



# Honours in Applied Medical Science at Westmead 2019

**Sydney. Science. Westmead.**



THE UNIVERSITY OF  
**SYDNEY**



# Why Study at Westmead

## Western Sydney is booming

With 100 000 people moving to the area every year, western Sydney is one of the fastest growing places in Australia. At the geographical heart of Sydney, Westmead is fast becoming a major centre of activity. Over \$5 billion of investment and development is expected to take place in Westmead by 2030, with an emphasis on large-scale expansion and transformation of the existing hospitals and medical research institutes located there.

The Westmead Precinct is a world-class centre of health research, education and services, employing over 1000 full-time scientists. The scale and diversity of activity at Westmead is unparalleled, including six major research institutes and centres co-located with six hospitals delivering healthcare to millions of patients every year.

## Exciting translational research

The Honours in Applied Medical Science program at Westmead has over 150 projects on offer in 2019 across the precinct, so there is bound to be a project that covers your interests. Projects are very broad in scope including basic research, public health, social sciences and allied health. Major specialities include cancer, infectious diseases, immunology, physiology, obesity and diabetes, neuroscience and dentistry. Westmead scientists and researchers are leaders in their fields working in close collaboration with clinicians, giving unparalleled opportunities for 'bench to bedside' translational research which provide students with unique opportunities to get involved in research that has a meaningful impact on the health of our community.



# Institutes and Research Partners

**The Children's Medical Research Institute (CMRI)** has been pioneering microsurgery, immunisations against lethal childhood illnesses, and care for premature babies, improving the lives of countless Australian children for 50 years. Today, the CMRI is the site of world-leading research in areas such as cancer, neurobiology, embryology and gene therapy.

**CMRI Honours Coordinator:**  
**Mark Graham;**  
**[mark.graham@sydney.edu.au](mailto:mark.graham@sydney.edu.au)**



**The Institute for Clinical Pathology and Medical Research - NSW Health Pathology (ICPMR)** is the largest research-active pathology service in the country and the leading national reference lab for infectious diseases, medical entomology and parasitology. In 2014–15, it contributed to initiatives that were awarded more than \$47 million in competitive external grants, and co-authored nearly 400 publications. The ICPMR's broad range of activities interfaces with all facets of research undertaken at Westmead, including facilitation of clinical trials, biobanking, electron microscopy, pathogen genomics and flow cytometry.

**ICPMR Honours Coordinator:**  
**David Brown; [D.Brown@amr.org.au](mailto:D.Brown@amr.org.au)**

# Institutes and Research Partners

**The Institute of Dental Research (IDR)** at the Westmead Centre for Oral Health is the oldest named dental institute in the world. Research at the Faculty of Dentistry and IDR embraces innovative research through broad themes of chronic diseases combined with a deeper understanding of the impact of oral health on the whole body. The IDR's research strengths include microbial pathogenicity, bioengineering and mucosal pathologies.

**IDR Honours coordinator:**

**Naisana Seyedasli; [naisana.seyedasli@sydney.edu.au](mailto:naisana.seyedasli@sydney.edu.au)**

**Kids Research (KR)** has 300 researchers working with **The Children's Hospital at Westmead (CHW)**, the biggest children's hospital in NSW and part of **The Sydney Children's Hospital Network (SCHN)**. KR's research improves the lives of children with debilitating illnesses through discovery and translational research in cancer, bone diseases, genetic conditions, diabetes, obesity, infectious diseases, brain and muscle disorders, rare genetic and immunological diseases, sleep disorders, and kidney and liver disease.

**KR/SCHN Honours Coordinators:**

**Fran Evesson; [frances.evesson@sydney.edu.au](mailto:frances.evesson@sydney.edu.au)**



# Institutes and Research Partners

## **The Westmead Institute for Medical Research**

is one of the largest medical research facilities in Australia. It is home to more than 300 scientists and students who are using the essential tools of molecular and cell biology, plus new techniques in gene discovery, genetic epidemiology, human and cell imaging technology, cell and gene therapy and clinical research. The institute undertakes diverse research spanning the laboratory to the patient, which has led to new medical treatment and prevention programs nationally, and changed health practice internationally.

