theme(s): Stroke
- Risk factors for patients with stroke developing acute coronary syndrome in Australia

Dr Gina Kusuma
gina.kusuma@hudson.org.au
- Bioengineering strategies to enhance stem cell therapeutics for chronic wounds
- Novel formulations of stem cell-derived exosomes for vascular regeneration

Emeritus Professor Ban-Hock Toh
ban-hock.toh@monash.edu
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology, Stroke
- Immune inflammatory mechanisms in Atherosclerosis-based heart attacks and strokes

Dr Morag Young
morag.young@hudson.org.au
Secondary theme(s): Endocrinology and Metabolism
- A search for new biomarkers and therapeutic targets in heart failure
- Identification of mineralocorticoid receptor signaling pathways in macrophages; a role in heart disease
- Understanding the signaling mechanisms for MR regulation of cardiomyocyte function in heart disease

Dr Sarah Zaman
sarah.zaman@monash.edu
Secondary theme(s): Women’s Health
- Gender related differences in prescription, management and outcomes following acute coronary syndromes
- Prevention and treatment of heart disease in women
EMERGENCY MEDICINE

Adult emergency medicine research interests include:

- Clinical decision rule application and validation
- Treatment and assessment of nausea/vomiting and confirmation of anteromotor effectiveness
- Alcohol harm and interventions for reduction
- Treatment of paracetamol poisoning
- Assessment of toxicity of emerging and novel pharmaceuticals in deliberate self-poisoning
- Toxicovigilance and poisoning trends and outcomes of poisoning in south-eastern Melbourne

Our paediatric emergency medicine group has wide interests in all aspects of the paediatric emergency care, including critical care and resuscitation, common illnesses and clinical procedures, diagnostic testing, pain management and clinical decision rules.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS:

| PhD | MicroRNA from a 12-h versus 20-h acetylsalicylic acid infusion for paracetamol overdose A Wong, C Najad, M Gantier, KW Choy, J Doey, A Graudins Human & experimental toxicology, 2019 (Early on-line) 0960327119833740

Endocrinology and Metabolism

The complex endocrine system impacts all aspects of health and disease. Our goal is to improve understanding of the role of hormones in human biology and disease to tackle key health challenges facing Australian and global communities, including reproductive health, metabolic bone disease, hypertension and cardiovascular disease, endocrine cancer and obesity. Clinical translation of our findings to improve diagnosis, therapeutic intervention and prevention of disease remains a key focus.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS:


AVAILABLE PROJECTS

Available Projects

Evelyn Chong

diana.egetter-warburton@monash.edu

Secondary theme(s): Neuroscience and Psychiatry, Precision Medicine
- Characteristics and epidemiology of anticonvulsant overdose
- Comparison of acetylsalicylic acid infusion times to treat paracetamol overdose
FETAL, INFANT AND CHILD HEALTH

The Fetal, Infant and Child Health theme encompasses five key research areas:

**Respiratory and Cardiovascular**
Research projects include: improving the transition at birth in asphyxiated infants, fetal lung growth and development, and imaging the entry of air into lungs at birth.

**Brain injury and Neurodevelopmental**
Research projects include: new therapies for neonatal seizures, neuro-steroids as brain growth and protection factors, causes of perinatal brain injury and how to prevent them, and prenatal origins of cerebral palsy and mental disorders (autism, schizophrenia).

**Infant and Child Health**
Research projects include: sudden infant death syndrome, infant cardio-respiratory development, and childhood sleep disorders.

**Cell Therapy and Regenerative Medicine**
Current research projects include: placental stem cells, lung and brain repair, neural and blood vessel regeneration, cerebral palsy, biomaterials and stem cells, and stem cell expansion.

**Infection, Inflammation and Immunity**
Research projects include: early life inflammation and cardiovascular disease, maternal immunisation against whooping cough – effect on fetal and postnatal brain development, effect of maternal asthma on fetal/neonatal lung development and function, vaccine safety for use in general practice, and novel anti-inflammatory approaches for currently untreatable diseases of the preterm baby.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS


AVAILABLE PROJECTS

Dr Beth Allison
beth.allison@hudson.org.au
Secondary theme(s): Cardiovascular
- Can we treat growth restricted fetuses in utero to improve cardiovascular function after birth?
- What is the impact of common and novel blood pressure therapies on brain injury in growth restricted newborns

Dr Robert Bischof
robert.bischof@hudson.org.au
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
- Therapeutic application of Human Adenoviral Cells in allergic asthma

Professor Jim Buttery
jim.buttery@monash.edu
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
- Vaccine safety in general practice: can representation rates be used as an early warning surrogate for adverse event rates?

Dr Michael Fahey
michael.fahey@monash.org.au
- Developing 3D brain organoids to model perinatal brain injury
- Developing a combination stem cell therapy for preterm inflammation induced brain injury

Dr Mark Flora
mark.flora@hudson.org.au
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
- Angiogenesis potential of exosomes

Dr Rebecca Lim
rebecca.lim@hudson.org.au
- Activating the Stem Cell Niche
- Stem cell based nanomedicine

Associate Professor Michelle Giles
michelle.giles@monash.edu
- Knowledge and uptake of BCG vaccination in high risk infants

Professor Stuart Hooper
stuart.hooper@monash.edu
Secondary theme(s): Sleep and Respiratory, Cardiovascular
- Imaging the Entry of Air into the Lungs at Birth
- Transition to Life After Birth

Professor Rosemary Home
rosemary.home@monash.edu
Secondary theme(s): Sleep and Respiratory, Cardiovascular
- Are Sleep Spindles Associated with Neurocognitive Deficits in Children with Sleep Disordered Breathing?
- Long-term consequences of respiratory instability on neurodevelopmental and cardiovascular outcomes in preterm infants
- Obstructive sleep apnoea in children with Down syndrome

Professor Graham Jenkin
graham.jenkin@monash.edu
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology, Neuroscience and Psychiatry, Stroke
- Isolation and Banking of Cord Blood Stem Cells and Placental Tissues for Future Clinical Therapies
- Isolation and Expansion of Umbilical Cord Blood Stem Cells for Regenerative Medicine

