2015 Postgraduate and Honours Research overview

School of Clinical Sciences at Monash Health
The new Translational Research Facility opening at MMC in 2015 will combine state of the art laboratories and clinical research facilities.

This booklet is intended as an overview of some of the broad areas of research conducted within our precinct.

For more detailed information about specific projects, contact a potential supervisor directly and/or go to the following links:


MIMR-PHI Institute http://mimr-phi.org/students/student-projects
Why do Honours at the School of Clinical Sciences at Monash Health?

1. **Ignite passion:** Honours is a research apprenticeship that will forever change the way you perceive the process of how medical knowledge is advanced. In some of you it will ignite the passion for a career in biomedical research.

2. **Work with the best:** Honours supervisors at SCS have international reputations for excellence in their field.

3. **Size is important:** A large number of research students have been successfully guided to completion, with a well-established infrastructure conducive to success.

4. **A clinical flavour:** Many of the Honours projects at SCS relate to clinical topics and are supervised by clinician-scientists. However there is also plenty of opportunity for important basic science projects, studying fundamental mechanisms of disease.

Next Steps

1. Make the decision to do an Honours year in 2015.

2. Make contact with a potential supervisor or the head of the unit you may be interested in.

3. Decide on a topic.

4. Applications are completed centrally through Monash University. Prospective applicants should complete an application form, which can be downloaded or obtained from the Faculty Office. Further information, entry requirements and to download application forms for: **BBiomedSc, BBiotech or Science Honours**.

Contact: Honours coordinator for SCS, Dr Paul King: paul.king@monash.edu
Overview

The School of Clinical Sciences (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 research strengths in cardiovascular disease, inflammatory diseases, nutrition, women’s and children’s health and neurosciences. 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.

A Message from the Head of School, Professor Eric Morand

The School of Clinical Sciences of the Faculty of Medicine, Nursing & Health Sciences comprises the Faculty’s academic departments based at Monash Health. It is the Faculty’s largest medical 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 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, Ritchie Centre for Baby Health Research (jointly with MIMR-PHI Institute), and the Monash Cardiovascular Research Centre. Many group leaders are recognised as international leaders in their areas of expertise.

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 Biomedical Science research students and BMedSci students in productive graduate (honours and doctoral) programs within the School. A growing number of gifted students have progressed from Honours or BMedSci through successful PhDs and postdocs to become successful, independent researchers and biomedical professionals in the School and beyond.

A HUB of activity

The Monash Health Translation Precinct (MHTP) consists of SCS, the MIMR-PHI Institute, and Monash Health, and provides exceptional collaboration opportunities. The precinct has world-class equipment and facilities similar to other Monash sites, but also offers student rooms, and a clinically grounded context. Monash Medical Centre has a gymnasium, on site ATM and bank, and cafe.
The Main Research Themes in which to complete an Honours project at the School of Clinical Sciences Precinct

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Medicine

The Monash University Department of Medicine at Monash Medical Centre is a centre for research and biomedical education and provides the essential interface between research and clinical medicine. Monash Medical Centre is a major tertiary referral hospital serving a population of over 1 million people. Activities of the Department include undergraduate education in Medicine and Biomedical Sciences, a well-established postgraduate program and major research programs.

Professor Peter Ebeling is Head of the Department of Medicine in the School of Clinical Sciences at Monash Health.

His research interests include musculoskeletal health and diseases; public health aspects of vitamin D; post-transplantation osteoporosis; osteoporosis in men; and biochemical bone turnover markers.

Surgery

The Department of Surgery (Monash Medical Centre) offers research projects centred around both the laboratory and clinical domains, which ultimately aim to improve our understanding and the practice of surgery. Students with special surgical interests are invited to discuss these with Professor Julian Smith.

Project areas include:

- Cardiothoracic Surgery
- Dental and oral maxillofacial surgery
- Intensive Care Unit
- Orthopaedic Surgery
- Plastic Surgery
Stroke and Ageing Research Group

The Stroke and Ageing Research Centre consists of internationally recognised experts in clinical medicine, brain imaging, epidemiology and public health. The group has four divisions, dealing with research into stroke, dementia and other neurological phenotypes of brain ageing. The projects available may involve existing large datasets, as well as novel topics. Significant emphasis is placed on learning new skills and working towards publishable work.

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Neurosciences

Professor Thyagarajan’s laboratory interest is in the molecular genetics of mitochondrial disease. He has established the only Adult Mitochondrial Disease Clinic in Victoria, to foster research into the genetics of mitochondrial disease. His clinical research area is Parkinson’s disease.

Professor Dominic Thyagarajan
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Centre for Inflammatory Diseases

The Centre for Inflammatory Diseases (CID) is a large organisational grouping of research areas at SCS, covering a variety of inflammatory diseases.