### **Honours coordinators:**

**Monica Miranda-Saksensa** [monica.miranda@sydney.edu.au](mailto:monica.miranda@sydney.edu.au)

**Lian Qiao** [liang.qiao@sydney.edu.au](mailto:liang.qiao@sydney.edu.au)



**Westmead Hospital** is a major teaching hospital of the University of Sydney for allied health, dental, medical and nursing students, and is one of Australia's largest centres for postgraduate training at specialist level in all health fields. Westmead Hospital conducts biomedical, clinical and public health research in hospital-based centres and departments. As such, their research covers a broad spectrum including, but not limited to, laboratory, drug and device trials, and epidemiological studies.

### **Honours Coordinator:**

**Heather Medbury** [heather.medbury@sydney.edu.au](mailto:heather.medbury@sydney.edu.au)



## More than just research

### Peer Mentoring Scheme

The Westmead Honours program has implemented a peer mentoring scheme which pairs each Honours student with a PhD student or early post doctoral researcher from another lab. This gives each student an opportunity to talk to someone who has recently gone through the experience of Honours about their own experience and any challenges they might be having.

### Honours Social Nights

Once a month the Honours Social Committee (HSoC), made up of honours students and mentors, hold an event to allow students to step out of the lab and have some fun. Previous events have included a welcome BBQ, Trivia nights, pizza dinners, board game nights and thesis submission celebrations. This has helped build a sense of community among the honours students working at Westmead, allowing students from across all the institutes to come together and get to know each other away from their studies.

# Projects

## Allied Health

Vicki Flood

**A systematic review of diet and nutrition interventions among people with Motor Neuron Disease**

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**Application of Mediterranean Diet among culturally diverse population groups of Western Sydney**

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Email:  
vicki.flood@sydney.edu.au

Phone:  
0412 118 977

Institute:  
Adult hospital

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## Bioinformatics/Data science

Ellis Patrick

**Omic-pathology – exploring the cellular composition of diseased tissue through ‘Omics technology**

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**One in a million – characterising a single cell’s impact on disease with state-of-the-art high throughput biomedical technologies**

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**High parameter imaging and novel high throughput analytics to study HIV kinetics**

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Email:  
ellis.patrick@sydney.edu.au

Phone:

Institute:  
WIMR

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Erdahl Teber

**Differential molecular characterisation of human organoids and tissues**

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**Understanding immunotherapy responses based on multi-omic cancer signatures**

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**Bioinformatics methods to understand cell fate decisions and developmental trajectories during embryogenesis**

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Email:  
eteber@cmri.org.au

Phone:  
0427 269 217

Institute:  
CMRI

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John-Sebastian Eden

**Exploring the HIV-1 reservoir using bioinformatics and genomics**

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**Bioinformatic methods in clinical meta-transcriptomics**

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**Revealing transmission networks using pathogen genomics**

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**Evolution and molecular epidemiology of RSV and other “non-flu” respiratory viruses in Australia**

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Email:  
js.eden@sydney.edu.au

Phone:

Institute:  
WIMR

---

Sandra Cooper

**Refining algorithms for analysis and interpretation of splicing variants in genetic disorders**

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**Contemporise the Neuromuscular genetic variant database**

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Email:  
sandra.cooper@sydney.edu.au

Phone:  
9845 1456

Institute:  
SCHN (KR)

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## Biomechanics

Babak Sarrafpour

**Biomechanical and cellular aspects of tooth development in the maxilla**

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**Mechanobiological role of endosteum and periosteum in bone modelling**

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Email:  
babak.sarrafpour@sydney.edu.au

Phone:  
8890 7401

Institute:  
IDR

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# Cancer

Anna deFazio

## **Predictors of endocrine treatment response in low-grade serous ovarian cancer**

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Email:  
anna.defazio@sydney.edu.au

Phone:  
8627 3740

Institute:  
WIMR

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Ashni Kumar

## **Development of a Computer Aided Diagnosis (CAD) technique for early detection of melanoma**

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Email:  
pablo.fernandezpenas@sydney.edu.au

Phone:  
8890 5686

Institute:  
Adult hospital

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Dinny Graham

## **Influence of chromatin architecture on transcriptional function of hormone receptors**

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Email:  
dinny.graham@sydney.edu.au

Phone:  
9845 6954

Institute:  
WIMR

---

Geraldine O'Neill

## **Space Invaders: How Cancer cells negotiate tissue barriers**

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Email:  
geraldine.oneill@health.nsw.gov.au