Dr Mirja Krause
mirja.krause@hudson.org.au
Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
- Angiogenesis potential of exosomes

Dr Rebecca Lim
rebecca.lim@hudson.org.au
- Activating the Stem Cell Niche
- Stem cell based nanomedicine

Dr Atul Malhotra
atul.malhotra@hudson.org.au
Secondary theme(s): Women's Health, Neuroscience and Psychiatry, Nutrition, Dietetics and Food
- Digital stethoscope assessment of breath sounds in neonates
- Interprofessional simulation based education
- Studying the growth restricted newborn brain
- Understanding the body composition of low birth weight infants

Professor Suzanne Miller
suzie.miller@hudson.org.au
- Do Cord Blood Stem Cells Reduce Cerebrovascular Brain Injury?
- Improving functional deficits associated with fetal growth restriction

Mr Ram Nataraja
ram.nataraja@hudson.org.au
- Creation of Laparoscopic Condition-specific laparoscopic training models
- Development of a simulation programme involving both the patient journey and consent process in Paediatric Surgery
- Does Peritoneal Lavage Influence the Rate of Complications in Paediatric Laparoscopic Appendectomy? A Prospective Randomised Trial
- Evaluation of a stress reduction programme for active surgeons
- Surgical Movement Tracking Using Wearable Augmented Reality Headsets
- Validation trial of eSIM Laparoscopic Bench trainer in medical students

Professor Graeme Polglase
graeme.polglase@monash.edu
Secondary theme(s): Postgraduate and Honours Research Projects 2020
- Improving the transition at birth in sepsis-related infants
- Protecting the Brain from Injury at Preterm Delivery

Dr Kenneth Tan
kenneth.tan@monash.edu
Secondary theme(s): Women's Health, Sleep and Respiratory, Infectious and Inflammatory Diseases and Immunology
- Maternal health and neonatal outcomes - investigating secular trends and risk factors
- Preterm Infants in the NICU - Mechanisms of Oxygen Desaturations - Seasonal variations in infections and effect on neonatal outcomes
- Temporal variations in clinical outcomes across international neonatal quality networks and effect
- The early recognition of the deteriorating neonate - Investigating the utility of statistical or machine learning models

Associate Professor Megan Wallace
megan.wallace@monash.edu
- Evaluating the outcomes of undergraduate medical and biomedical student research
- Preventing Lung Disease in Very Premature Babies

Professor Katrina Williams
katrina.williams@monash.edu
- Making best use of existing data to understand autism spectrum disorders, changes over time and service needs in Australia
- Understanding the development and outcomes of children who lose skills before they develop autism

Associate Professor Flora Wong
flora.wong@monash.edu
Secondary theme(s): Neuroscience and Psychiatry, Cardiovascular
- Coupling between Brain Activity and Brain Blood Flow in the Immature Brain
- Using heart rate variability to predict clinical disease in preterm babies

Dr Tamara Yawno
tamara.yawno@hudson.org.au
- Ganciclovir: a new treatment for neonatal sepsis

FOR A FULL PROJECT LIST, VISIT – MONASH.EDU/NSC/SCS

CLINICAL SCIENCES AT MONASH HEALTH - POSTGRADUATE AND HONOURS RESEARCH PROJECTS 2020
GENETIC DISEASES

Many of the diseases that affect us originate from changes present at or just after fertilisations and are known as inherited disorders. It was originally thought that these diseases were primarily caused by mutations to the genes inherited by our parents. However, it is becoming increasingly evident that many diseases also arise from the number of copies of a gene present in our cells and the changes to epigenetic regulators, which are factors that control how and if the gene is expressed.

By looking into the very earliest stages of development, when genetic and epigenetic disorders first manifest, we can understand the underlying mechanisms of disease and provide a platform for the development of tomorrow’s therapies and clinical practices.

Our aim is to provide explanations for how a large number of diseases are passed from one generation to the next.

Researchers investigate how very early epigenetic markers in sperm and eggs are controlled during development, and how they will affect our children and their children, if they are poorly regulated.

Another area of research looks at genetic perturbations in sex-specific pathways in the gonads and the brain that lead to clinical disorders, including intersex conditions and gender dysphoria, and sex bias in neurological conditions such as Parkinson’s disease, ADHD and schizophrenia. A hallmark of this work is the translation of basic science research into clinically useful tools that improve patient health.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS


HAEMATOLOGY

The Oncology and Haematology units at Monash Health have one of Australia’s largest and most active clinical trial centres, performing Phase I-IV trials in multiple disease types. Biospecimens from these trials are a rich source of specimens that can be studied to understand the causes, progression and response to treatment of these tumours.

AVAILABLE PROJECTS

Dr George Grigoriadis
george.grigoriadis@monash.edu
- Deregulation of Key Signalling Molecules in the NF-κB Pathway and their links to Chronic Disease Development
- Predicting response to lenalidomide based induction: Real World Experience
- Role of bone marrow inflammation in the progression of myelodysplastic syndrome
- Role of NF-κB in haematological malignances

Dr Jim Vadolas
jim.vadolas@hudson.org.au
Secondary theme(s): Genetic Diseases, Precision Medicine
- Epigenetic modifications of the human β-globin locus: new therapeutic targets for haemoglobin disorders
- Harnessing RNA interference in gene therapy vectors for β-thalassaemia
- Impact of impaired immune function in haemoglobin disorders
INFEKTIVE AND INFLAMMATORY DISEASES AND IMMUNOLOGY

The immune response will be important to nearly every disease you research, study or treat in your career as a basic scientist or clinician-scientist. Therefore, understanding immunology and the clinical and experimental techniques used to study infectious and inflammatory diseases and cancer will be invaluable to your development as a scientist or clinician. Choosing a research project with one of the supervisors below will provide you with outstanding training in infectious/inflammatory disease research. You will conduct high quality discovery and clinical research using the latest technologies, contributing to translation of research into preventions, diagnostics and treatments for patients. You will also have the opportunity to publish your research in leading journals.