Mechanisms of immune injury in vasculitis and glomerulonephritis

The most severe and acute forms of kidney disease are rapidly progressive glomerulonephritis and acute kidney injury. Our research aims to define key events in leukocytes that control how these diseases develop. Understanding the fundamental elements of disease pathogenesis may lead to better treatments for these severe and difficult to treat conditions.

Lupus and Rheumatic Diseases: Molecular and Clinical Studies

Systemic lupus erythematosus (SLE, or lupus) is the archetypal serious multisystem autoimmune disease. Monash hosts Australia’s only multidisciplinary research-centred clinic for SLE, now Australia’s largest longitudinal disease status, outcome and biomarker study. The centre also includes a basic laboratory research group studying fundamental mechanisms of rheumatic diseases.

Control of leukocyte recruitment during inflammation

Leukocytes play critical roles in protective responses to infection and injury. However, these same cells are also major contributors to inappropriate, injurious responses in inflammatory diseases. Our laboratory studies the actions of leukocytes in models of inflammatory disease, using state of the art imaging systems to directly visualise leukocytes in vivo during their recruitment from the bloodstream, and following their entry into tissues.
Mechanisms of liver fibrosis
Liver fibrosis and cirrhosis is the common end stage to all liver diseases in humans. We study mechanisms of liver fibrosis and factors that determine its progression to cirrhosis.

**Prof. William Sievert**  
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Inflammation in Type 2 diabetes and its complications
Type 2 diabetes is a metabolic syndrome caused by the development of insulin resistance, which is normally a consequence of chronic obesity. Diabetes enhances the inflammatory response, causing additional tissue damage to a number of organs including the heart, kidney, eye and nervous system. We aim for a greater understanding of the inflammatory process during type 2 diabetes, and its complications.

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Atherosclerotic vascular disease: Role of the immune system
Our studies are directed towards a precise understanding of the role of the innate and adaptive immune system in the initiation and progression of atherosclerosis.

**Professor Ban Hock Toh**  
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Systemic Immunity & Stroke
Current work focuses on the mechanisms of immune suppression after stroke and the role of dietary fibre in the modulation of immunity following infection.

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Respiratory infection
The outcome in respiratory infection is primarily determined by the interaction between the bacterial pathogen and host immune response. We have a longstanding research interest in assessing the immune response to common bacteria. Our work has concentrated on clinical samples from patients and cell lines.

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Psychiatry

The Monash Health Psychiatry Group offers research projects based at the Monash Health Mental Health Program sites (Monash Medical Centre, Dandenong Hospital and Kingston Centre). A range of projects run each year within the four main research groups at Psychiatry:

- Aged Mental Health Research Unit
- Centre for Developmental Psychiatry and Psychology (CDPP)
- Consultation Liaison Psychiatry
- Southern Synergy

Research interests of the group are wide-ranging both in the areas of clinical research in mental health and mental health services research. Project topics include Mindfulness, Suicide Risk Assessment, Suicide Prevention, Family psychosocial wellbeing, Nursing home resident mental health and Child, Adolescent and Family mental health, and Epidemiology of mental disorders.

For more information please visit:
www.med.monash.edu.au/assets/docs/scs/psychiatry/student-projects.docx
Gain broad research and clinical skills, cradle to tomb

The Monash Health Emergency Medicine Research Group offers clinical BMedSci (Hons) projects based at all of the Monash Health Emergency Departments. Research interests of the group are wide-ranging both in the areas of clinical research in emergency medicine, and toxicology as well as applied basic-science research in various aspects of clinical toxicology. The projects encompass the diverse range of clinical problems that confront emergency medicine.

Our clinical research focuses on pragmatic patient centred research that is aimed at driving innovation and change. A recent student project was headlined on Medscape Time to Rethink ED IV Insertion Standing Protocols? Our students have regular clinical shifts in the adult and paediatric Emergency Department (ED) with senior medical staff that ensures their clinical skills accelerate during their research year. Students have an opportunity to run multicentre trial across our three ED and access to about a third of the ED patients in Melbourne. Monash Emergency research offers a rare opportunity for adult and paediatric projects or combined across all ages. We are open to new ideas that students have about novel projects.

Paediatric Emergency Medicine

Over 50,000 children are seen across the three Monash Health emergency departments each year. Our paediatric emergency medicine group has wide interest in all aspects of the emergency care of children, including critical care and resuscitation, common illnesses and clinical procedures, diagnostic testing, pain management, and clinical decision rules. We have strong links with all Monash Children’s inpatient units, as well as the Royal Children’s Hospital ED, and other paediatric EDs across Australia and New Zealand.
Monash Cardiovascular Research Centre (MCRC) researches a wide variety of cardiac disease and is located at Monash Medical Centre. The Centre has an international reputation for excellence and achievement in basic and translational research, supporting the uptake of state-of-the-art cardiovascular treatments into clinical service. Research projects are available in several areas, including echocardiography, CT coronary imaging and the genetic disease, familial hypercholesterolaemia.