Phone:  
9845 1206

Institute:  
SCHN (KR)

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Hilda Pickett

**Investigating the role of a novel RNA binding protein in telomerase activity**

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**Using telomere length analysis to understand human disease**

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**Understanding protein dephosphorylation in the DNA damage response**

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Email:  
hpickett@cmri.org.au

Phone:  
9687 2800

Institute:  
CMRI

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**Nutrient regulation of the stem cell in cancer**

Jacob George

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Email:  
saeed.esmaili@sydney.edu.au

Phone:  
8627 3159

Institute:  
WIMR

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Jennifer Byrne

**A weighty problem- targeting the lipid droplets in cancer cell lines**

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**Identifying targets to improve therapy of high-risk and relapsed paediatric cancer patients**

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Email:  
jennifer.byrne@sydney.edu.au

Phone:  
9845 3027

Institute:  
SCHN (KR)

---

**Interactions between sleep and cancer**

Kristina Kairaitis

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Email:  
kristina.kairaitis@sydney.edu.au

Phone:  
9845 6797

Institute:  
WIMR

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Liang Qiao

**Single-cell RNA-Seq for characterization of the subset of HCC cells with Innate or acquired resistance to chemotherapy**

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**Searching for potential therapeutic targets for liver cancer**

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**Anticancer drug screening for liver cancer using liver organoids**

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**Mechanisms of Strigolactones on liver cancer: *in vitro* studies**

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Email:  
liang.qiao@sydney.edu.au

Phone:  
8628 3534

Institute:  
WIMR

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Naisana Seyedasli

**Cracking the molecular machinery of therapy resistance in human epithelial carcinoma**

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**Epithelial plasticity in human epithelial carcinoma; roles in cancer relapse and drug resistance**

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Email:  
naisana.seyedasli@sydney.edu.au

Phone:  
8890 4818

Institute:  
IDR

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Pablo Fernandez Penas

**Proteomic analysis of Stratum Corneum in cutaneous Squamous Cell Carcinoma (SCC)**

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**Proteomic analysis of Cutaneous T cell lymphomas (CTCL) using Scarless biopsy**

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**CTCL proteomics in Formalin Fixed Paraffin Embedded (FFPE) tissue**

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**Comparison, validation and characterisation of primary human cutaneous squamous cell carcinoma cells (cSCC) isolated and cultured using different techniques**

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Email:  
pablo.fernandezpenas@sydney.edu.au

Phone:  
8890 5686

Institute:  
Adult hospital

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Ping Ye

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**Nanoparticle enhanced drug delivery and release of oral cancer**

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Email:	Phone:	Institute:
p.ye@sydney.edu.au	0416 170 609	IDR/WIMR

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Roger Reddel

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**Killing cancer cells with cytolytic viruses**

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**Alternative lengthening of telomeres activity in normal cells**

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**Proteomics of normal and malignant blood cells**

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Email:	Phone:	Institute:
rredel@cmri.org.au	8865 2901	CMRI

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Scott Cohen

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**Identification and development of telomerase inhibitors as potential cancer therapeutics**

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Email:	Phone:	Institute:
scohen@cmri.org.au	9687 2800	CMRI

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Tony Cesare

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**The telomere deprotection and cancer**

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**The DNA replication stress response**

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Email:	Phone:	Institute:
tony.cesare@sydney.edu.au	8865 2912	CMRI

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Tracy Bryan

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**Telomerase: the RNA-protein enzyme that drives cancer mortality**

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Email:	Phone:	Institute:
tracy.bryan@sydney.edu.au	9687 2800	CMRI

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# Clinical

Chameen Samarawickrama

## Empirical antibiotics for microbial keratitis

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### Corneal collagen glue: inducing corneal regeneration in the treatment of acute corneal perforations

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Email:  
chameen.sams@sydney.edu.au

Phone:  
0468 383 801

Institute:  
Adult Hospital

---

Dana Robaei

## Impatient vs. outpatient management of microbial keratitis: A comparison of outcomes, complications and cost

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Email:  
dana.robaei@sydney.edu.au

Phone:  
0422 128 763

Institute:  
Adult Hospital

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Indika Alahakoon

## Use of glyceryl trinitrate in the modulation of inflammatory milieu in preeclampsia (PE) and intrauterine fetal growth restriction (IUGR)