Diseases we study include:

- Autoimmune diseases: systemic lupus erythematosus (SLE), rheumatoid arthritis, glomerulonephritis, vasculitis and hepatitis.
- Infectious disease: HIV, Zika virus, Influenza, Chlamydia, Helicobacter pylori, Herpes simplex virus, Human metapneumovirus, Respiratory syncytial virus.
- Inflammation-based disorders: stroke, sepsis, COPD.
- Gastrointestinal disease: Gastritis, bowel disease.
- Pulmonary disease: Chronic obstructive pulmonary disease (COPD), idiopathic pulmonary fibrosis.
- Oncology: pancreatic, lung, breast, ovarian, endometrial and gastric.

The techniques covered by our PhD program include experimental immunology, innate immunity, biochemistry, protein interaction and signal transduction, molecular and cell biology, bacteriology, functional genomics and bioinformatics, preclinical models of disease, clinical research, clinical practice in inflammatory diseases, and you will also receive training in communication (written & oral), organisational and other professional skills.

A project in immunology, infectious or inflammatory diseases or cancers with an inflammatory component offers:
- Internationally recognised researchers and clinician-scientists as your supervisors.
- Strong links to Monash Health clinical departments (Departments of Nephrology, Rheumatology, Gastroenterology and Hepatology, Monash Infectious Diseases, Clinical Immunology and Monash Lung and Sleep).
- Access to world class infrastructure and technologies (functional genomics, flow cytometry, imaging and clinical trials facility).
- A choice of over 60 Research Projects covering topics ranging from preclinical discovery to clinical translation.

Recent Publications Arising from Student Projects


Available Projects

Professor Jim Buttery
jm.buttery@monash.edu
Secondary theme(s): Fetal, Infant and Child Health

-SNOTWATCH: Real Time Seasonal Viral Information for Health Providers
-SYNTROCK: Linking ED Data to Detect Outbreaks and Vaccine Safety Signals

Dr Nicole De Weerd
nicole.deweerd@hudson.org.au
- Structural & functional characterisation of type I interferon receptors and signalling pathways

Professor Richard Ferrero
richard.ferrero@hudson.org.au
Secondary theme(s): Cancer and Haematology

- Defining the immunomodulatory and oncogenic properties of bacterial extracellular vesicles
- Defining the role of a novel NLR protein in B cell lymphomagenesis associated with chronic Helicobacter Infection
- The role of the innate immune system in preventing stomach cancer during Chronic Helicobacter pylori Infection
- Understanding how Helicobacter pylori regulates host immune responses through the actions of long noncoding RNAs

Dr Sam Forster
sam.forster@hudson.org.au
Secondary theme(s): Fetal, Infant and Child Health, Genetic Diseases, Precision Medicine

- Characterization of human microbiota diversity across the Australian community
- Characterization of microbiota composition in paediatric inflammatory bowel disease
- Discovery of antibiotic resistance gene dispersal networks In the human gastrointestinal microbiota
- High Resolution Computational Analysis of the Gastrointestinal Microbiota

Dr Michael Gantier
michael.gantier@hudson.org.au
Secondary theme(s): Cancer and Haematology, Genetic Diseases

- Creating a new generation of adjuvants for vaccine and cancer immunotherapy
- Defining the side-effects of CRISPR-Cas9 gene editing on immune responses
- Modulating microRNA levels in inflammation

Dr Edward Giles
edward.giles@monash.edu
Secondary theme(s): Fetal, Infant and Child Health

- A new model of transition to adult care in paediatric inflammatory bowel disease
- Mucosal Immunology in Paediatric Inflammatory Bowel Disease
- Optimising the function of anti-cancer Regulatory T cells - how do they restrict Investigating leukocyte trafficking in the Secondary theme(s): Cancer and metabolism.

Dr. Joshua Ooi  
JOSHUA.OOI@MONASH.EDU  
Antigen-specific regulatory T cells to treat SLE.

Dr. Dakang Xu  
DAKANG.XU@HUSON.ORG.AU  
Ergic control of inflammatory disease.

- The role of innate immune responses in modulating disease during infection in influenza virus infections.

Dr. Ian Woolley  
IAN.WOOLLEY@MONASH.EDU  
- Regulators of TNF signaling in Salmonella infection.
- Understanding the biochemical mechanisms of Salmonella virulence proteins.
- Understanding the molecular basis of virulence in invasive Salmonella lineages.

- The role of a innate cytokine receptors in cell responses.

Dr. Joshua Ooi  
JOSHUA.OOI@MONASH.EDU  
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NEUROSCIENCE AND PSYCHIATRY

Psychiatric neuroscience is an exciting and emerging field of research that attempts to identify the molecular abnormalities in the brain that underpin psychiatric disorders. The Translational Molecular Psychiatry program focuses on the major psychotic disorders such as schizophrenia, bipolar disorder and major depression and uses a range of clinical techniques and animal models to better understand their pathology with a view to the development of biomarkers and novel drugs. Such approaches include clinical characterisation and whole exome sequencing of families affected by these disorders; post-mortem human brain studies examining expression profiles of genes of interest; and transgenic animals modelling brain specific genetic risk factors.

The Centre for Developmental Psychiatry and Psychology (CDPP) undertakes research with a particular focus on child, adolescent and family mental health. We work in close affiliation with the clinical services provided by Monash Health Mental Health Program including Early in Life Mental Health Service. Our special areas of interest include mental health in children and young people with developmental and intellectual disabilities, autism spectrum disorders, disorders of infancy, school refusal, refugees, anxiety, depression, and suicide risk.

The Psycho-Oncology Research Unit collaboratively conduct studies of coping and adjustment in patients with cancer and their families. Areas of interest include studies of existential distress, morale and coping; meaning and purpose therapy; family interventions; studies of end-of-life decision making; communication studies; mindfulness compassion therapies; and use of advanced care planning.

The intersection between neurology and psychiatry and the neuroscience of psychiatric disorders is an evolving and increasingly relevant field of research. Other research includes studies into progressive neurological diseases (PND) such as Huntington’s disease and Motor Neurone Disease, neuroimaging biomarkers to track disease progression, and the psychological and social aspects of PND.