For more information please visit: www.monashheart.org.au/page/Research_and_Education/LabClinical_Research/

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Dr Tony White
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Nutrition, Dietetics and Sleep

The Be Active Eat and Sleep (BASE) facility is a leading research facility in the Faculty of Medicine. (www.med.monash.edu.au/base) It provides facilities for a multidisciplinary group of academics who conduct research across a wide range of areas that will educate the community with emphasis on the prevention of disease and maintenance of optimum health. With state of the art research equipment and facilities and highly qualified and experienced investigators, BASE is applying the integration of nutrition, sleep and exercise physiology research to address the needs of individuals, corporations, health professionals and the community at large.

Project areas include:

- Clinical dietetics including paediatrics
- Community and population nutrition
- Sport and exercise nutrition
- Sleep, nutrition and metabolism

Monash Children’s Hospital / Paediatrics

Monash Children’s is the third largest children’s hospital in Australia, with the new Monash Children’s build commenced in July 2014. Research at MCH occurs across multiple groups in different child health disciplines, often in collaboration with the Ritchie Centre/MIMR-PHI Institute as well as the Murdoch Children’s Research Institute. International projects are also available including developed and developing settings.

Clinical, laboratory, epidemiological and child health informatics projects are available in 2015 across many child health specialties including:

- Children’s cancer
- Paediatric surgery
- Neonatology
- Neurology
- Emergency medicine
- Respiratory and sleep medicine
- Genetics
- Infectious diseases and vaccinology.

Contact:
MCH Research Director,
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Obstetrics and Gynaecology / The Ritchie Centre

The Ritchie Centre is a research centre within MIMR-PHI Institute and is affiliated with the Monash University School of Clinical Sciences through the Department of Obstetrics and Gynaecology, and the Department of Paediatrics. 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 four Research Themes in The Ritchie Centre:

- Women’s Health
- Fetal and Neonatal Health
- Infant and Child Health
- Cell Therapy and Regenerative Medicine

Recent successful projects at The Ritchie Centre

**Alannah Kavanagh**  
*Exploring a physiological definition of bronchopulmonary dysplasia.*  
Alannah worked with Dr Kenneth Tan to quantify shunt and reduced VA:Q in infants with BPD still requiring positive pressure respiratory support.

**Chun Wang Jason Lao**  
*Shedding light on Preterm Neonatal Immunity.*  
Jason worked with Drs Claudia & Marcel Nold to study the immune system of preterm babies and its relevance to bronchopulmonary dysplasia.

**Grace Davies**  
*The impact of dopamine on preterm brain injury.*  
Grace worked with Dr Flora Wong and found a trend that dopamine may reduce inflammation, apoptosis and oligodendrocyte proliferation in the preterm brain exposed to severe hypoxia.
MIMR-PHI Institute

MIMR-PHI Institute officially launched in January 2014, with the joining of two of the most trusted names in medical research, Prince Henry’s Institute (PHI) and the Monash Institute of Medical Research (MIMR).

With a combined 75 years of research experience, more than 400 leading research experts and postgraduate students and state-of-the-art research platforms and facilities, the Institute has taken its place as a leader in improving global wellbeing through excellence in medical research and clinical application.

As one of Melbourne’s top medical research institutes and the research hub of the Monash Health Translation Precinct (MHTP), MIMR-PHI scientists and clinicians are at the forefront of discovery and translational research. Our partnerships with Monash Health and Monash University have uniquely positioned the Institute to directly translate our discoveries into patient treatments and to research those issues identified in the clinic.

An $84 million state-of-the-art Translational Research Facility (TRF) is currently under construction at this site, due for completion in 2015. The TRF will co-locate research, clinical and technological platforms to facilitate the collaboration of our researchers and clinical partners to accelerate and coordinate the translation of scientific breakthroughs.

Under the guidance of CEO and Director, Professor Bryan Williams, and Board Chair, Dr Robert Edgar and the MIMR-PHI Board, the Institute drives the innovative, cutting-edge research programs long associated with MIMR and PHI.

The Institute’s specialist Research Centres tackle key health priorities in the following areas:

- Cancer
- Genetic Disease
- Immunity, Inflammation and Infectious Diseases
- Reproductive Health
- Fetal, Neonatal and Children’s Health
- Endocrinology and Metabolism

MIMR-PHI Institute is also a Department in the School of Clinical Sciences at Monash Health, further strengthening the partnership and opportunities for collaboration.

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Contact us

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Don’t miss your opportunity to kick start your research career alongside nationally and internationally recognised professionals in a variety of areas.