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### Circulating and placental angiogenic factors in congenital heart disease

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Email:  
indika.alahakoon@health.nsw.gov.au

Phone:  
8890 4851

Institute:  
Adult Hospital

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Joerg Eberhard

## Gamma-delta cells: A key cell population regulating inflammation

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### Depression and inflammation, linked by oxidative stress

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Email:  
joerg.eberhard@sydney.edu.au

Phone:  
0437 487 452

Institute:  
IDR

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Karen Waters

**Does adding CO<sub>2</sub> monitoring improve the sensitivity of screening for obstructive sleep apnoea (OSA) in children?**

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**Infant sleep studies. “What, if any of the original sleep study or clinical parameters can help predict the length time that the infant will need to use CPAP at home?”**

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Email:  
karen.waters@sydney.edu.au

Phone:  
9845 3437

Institute:  
SCHN (CHW)

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Marjan Khajehei

**Measuring transcutaneous bilirubin: a comparative analysis of the correlation between three devices and serum bilirubin measurements**

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**Prevalence of antenatal anxiety and its association with postnatal length of stay and maternal-neonatal outcomes**

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Email:  
Marjan.Khajehei@health.nsw.gov.au

Phone:  
0437 793 398

Institute:  
Adult hospital

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Wayne Hawthorne

**Assessment of and improvement to Clinical Islet Cell Isolation Outcomes for Transplantation**

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Email:  
wayne.hawthorne@sydney.edu.au

Phone:  
9846 7365

Institute:  
WIMR

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## **Genetics/Genomics/Development**

Christina Adler

**The oral microbiome beyond bacteria – what role do fungi play in establishing good oral health in childhood?**

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**Determining how genetic and environmental factors influence the developing oral microbiota and drive disease in early childhood**

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Email:  
christina.adler@sydney.edu.au

Phone:  
8890 4818

Institute:  
IDR/WIMR

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Grant Logan

**Development of immunotherapies through virus vector gene delivery**

Email:  
glogan@cmri.org.au

Phone:  
8865 2800

Institute:  
CMRI

Gopala Rangan

**Therapeutic role ATR-DNA Damage signalling in autosomal dominant polycystic kidney disease**

**Biomarkers in the progression of autosomal dominant polycystic kidney disease**

Email:  
g.rangan@sydney.edu.au

Phone:  
9845 6962

Institute:  
WIMR

Ian Alexander

**Gene therapy for genetic and acquired diseases of the liver and haematopoietic system**

**Discovery of ancient and contemporary adeno-associated viruses in Australian marsupials**

Email:  
iana@chw.edu.au

Phone:  
9845 3071

Institute:  
CMRI

Leigh Waddell

**Genomic medicine and the hunt for new disease genes in nerve and muscle disorders**

Email:  
leigh.waddell@health.nsw.gov.au

Phone:  
9845 1456

Institute:  
SCHN (CHW)

Munira Xaymardan

**Role of transcription factor Nkx2-5 in orofacial muscle development**

**Differentiation of orofacial myocytes from human pluripotent stem cells (hPSCs) by modulation of Notch and Wnt signalling pathway**

Email:  
munira.xaymardan@sydney.edu.au

Phone:  
8890 4816

Institute:  
IDR

Patrick Tam

**Lineage-restricted progenitors for disease modelling, lineage analysis and cellular therapy**

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**Head Development: Intersection of transcriptional and signalling activities**

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Email:  
patrick.tam@sydney.edu.au

Phone:  
8865 2911

Institute:  
CMRI

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Phillip O'Connell

**Investigating the Role of Intronic SNP of SHROOM3 in Kidney Inflammation and Injury after Renal Ischemia-reperfusion Injury**

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Email:  
philip.oconnell@sydney.edu.au

Phone:  
8627 3501

Institute:  
WIMR

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Pierre Osteil

**Deciphering mechanisms leading to self organising differentiation of human pluripotent stem cells**

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Email:  
posteil@cmri.org.au

Phone:  
8866 2911

Institute:  
CMRI

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Robyn Jamieson

**Pathways to therapies in blinding genetic retinal eye diseases**

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Email:  
rjamieson@cmri.org.au