Southern Synergy, a research centre co-located at Dandenong Hospital, focuses on mindfulness, refugee mental health, epidemiology of mental health disorders, policy relevant research into health services particularly for vulnerable populations, and population need and wellbeing research using large-data registry interrogation and national surveys. Particular strengths of Southern Synergy lie in a unique combination of research, training and clinical academic staff with close linkage to collaborators responsible for mental health service delivery in the Monash Health catchment area. Our multidisciplinary team consists of members from psychiatry, clinical psychology, social work, epidemiology and biostatistics, health economics and sociology.

The Brain and Gender laboratory at Hudson Institute focuses on unravelling the genetic differences between the male and female brain. The laboratory uses a combination of cellular, whole animal, and clinical approaches to better understand the sex differences in disorders such as Parkinson’s disease, ADHA, and autism and to identify novel sex-specific therapeutic targets (e.g. Y chromosome genes).
Dr Joanne Enticott
joanne.enticott@monash.edu

- Application of machine learning methods to diagnosis of neurological disorders from medical records
- Discovering themes in Twitter activity related to neurological disorders
- Implementing of machine learning methods for the diagnosis of neurological disorders
- Deep Dive Learning clinical features from patterns on PET scan in patients with dementia
- Mapping hyperlink web structures of six health industry lobby groups: Insight from Big data analysis
- Mapping the geography of multiple sclerosis around the world
- Measuring self-rated mental health in a large Australian cohort
- Using advanced genetic tools to guide precision medicine in psychosis
- Using genetic models to understand how estradiol improves cognitive functioning
- Using single-nucleic RNA-Sequencing to uncover novel candidate genes and/or signalling pathways that are altered in people with schizophrenia.

Dr Rachel Hill
rachel.hill@monash.edu

- Characterizing the behavioural phenotype of betacellulin knockout mice – a promising new candidate gene associated with schizophrenia
- The role of GluNR2D in mediating cognitive dysfunction
- Touchscreens for mice – understanding how prenatal exposure to infection alters cognitive ability later in life
- Using genetic models to understand how estradiol improves cognitive function
- Using single-nucleic RNA-Sequencing to uncover novel candidate genes and/or signalling pathways that are altered in people with schizophrenia.
- Using advanced genetic tools to guide the future of precision medicine in psychiatry

Prof Thanh Phan
thanh.phan@monash.edu

Second theme(s): Cardiovascular, Stroke, Precision Medicine, Cancer and Haematology, Women’s Health

- Application of machine learning methods to diagnosis of neurological disorders from medical records
- Discovering themes in Twitter activity related to neurological disorders
- Image classification for diagnosis of neurological disorders
- Deep Dive Learning clinical features from patterns on PET scan in patients with dementia
- Mapping hyperlink web structures of six health industry lobby groups: Insight from Big data analysis
- Mapping the geography of multiple sclerosis around the world
- Measuring the territory of the anterior choroidal artery
- Mapping topography and network of brain injury in patients with disorders of consciousness
- Natural history of TIA like presentation of migraine
- Phenotyping patients with neurological disorders using machine learning

Dr Jooyung Lee
jooyung.lee@hudson.org.au

Secondary theme(s): Endocrinology and Metabolism, Genetic Diseases, Surgery, Fetal, Infant and Child Health

- Biophysical Basis of Sex Differences in the Healthy and Diseased Brain
- Decasculinising the Male Brain
- Is Deep Brain Stimulation Neuroprotective in Parkinson’s Disease?
- Novel Therapeutic Targets for Parkinson’s disease
- Why are Boys More Susceptible to attention-deficit hyperactive disorder (ADHD) than Girls?

Dr Frances Shwayer
frances.shwayer@monash.edu

- Characterizing the behavioural phenotype of betacellulin knockout mice – a promising new candidate gene associated with schizophrenia
- The role of GluNR2D in mediating cognitive dysfunction
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- Using genetic models to understand how estradiol improves cognitive function
- Using single-nucleic RNA-Sequencing to uncover novel candidate genes and/or signalling pathways that are altered in people with schizophrenia.

Dr Adit Seneviratne
udaya.seneviratne@monash.edu
- Emotional facial expressions during epileptic and psychogenic nonepileptic seizures

Dr Thanh Phan
thanh.phan@monash.edu

Second theme(s): Cardiovascular, Stroke, Precision Medicine, Cancer and Haematology, Women’s Health

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AVAILABE PROJECTS

Dr Joanne Enticott
joanne.enticott@monash.edu

- The longitudinal nature of refugees’ mental health in a large Australian cohort
- Using advanced genetic tools to guide precision medicine in psychosis
- Using genetic models to understand how estradiol improves cognitive functioning
- Using single-nucleic RNA-Sequencing to uncover novel candidate genes and/or signalling pathways that are altered in people with schizophrenia.

Dr Jooyung Lee
jooyung.lee@hudson.org.au

Secondary theme(s): Endocrinology and Metabolism, Genetic Diseases, Surgery, Fetal, Infant and Child Health

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Dr Adit Seneviratne
udaya.seneviratne@monash.edu
- Emotional facial expressions during epileptic and psychogenic nonepileptic seizures

Dr Thanh Phan
thanh.phan@monash.edu

Second theme(s): Cardiovascular, Stroke, Precision Medicine, Cancer and Haematology, Women’s Health

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jooyung.lee@hudson.org.au

Secondary theme(s): Endocrinology and Metabolism, Genetic Diseases, Surgery, Fetal, Infant and Child Health

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NUTRITION, DIETETICS AND FOOD

The Department of Nutrition, Dietetics and Food is led by Professor Gary Williamson who is a highly cited author (Scopus h-index of 90), and has extensive experience in international research in academic, institute and industrial environments. His research focuses on the link between dietary components (especially polyphenols) and carbohydrate/energy metabolism.

Research in the Department of Nutrition, Dietetics and Food[1] covers the themes of:

- Clinical Nutrition including paediatrics and developing clinical collaborations to facilitate research translation;
- Metabolism including, exploring the link between dietary components (especially polyphenols) and carbohydrate / energy metabolism, sport and exercise nutrition, circadian rhythms and sleep, weight loss and maintenance, appetite regulation and energy expenditure;
- Public Health including communicating health messages using technology and innovation in food and food systems; and
- Teaching and Learning with a focus on competency based education and assessment of professionalism.

Recently the Department has received research funding from a number of sources including three NHMRC project grants and three NHMRC research fellowships, National Heart Foundation, Sports Medicine Australia, Queensland Department of Health and a Victorian Department of Health and Human Services project grant.

The Department is located at the ‘Be Active Sleep and Eat’ (BASE) Facility in Notting Hill (med.monash.edu/base). The facility comprises of a state-of-the-art iDXA for bone and body composition assessment, phlebotomy facilities, clinical chemistry analysis, a four room sleep laboratory, a commercial kitchen, environmental chamber, exercise physiology testing, and consulting suites which provide the infrastructure to support research work. Students also have access to a desk, phone and each have a laptop provided.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS


Nguyen BT, Bonham MP, Truby H, Barber E, Brown J, Huggins CE. Effect of Macronutrient Composition on Appetite Hormone Responses in Adolescents with Obesity. Nutrients. 2019 Feb 5;11(2)


AVAILABLE PROJECTS

- **Associate Professor Maxine Bonham**
  - maxine.bonham@monash.edu
  - **Secondary theme(s):** Cardiovascular
  - **Protecting cardiovascular function through dietary manipulation of post-prandial metabolism**

- **Dr Catherine Huggins**
  - kate.huggins@monash.edu
  - **Secondary theme(s):** Cardiovascular
  - **Protecting cardiovascular function through dietary manipulation of post-prandial metabolism**

- **Dr Nicole Kellow**
  - nicole.kellow@monash.edu
  - **Secondary theme(s):** Endocrinology and Metabolism, Reproductive Health and Biology, Women’s Health
  - **Dark, sticky and treacherous: targeting dietary advanced glycation end-products (AGEs) in female infertility.**
  - **Menses, mood and the munchies: examining and modulating gut and brain function during menstruation**
  - **Should you be eating that? Generation and validation of a dietary advanced glycation end-product (AGE) food frequency questionnaire.**

- **Professor Helen Truby**
  - helen.truby@monash.edu
  - Using marketing and social media to positively the impact and adoption of health messages by young adults

- **Professor Gary Williamson**
  - gary.williamson1@monash.edu
  - - Reducing the risk of type 2 diabetes by diet through molecular targeting; cellular and biochemical studies
  - - Reducing the risk of type 2 diabetes using bioactive components of the diet: human intervention studies
PRECISION MEDICINE

Our working definition of Precision Medicine includes: creation of the evidence for, and its cost-effective application, to achieve better prevention, screening, diagnosis, treatment, monitoring and other issues related to health care that will lower the impact of disease based on an individual's lifestyle, behaviour, environment, clinical, genomic, epigenomic and other molecular measures. Precision Medicine, thus, aims to improve health outcomes and save money by targeting health interventions to those individuals who are most likely to benefit, underpinned by better understanding of individual diversity. This encompasses, but is not the same as, Genomic Medicine. Monash University's first Chair of Precision Medicine is Professor Melissa Southey, who is a highly cited author, who came to Monash to lead this discipline.

Cancer is currently one of the principal foci for Precision Medicine and exemplifies the opportunities and challenges for the discipline. Our team have been pivotal to the establishment of large epidemiological research resources that are now being utilized to address key questions in cancer research. Highly selected groups of men and women are participating in our studies to support the identification of heritable risk factors (genetic and epigenetic) and large population-based samples of men and women are enabling research to further characterize the prevalence and penetrance of risk factors to enable clinical translation of new information and inform healthcare policy.

With an initial focus on common cancers such as breast and prostate cancer we now aim to impact key stages across the disease and life course, including:
- defining the best molecular tests for placing each man and woman individually and accurately on the breast or prostate cancer risk spectrum throughout life.
- defining the best molecular tests for early detection, targeted therapies, prognostication and disease monitoring throughout the disease course.
- devise best practice guidelines and drive necessary policy change.
- develop a workforce trained in the environment anticipated for future clinical research that demands a knowledge base and connection from basic research through to clinical outcomes that integrates molecular data at all decision points across the life and disease course. Our work is therefore also providing the foundation for the emerging Precision Public Health era.

AVAILABLE PROJECTS

Associate Professor Ron Firestein
ron.firestein@hudson.org.au
Secondary theme(s): Cancer and Haematology, Genetic Diseases
- Development of new 3-dimensional models of cancer to model drug resistance and develop new cancer treatment
- Precision Medicine for Childhood Brain Cancer

Dr -Yaw Ho
gwo-yaw.ho@monash.edu
Secondary theme(s): Cancer and Haematology
- Establishing human xenograft model platform for “Live Cancer Biobanking”

Professor Graham Jenkin
graham.jenkin@monash.edu
Secondary theme(s): Cancer and Haematology, Infectious and Inflammatory Diseases and Immunology
- Genetically engineered human MSCs as supporting inducers of in vitro T-cell production

Dr Tu Nguyen-Dumont
tu.nguyen-dumont@monash.edu
Secondary theme(s): Cancer and Haematology, Genetic Diseases
- Assessing the impact of genetic variants on splicing of breast cancer susceptibility genes
- Identifying high-risk genes for lobular breast cancer
- Identifying high-risk genes for childhood cancers

Professor Melissa Southey
melissa.southey@monash.edu
- CHEK2 genetic variants and breast cancer predisposition – Time for clinical translation?
- Do missense variants in PALB2 predispose to breast cancer?
- Genomic susceptibility to invasive lobular breast cancer
- Heritable DNA methylation marks associated with prostate cancer risk.

Dr Anselm Wong
anselm.wong@monash.edu
Secondary theme(s): Emergency Medicine
- Novel biomarkers in the setting of the poisoned population
REPRODUCTIVE HEALTH AND BIOLOGY

Reproductive health is a key global challenge that affects every individual, as it both reflects and determines the health of present and future generations.

Recent breakthroughs in our discipline have provided unequivocal proof that an individual’s lifelong health is determined by events which occurred prior to their conception; their effects are transmitted by both mother and father via the placenta, oocyte and sperm.

Using basic and translational science, Reproductive Health and biology researchers are making discoveries about sperm and egg development, formation of the embryo and its implantation into the womb, formation of the placenta and its impact on fetal development. We study how each of these affects human development and health, and use animal and cell culture models to reveal the cellular, molecular and biochemical mechanisms involved.