Phone:  
9845 3273

Institute:  
CMRI

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Samantha Ginn

**Developing CRISPR/Cas9-based gene therapy reagents for paediatric metabolic liver diseases**

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Email:  
sginn@cmri.org.au

Phone:  
8865 2800

Institute:  
CMR

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# Health Services

Kate Steinbeck

**A health service website review of adolescent involvement in the planning and provision of age specific health care services**

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**A systematic review of international child and adolescent health research advisory groups with an emphasis on their creations and the factors that influence sustainability**

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Email:  
kate.steinbeck@health.nsw.gov.au

Phone:  
9845 2507

Institute:  
SCHN (CHW)

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# Infectious Disease/Immunology

Andrew Harman

**Defining the HIV target cells in inflamed human mucosal tissue and their role in sexual transmission**

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**Investigating the Dynamics of Sexual Transmission of HIV Using Human Anogenital Tissues**

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Email:  
andrew.harman@sydney.edu.au

Phone:  
8627 2623

Institute:  
WIMR

---

Carola Venturini

**Effects of antibiotics on the ecology of enterobacteria and horizontal gene transfer in the Enterobacteriaceae**

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Email:  
carola.venturini@sydney.edu.au

Phone:  
8627 3415

Institute:  
WIMR

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David Booth

**Does CpG island methylation affect Vitamin D Receptor regulation of gene expression?**

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**Is EBV miRNA in immune cells dysregulated in MS?**

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Email:  
david.booth@sydney.edu.au

Phone:  
8627 3602

Institute:  
WIMR

---

Golo Ahlenstiel

**The Role of Lambda Interferons in Immune Cell Migration to Sites of Inflammation**

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**Generation of human colonoids to examine gut immune responses**

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Email:  
golo.ahlenstiel@sydney.edu.au

Phone:  
9845 7986

Institute:  
WIMR

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Heather Medbury

**Monocyte reprogramming with increased cardiovascular disease risk**

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Email:  
heather.medbury@sydney.edu.au

Phone:  
8890 3668

Institute:  
Adult Hospital

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Helen Williams

**Does familial hypercholesterolemia promote M1 macrophage formation?**

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**Monocyte inflammatory profile in people with Peripheral arterial disease and diabetic foot ulcers**

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Email:  
helen.williams@sydney.edu.au

Phone:  
8890 5775

Institute:  
Adult Hospital

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Jinlong Gao

**Comparative and binding analysis of the bacterial HusA Haemophore homologs to explore the function evolution of peridontal pathogen Porphyromonas gingivalis**

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**Exploring the antibacterial potential of oxolate nanocrystal in dentistry**

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Email:  
jinlong.gao@sydney.edu.au

Phone:  
9847 8766

Institute:  
IDR

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Julianne Djordjevic

**Understanding the role of Arg1 in invasive fungal disease and Arg1 potential as a new antifungal**

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Email:  
julianne.djordjevic@sydney.edu.au

Phone:  
8627 3420

Institute:  
WIMR

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**Kerrie Sandgren**

**How does the promising vaccine adjuvant AS01 work in humans**

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**Exploiting skin dendritic cells in vaccination**

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Email:  
kerrie.sandgren@sydney.edu.au

Phone:  
8627 3633

Institute:  
WIMR

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**Ky-Anh Nguyen**

**Mutagenesis study of LptO – an essential component of type IX secretion sydtem in Porphyromonas gingivalis**

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Email:  
ky-anh.nguyen@sydney.edu.au

Phone:

Institute:  
IDR

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**Min Hu**

**Role of IL-7 and IL-7/anti-IL-7 Antibody Complexes in Treg Expansion in Vitro and in Vivo a Murine Skin Transplant Model**

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**Tracking Foxp3 Tregs by Foxp3 GFP Report Gene in Vivo in a Transplant Tolerant Model**

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Email:  
min.hu@sydney.edu.au

Phone:  
8627 3509

Institute:  
WIMR

---

**Monica Miranda-Saksena**

**Role of the cytoskeleton in the exit of herpes simplex virus from sensory nerves**

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Email:  
monica.saksena@sydney.edu.au

Phone:  
8627 3624

Institute:  
WIMR

---

**Muhammad Kamruzzaman**

**Plasmid interference and curing antibiotic resistance from Enterobacteriaceae**

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Email:  
muhammad.kamruzzaman@sydney.edu.au

Phone:  
8627 3417

Institute:  
WIMR

---

Najla Nasr

**Characterising 'Bona-fide' plasmacytoid dendritic cell responses in initial HIV infection**

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Email:  
najla.nasr@sydney.edu.au