With an increasing number of couples seeking the use of assisted reproductive technologies and the rapidly increasing world population, new approaches are needed in the field of fertility research. Advances in reproductive sciences translate to allied fields: cancer biology, animal food production, and conservation of endangered species. In addition, proteins involved in the regulation of reproduction have wider actions, influencing inflammation and tissue repair in a variety of organs. Due to our focus on clinical problems, we expect our studies to lead to new approaches from improved diagnosis, prevention or treatment of disease.

AVAILABLE PROJECTS

- Dr Minna-Liisa Anko
  minni.anko@hudson.org.au
  Secondary theme(s): Cancer and Haematology, Genetic Diseases
  - Discovering the role of miRNA processing in cancer
  - RNA biology of blood cell production - how platelets get their RNA
  - Tapping the power of pluripotency: The role of HMGA1 in stem cell self-renewal and cell fate transitions

- Dr Simon Chu
  simon.chu@hudson.org.au
  Secondary theme(s): Endocrinology and Metabolism
  - Role of XIAP in normal ovarian folliculogenesis

- Dr Tracey Edgell
  tracey.edgell@hudson.org.au
  - Endometrial proliferative phase as a determinant of embryo implantation
  - Impact of extracellular matrix turnover products on female fertility

- Associate Professor Mark Hedger
  mark.hedger@monash.edu
  - Discovering therapies to prevent inflammatory diseases of the male reproductive tract and infertility
  - Exploring the functional regulation of the male reproductive tract in health and disease
  - Uncovering the novel phenotype of macrophages in the testis

- Professor Katherine Loveland
  kate.loveland@monash.edu
  - Immune cell regulation of male fertility and testicular cancer progression

- Professor Guiying Nie
  guiying.nie@hudson.org.au
  Secondary theme(s): Cardiovascular, Fetal, Infant and Child Health, Reproductive Health and Biology, Women’s Health
  - Blood vessel endothelial aging and pregnancy disease preeclampsia
  - Molecular understanding of placental development and preeclampsia
  - Uterine surface remodelling for embryo implantation and IVF success

- Dr Peter Stanton
  peter.stanton@hudson.org.au
  Secondary theme(s): Reproductive Health and Biology
  - How does activin regulate adult testis function?
RHEUMATOLOGY

The Rheumatology Group includes senior clinicians and laboratory researchers with backgrounds in rheumatology, kidney disease, immunology, clinical trials, lupus and arthritis.

In the lab, we principally study the role of glucocorticoid-induced molecules in the human diseases rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE). Glucocorticoids have broad-spectrum effects on immune-inflammatory activation and are widely used in the treatment of inflammatory diseases, but their use is complicated by significant toxicity owing to non-anti-inflammatory effects. Work includes clinico-pathological correlations using human samples, animal models of disease including novel gene knockout mice, and in vitro work on signal transduction pathways. It is our hypothesis that a greater understanding of the actions of glucocorticoids will lead to the development of new therapeutic agents for the treatment of inflammatory disease.

In the clinic, Australian Lupus Registry is a collaboration between centres and institutes all over Australia to improve treatment and outcomes for people suffering from lupus. Its biobank, housed at Monash, is a multi-thousand sample asset in which we are using unbiased multi-omics approaches to better understand this disease.

We are also the headquarters of Asia Pacific Lupus Collaboration (APLC), an international collaboration involving researchers and expert clinicians from 11 countries to improve the quality of care for lupus patients in the Asia Pacific region. This is now the largest cohort of SLE patients being followed worldwide and provides a huge dataset for epidemiology and data science approaches; we are using machine learning approaches to develop new instruments for clinical measurement in SLE.

We have similar large scale clinical projects in diseases including rheumatoid arthritis, scleroderma, and fibromyalgia.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS

- EF, Lang T, Harris J. Analysis of serum Glucocorticoids have broad-spectrum effects on immune-inflammatory arthritis (RA) and systemic lupus erythematosus (SLE). In the lab, we principally study the role of glucocorticoid-induced molecules in the human diseases rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE). Glucocorticoids have broad-spectrum effects on immune-inflammatory activation and are widely used in the treatment of inflammatory diseases, but their use is complicated by significant toxicity owing to non-anti-inflammatory effects. Work includes clinico-pathological correlations using human samples, animal models of disease including novel gene knockout mice, and in vitro work on signal transduction pathways. It is our hypothesis that a greater understanding of the actions of glucocorticoids will lead to the development of new therapeutic agents for the treatment of inflammatory disease.


AVAILABLE PROJECTS

- Dr Sarah Jones
  sarah.a.jones@monash.edu
  Secondary theme(s): Immunology
  - Developing and conducting a screen for a new therapy for autoimmune disease
  - Regulation of cytotoxic T cells in the contexts of immunity and autoimmunity
  - The immunology of B cells in the contexts of immunity and autoimmunity
  - Transcriptional profiling in lupus B cells
  - Understanding how a key anti-inflammatory gene is controlled

- Dr Joshua Ooi
  joshua.ooi@monash.edu
  Secondary theme(s): Infectious and Inflammatory Diseases and Immunology, Precision Medicine
  - Genes and outcomes in SLE (lupus)
  - Serum cytokines in SLE (lupus)
  - Antigen-specific regulatory T cells to treat SLE
Adult sleep medicine projects span both clinical sleep medicine and the underlying pathophysiology of sleep disorders. The major focus of our research is on obstructive sleep apnoea (OSA). OSA is a highly prevalent condition which is associated with symptoms of excessive daytime sleepiness, as well as an increased risk of hypertension, cardiovascular disease, depression, and cognitive impairment.

The major risk factor is obesity. We have a range of research interests, including but not limited to: 1) understanding OSA physiology as a means of predicting treatment response and exploring new treatment approaches; and 2) the interaction between obesity and sleep. Our current research strategy is built around the idea that the pathogenesis of OSA is driven by the interaction of several physiological traits. These traits provide multiple targets for individual or combinations of interventions that could effectively treat this disorder on an individual-patient basis. We work closely with the Department of Physiology at the BASE (Better Active Sleep and Eat) facility, as well as the Department of Nutrition and Dietetics at BASE.