Phone:  
8628 3622

Institute:  
WIMR

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Nicholas Manolios

**Cloning of receptors specific for joints**

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**Designing and testing skin patches for drug delivery**

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**Marijuana oils for the treatment of arthritis**

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**Testing different sympathetic/parasympathetic drugs and their effect on immune function**

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**Niacin dietary effects on arthritis**

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**Niacin dietary effects on the onset of diabetes in diabetic mice**

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Email:  
nicholas.manolios@sydney.edu.au

Phone:  
9847 6305

Institute:  
Adult Hospital

---

Nicole Carnt

**Understanding the immune response to eye infections: The hope for limiting sight threatening tissue damage**

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Email:  
nicole.carnt@sydney.edu.au

Phone:  
0403 976 245

Institute:  
WIMR

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Peter Hsu

**Investigating regulatory T and B cells in children with atopic disorders**

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**Exploring the immune regulatory mechanisms in oral peanut immunotherapy for the treatment of peanut allergy**

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**Exploring the mechanism of immune dysregulation in primary immune deficiencies**

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Email:  
peter.hsu@sydney.edu.au

Phone:  
9845 3420

Institute:  
SCHN (KR)

---

Philip O'Connell

**The role of memory Foxp3-GFP report gene in vivo in a transplant mouse model**

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Email:  
philip.oconnell@sydney.edu.au

Phone:  
8627 3501

Institute:  
WIMR

---

Ping Ye

**Expression of human serum amyloid A protein in inflamed gingival epithelium**

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**Activation of inflammasome by oral Campylobacter concisus in a cultured epithelial cell model**

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Email:  
p.ye@sydney.edu.au

Phone:  
0416 170 609

Institute:  
IDR

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Robert Booy

**Influenza Vaccination: Fever, antipyretics and immunogenicity**

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**Human Papilloma Virus (HPV) vaccine: long term protection**

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**Meningococcal disease: evolving epidemiology and provoking microbe elimination**

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**Surviving meningococcal disease: long term physical, psychological and economic implications**

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Email:  
robert.booy@health.nsw.gov.au

Phone:  
0423 800 128

Institute:  
WIMR

---

Ruby Lin

**Investigating the roles of microRNA dysregulation in sepsis**

---

Email:  
ruby.lin@sydney.edu.au

Phone:  
8627 3414

Institute:  
IDR

---

Sarah Palmer

**Delineating the role of turnover rates and T cell activation in maintaining the latent HIV reservoir during effective antiretroviral therapy**

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Email:  
sarah.palmer@sydney.edu.au

Phone:  
8627 3620

Institute:  
WIMR

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Vitali Sintchenko

**Corynebacterium diphtheriae: deciphering molecular mechanisms of virulence and antibiotic resistance**

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**Deciphering transmission networks of genital Chlamydia using genomics**

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Email:  
vitali.sintchenko@sydney.edu.au

Phone:  
9845 6255

Institute:  
ICPMR

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Wieland Meyer

**Finding the link between the environment and the patient - environmental sampling and phylogenetic studies with the artificial genus *Candida***

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**Correlation between Genotype and Virulence of a New Super Killer; *Cryptococcus neoformans* and *Cryptococcus gattii***

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**MLST applied to *Pneumocystis jirovecii* strain typing**

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**Next generation sequencing applied to DNA barcoding of human pathogenic fungi**

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**Molecular epidemiology of chlamydiosis in koalas in Gunnedah, New South Wales**

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**Fungal Microbiome of beach sands - a clinical connection?**

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Email:  
wieland.meyer@sydney.edu.au

Phone:  
8627 3430

Institute:  
WIMR

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# Neurosciences

Fabienne Brilot-Turville

**Detecting MOG-specific B cells in children with brain myelin diseases**

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**Maternal cell surface autoantibodies and association with neurodevelopmental and neuropsychiatric disease in offspring**

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**Understanding the role of T cells in autoantibody-associated movement and psychiatric disorders**

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Email:  
fabienne.brilot@sydney.edu.au

Phone:  
9845 1456

Institute:  
SCHN (KR)

---

Fran Evesson

**PYROXD1; a novel cause of an inherited muscle disorder, and essential for life. But what does it do?**

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Email:  
frances.evesson@sydney.edu.au