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS

ADULT SLEEP:


The major risk factor is obesity. We have a range of research interests, including but not limited to: 1) understanding OSA physiology as a means of predicting treatment response and exploring new treatment approaches; and 2) the interaction between obesity and sleep. Our current research strategy is built around the idea that the pathogenesis of OSA is driven by the interaction of several physiological traits. These traits provide multiple targets for individual or combinations of interventions that could effectively treat this disorder on an individual-patient basis. We work closely with the Department of Physiology at the BASE (Better Active Sleep and Eat) facility, as well as the Department of Nutrition and Dietetics at BASE.

STROKE

The Stroke and Ageing Research Group (STAR) adopts a trans-disciplinary approach towards research and clinical translation in the fields of cerebrovascular disease (acute stroke, imaging, small vessel disease, stroke prevention, health services research and public health) and brain ageing. Within STAR we have experts who head divisions in clinical trials, imaging and informatics; epidemiology and prevention; and translational public health including economic evaluation, implementation science and analysis of ‘big data’ i.e. (linked clinical registry and government datasets).

RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS

Student projects publications since 2016. These include impersive publications in journals such as Jama and Lancet Neurology.


SUPPORTIVE AND PALLIATIVE CARE

The Supportive and Palliative Care Unit has a strong focus on both clinical and health service translational research. Research addresses issues from complex pain, symptom management and end-of-life care, to “big data” analysis and telemedicine. A highly dynamic and broadly experienced team including palliative care physicians, PhD candidates and research assistants are currently focusing on the following areas of research:

AVAILABLE PROJECTS

Dr Michael Franco
michael.franco@monash.edu
- Electronic Implementation of a Validated Palliative Care Assessment Tool in an Electronic Medical Record

Adj Associate Professor Peter Poon
peter.poon@monash.edu
- An audit of the effects of ketamine in palliative care patients with refractory pain
- Chronic diseases and early palliative care support
- Delirium and utilization of non-pharmacological interventions in its management
- Determining the risk factors for presentation to the Emergency Department of patients with a diagnosis of advanced cancer
- Electronic Implementation of a Validated Palliative Care Assessment Tool in an Electronic Medical Record
- Improving utilization of specialist palliative care services in geriatric and rehabilitation units
- Subcutaneous lymphoedema drainage for refractory lymphoedema

Professor Dominique Cadilhac
dominque.cadilhac@monash.edu
Secondary theme(s): Neuroscience and Psychiatry, Emergency Medicine
- Movement-based mindfulness to reduce anxiety and depression after stroke: a new approach
- Pre-hospital stroke care: evaluation of the Melbourne Mobile Stroke Unit
- Recovery-focused Community support to Avoid readmissions and Improve Participation after Stroke (ReCAPS) - RCT

Dr Monique Kilkenny
monique.kilkenny@monash.edu
- Classification of coding of stroke in administrative data
- Evaluation of stroke indexes to predict poor outcomes
- Understanding adherence to pharmacological interventions

Associate Professor Henry Ma
henry.ma@monash.edu
- Bayesian approach to perinatal imaging
- Computer modelling of clot retrieval-effect of different occlusion patterns on flow in Circle of Wills
- Mapping infarct location in patients with visual field deficit
- Relationship between plaque and carotid artery anatomy and geometry
- Trajectory of neurological decline in patients with intracerebral hemorrhage
- Trajectory of recovery following clot retrieval-analysis of clot retrieval trials using simulation

Professor Thanh Phan
thanh.phan@monash.edu
Secondary theme(s): Cardiovascular, Neuroscience and Psychiatry, Women's Health, Emergency Medicine
- Bayesian approach to perinormal imaging
- Computer modelling of clot retrieval-effect of different occlusion patterns on flow in Circle of Wills
- Mapping infarct location in patients with visual field deficit
- Relationship between plaque and carotid artery anatomy and geometry
- Trajectory of neurological decline in patients with intracerebral hemorrhage
- Trajectory of recovery following clot retrieval-analysis of clot retrieval trials using simulation

Professor Amanda Thrift
amanda.thrift@monash.edu
Secondary theme(s): Cardiovascular
- Applying a systems lens to identify enablers and barriers to the GACD scale-up interventions
- Identifying factors associated with hypertension, and barriers to the control of hypertension in the setting of poverty, overcrowding and infection.
The Department of Surgery offers research projects centred in both the laboratory and clinical domains which will ultimately aim to improve our understanding and practice of surgery. Students with special interests are invited to discuss these with the Head of Department, Professor Julian Smith.

Current research interest and activities include: breast surgery, cardiothoracic surgery, colorectal surgery, dental and oral maxillofacial surgery, ear, nose, throat/head and neck surgery, intensive care, neurosurgery, surgical oncology, ophthalmology, orthopaedics, paediatrics, plastic surgery, respiratory and thoracic surgery, upper gastrointestinal and hepatobiliary surgery, urology, vascular and transplantation surgery. There have been strong recent collaborations through the Monash Institute of Medical Engineering with a focus on minimally invasive techniques robotic assisted surgery and surgical simulation.

**RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS**


**AVAILABLE PROJECTS**

**Cardiothoracic Surgery**
- A comparison of the outcomes of the surgical treatment of atrial fibrillation utilising radiofrequency, cryotherapy or high intensity focused ultrasound

**General Surgery (Upper Gastrointestinal, Hepatobiliary, Colorectal, Breast and Endocrine)**
- A review of the accuracy of EUS FNA in pancreatic tumours: comparing adenocarcinomas to neuroendocrine malignancy

**Neurosurgery**
- A collaborative study with engineering assessing sitting with novel technology and its effect on spinal health

**Orthopaedic Surgery**
- Comparison of Outcomes of Anatomical and Reverse Shoulder Replacements

**Otolaryngology**
- An exploratory safety study of 480 biomedical mometasone furoate sinus drug depot (MFSDD) in adult patients with chronic sinusitis

**Plastic Surgery**
- 3D Printing For Patient Education and Teaching
- A multicentre comparison of techniques in collagenase in the management of Dupuytren disease

**Urology**
- Effects of local anaesthesia with pudendal block for transperineal prostate biopsy
- Free hand transperineal (TP) prostate biopsy
RECENT PUBLICATIONS ARISING FROM STUDENT PROJECTS


**Additional projects**

**Cancer and Haematology**
Professor Brendan Jenkins
brendan.jenkins@hudson.org.au
*Secondary theme(s): Infectious and Inflammatory Diseases and Immunology, Precision Medicine*
- Identification of immune system regulators as therapeutic targets in lung cancer
- Identification of novel immune regulators in stomach (gastric) cancer
- Precision medicine for innate immune pattern recognition receptors in pancreatic cancer

**Cardiovascular**
Dr Sarah Zaman
Sarah.Zaman@monash.edu
*Secondary theme(s): Women's Health*
- Breast Arterial Calcification on Mammography and Correlation with Coronary Artery Atherosclerosis in Women

**Emergency Medicine**
Dr Gabriel Blecher
Gabriel.Blecher@monash.edu
*Secondary theme(s): Surgery*
- Patterns of investigation in patients presenting to the ED with abdominal pain

**Fetal, Infant and Child Health**
Dr Beth Allison
Gabriel.Blecher@monash.edu
*Secondary theme(s): Cardiovascular*
- Can we treat growth restricted fetuses in utero to improve cardiovascular function after birth?
- What is the impact of common and novel blood pressure therapies on brain injury in growth restricted newborns?

**Fetal, Infant and Child Health**
Dr Douglas Blank
doug.blank@hudson.org.au
*Secondary theme(s): Women’s Health*
- The Baby Directed Umbilical Cord Cutting Physiology Study: A Randomised Controlled Trial (Baby-DUCC)
Dr Alison Crichton
Ali.Crichton@monash.edu
➢ Application of everyday memory skills group to clinical practice in child brain injury

Genetic Diseases
Dr Patrick Western
patrick.western@hudson.org.au
Secondary theme(s): Fetal, Infant and Child Health, Reproductive Health and Biology
➢ Pharmaceutical impacts on germline epigenetics and offspring health and development

Infectious and Inflammatory Diseases and Immunology
Dr Christopher Lemoh
Christopher.Lemoh@monash.edu
Secondary theme(s): Nutrition, Dietetics and Food
➢ Study of Clinically Unrecognised Relevant Vitamin deficiencies in Inpatients (SCURVI)

Dr Ashley Mansell
ashley.mansell@hudson.org.au
➢ Innate Immune immunometabolism: the intersection between metabolism and immunology
➢ The inflammasome and hyperinflammation in emerging infectious diseases

Prof Thanh Phan
thanh.phan@monash.edu
➢ Googling hotspot of Hepatitis in Victoria

Dr Anthony Sadler
anthony.sadler@hudson.org.au
Secondary theme(s): Endocrinology and Metabolism, Genetics, Rheumatology, Women’s Health
➢ Control of inflammation in colitis
➢ Investigating antiviral responses that induce type I diabetes
➢ Targeting cytokine signalling in systemic lupus erythematosus

Neuroscience and Psychiatry
Dr Joanne Enticott
Joanne.Enticott@monash.edu
➢ Medication management with culturally and linguistically diverse (CALD) residents in Residential Aged Care Facilities - what could go wrong!

Professor Thanh Phan
mailto:Thanh.Phan@monash.edu
Secondary theme(s): Cardiovascular, Emergency Medicine
➢ Safety of Monash Health Minor Stroke Pathway (MS-Home)
Precision Medicine
Dr Ron Firestein
ron.firestein@husdon.org.au

Secondary theme(s): Cancer and Haematology, Genetic Diseases
➤ Development of new 3-dimensional models of cancer to model drug resistance and develop new cancer treatment

Reproductive Health and Biology
Dr Sarah Marshall
Sarah.Marshall@monash.edu

Secondary theme(s): Fetal, Infant and Child Health
➤ Assessing the Beneficial Affects of Cruciferous VegetableExtracts on the Vasculature

Sleep and Respiratory
Dr Belinda Thomas
Belinda.Thomas@monash.edu

Secondary theme(s): Infectious and Inflammatory Diseases and Immunology
➤ Characterisation of innate immune responses during exacerbation of asthma and COPD

Surgery
Dr Maurizio Pacilli
Maurizio.Pacilli@monash.edu

Secondary theme(s): Fetal, Infant and Child Health, Infectious and Inflammatory Diseases and Immunology, Nutrition, Dietetics and Food
➤ Newborn/infant parasympathetic evaluation (NIPE) as a predictor of pain response in children younger than 2 years undergoing surgery under general anaesthesia
➤ The use of probiotics in preventing post-operative antibiotic-associated diarrhea in children following appendicectomy

Dr Nora Mutalima
Nora.mutalima@monash.edu

Secondary theme(s): Bone and Muscle Health
➤ A prospective, multi-centre randomised comparative study of implant fit of the Stryker Accolade II® Hip Stem compared to the Corail Hip Stem
CONTACT US

School of Clinical Sciences at Monash Health
Reception
Level 5, Block E
Monash Medical Centre
246 Clayton Road
Clayton, 3168
t: +61 3 8572 2602
w: monash.edu/medicine/scs

Head of School
Professor Eric Morand

Executive Officer
Jin Leng Graham
t: +61 3 8572 2650

Hudson Institute of Medical Research
27-31 Wright St
Clayton, 3168
t: +61 3 8572 2700
e: info@hudson.org.au
w: hudson.org.au

Director and CEO
Professor Elizabeth Hartland

SCS Honours Coordinator
Dr Paul King
e: scs.reception@monash.edu

Hudson Institute Honours Coordinator
Professor Mark Hedger
e: mark.hedger@hudson.org.au

SCS BMedSc (Hons) Coordinator
Dr Tony White
Enquiries: BMedSc.Hons.SCS@monash.edu

Head, Postgraduate Research Studies
Professor Kate Loveland
Enquiries: scs.gradresearch@monash.edu

Postgraduate Enquiries
Postgraduate Research Programs Officer
Enquiries: scs.gradresearch@monash.edu
e: +61 3 8572 2787

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