Phone:  
9845 1444

Institute:  
SCHN (KR)

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Mark Graham

**Big omics data analysis of neurological diseases to determine new drug targets**

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**How to stop and epileptic seizure – looking for the right molecules to target**

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**How do molecules make memories? Understanding learning and memory at the level of protein interaction and signalling**

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**Big omics data analysis of neurotransmission to determine emergent properties**

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Email:  
mark.graham@sydney.edu.au

Phone:  
8865 2989

Institute:  
CMRI

---

Steve Vucic

**Cortical processes underlying generation of intracortical inhibition and facilitation in healthy humans and ALS patients**

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**Brain plasticity using tDCS in healthy controls and neurodegenerative diseases**

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**Nerve dysfunction in amyloid related neuropathy. Towards a biomarker of disease progression**

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**Cortical dysfunction in ALS. Utilising novel MRI imaging and analytical techniques**

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**Motor neuron disease phenotypes in ALS. Pathophysiological insights using transcranial magnetic stimulation and MRI techniques**

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Email:  
steve.vucic@sydney.edu.au

Phone:  
9845 6097

Institute:  
Adult Hospital

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Vijay Kumar

**Development of radiopharmaceuticals for the management of Parkinsons disease**

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**Development of radiopharmaceuticals for the insulinoma**

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Email:  
vijay.kumar@health.nsw.gov.au

Phone:  
8890 6533

Institute:  
Adult Hospital

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Wendy Gold

**Maternal immune activation in neurodevelopmental and neuropsychiatric disorders**

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**Maternal immune activation in neurodevelopmental and neuropsychiatric disorders using brain slices as a model system**

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**Modelling neurological disorders using CRISPR**

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Email:  
wendy.gold@sydney.edu.au

Phone:  
9845 1446

Institute:  
SCHN (KR)

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# Obesity/Diabetes/Nutrition

Jenny Gunton

**Role of vitamin D in acute liver damage**

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**Muscle stem cells and vitamin D**

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**Is it Scurvy? Vitamin C and dental/periodontal disease**

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**Beige fat and obesity treatment**

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Email:  
jenny.gunton@sydney.edu.au

Phone:  
9845 8089

Institute:  
WIMR

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# Physiology

## Bone

Andrew Biggin

**Gene discovery in a cohort of paediatric bone fragility disorders**

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Email:  
andrew.biggin@sydney.edu.au

Phone:  
9845 0221

Institute:  
SCHN

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Aaron Schindeler

**Building bone strength in brittle bone disease**

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**Studying the effects of genetic mutations on musculoskeletal tissue function**

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**Gene therapy for bone diseases**

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Email:  
aaron.schindeler@sydney.edu.au

Phone:  
9845 1451

Institute:  
SCHN

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## Cardiology

**Gene therapy of cardiac arrhythmias**

Eddy Kizana

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**Development of novel viral vectors for cardiac gene therapy applications**

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**Cardioprotection against anti-cancer drugs**

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Email:  
eddy.kizana@sydney.edu.au

Phone:  
8627 3670

Institute:  
WIMR

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James Chong

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**Repair and regeneration of the injured heart**

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Email:  
james.chong@sydney.edu.au

Phone:  
9845 6795

Institute:  
WIMR

## Cellular

Belal Chami

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**Stem cell differentiation – A novel mechanism involving MitoCeption and cytoplasmic exchange**

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Email:  
belal.chami@sydney.edu.au

Phone:  
0420 901 899

Institute:  
IDR

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James Cornwell

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**Development of live-cell biomarkers to probe cell molecular states in live-cell imaging experiments**

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**Investigating single-cell growth dynamics by live-cell imaging and single-cell tracking**

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**Quantifying cell-cell and cell-microenvironment interactions and their effect on cell fate inheritance**

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Email:  
james.cornwell@sydney.edu.au

Phone:  
0402 613 576

Institute:  
IDR

## Renal

Guoping Zheng

**Therapeutic potential of mesenchymal stem cells for kidney injury repair (in vitro study)**

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**Prevention of kidney failure by targeting  $\beta$ -catenin Foxo**

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Email:  
guoping.zheng@sydney.edu.au

Phone:  
8627 3904

Institute:  
WIMR

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Natasha Rogers

**Investigating the role of thrombospondin-1 and CD47 in diabetes mellitus and islet cell transplantation**

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**Biomarkers in kidney disease**

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**Different ways of dying – changing how cells respond to injury**

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**Treating inflammation to improve kidney transplant outcomes**

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**Preventing fibrosis leading to chronic kidney disease**

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Email:  
natasha.rogers@health.nsw.gov.au

Phone:  
9847 7365

Institute:  
WIMR

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Philip O'Connell

**The role of key driver genes in the pathogenesis of acute renal allograft rejection**

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**Identifying the causes of fibrosis after kidney transplantation**

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Email:  
philip.oconnell@sydney.edu.au

Phone:  
8627 3501

Institute:  
WIMR

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Stephen Alexander

## Glomerular Podocyte Injury and Repair Mechanisms?

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### Gene Identification and Treatment in Genetic Kidney Disease

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### Targeting Regulatory T Cells for the Treatment of Autoimmune Disease

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Email:	Phone:	Institute:
stephen.alexander@health.nsw.gov.au	9845 3408	SCHN (KR)

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Wayne Hawthorne

## Alternative approaches to preventing rejection in transplant models. Focusing on islet cell transplantation

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Email:	Phone:	Institute:
wayne.hawthorne@sydney.edu.au	9846 7365	WIMR

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Yuan Wang

## Glomerular Podocyte Injury and Repair Mechanisms

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Email:	Phone:	Institute:
YuanMin.Wang@health.nsw.gov.au		SCHN (KR)

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Sleep

Kristina Kairaitis

## The body clock in breast cancer survivors: Relations to sleep quality

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### Intermittent hypoxia during sleep: A preventable contributor to melanoma?

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Email:	Phone:	Institute:
kristina.kairaitis@sydney.edu.au	8627 3331	WIMR

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# Public Health

Karen Scott

**Investigating parents' experiences communicating with their child's doctor about the online health information they find on their child's medical condition**

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Email:  
karen.scott@sydney.edu.au

Phone:  
9845 3385

Institute:  
SCHN (CHW)

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Rachel Skinner

**Adolescence, risk-taking and sexual health**

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**HPV school based vaccination of adolescence**

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Email:  
rachel.skinner@sydney.edu.au

Phone:  
9845 3377

Institute:  
SCHN (CHW)

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Bamini Gopinath

**'Caring for the Carer': implementing a comprehensive support service model for family caregivers looking after persons with age-related macular degeneration**

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Email:  
bamini.gopinath@sydney.edu.au

Phone:  
8628 3368

Institute:  
WIMR

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# What to do next...

## Want more information on a project/supervisor?

Talk to the supervisor or the institutes Honours coordinator at the Honours information night. If they are not available on the night head to the Honours information page at <http://sydney.edu.au/medicine/study/honours/westmead/>

to search for a brief overview of the project and previous work the supervisor has undertaken. While you're there use the search tool to look for other projects of interest offered at Westmead.

## Found a project/supervisor you're interested in?

Contact your potential supervisor directly (usually via email) and request a time for a meeting. It's extremely important you meet with your potential supervisor in person before applying for their project, both for you and the supervisor. It is also useful to include a scanned copy of your academic transcript and CV and a bit about yourself and why you're interested in the offered project.

Following the meeting if you are interested in undertaking the project and the supervisor is willing to accept you for the project then you can proceed to make an application. Fill out and submit an expression of interest form available from your potential supervisor or the Honours coordinator (Andrew Harman) and keep working hard to ensure you obtain the required SCIWAM of 68.

## Eligible for a scholarship?

A number of scholarships are available for Honours students each year. These include:

- Westmead Honours scholarship (external applicants only)
  - Interstate/ international \$10,000
  - NSW/ ACT \$5,000
- USYD honours scholarships \$6,000

For more information on scholarships visit:

[http://sydney.edu.au/science/fstudent/undergrad/honours\\_scholarships.shtml](http://sydney.edu.au/science/fstudent/undergrad/honours_scholarships.shtml)

## CMRI Honours Stipend

All CMRI honours students receive a \$2,000 stipend



THE UNIVERSITY OF  
**SYDNEY**

**For more information**

**Applied Medical Science Honours Coordinator**

**Andrew Harman**

**T +61 2 9846 9118 | E [westmead.honours@sydney.edu.au](mailto:westmead.honours@sydney.edu.au)**