



# 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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## 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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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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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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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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## 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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# Cancer

Anna deFazio

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

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Ashni Kumar

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

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Dinny Graham

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

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Geraldine O'Neill

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

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

Jacob George

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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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**Interactions between sleep and cancer**

Kristina Kairaitis

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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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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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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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Ping Ye

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

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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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Scott Cohen

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

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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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Tracy Bryan

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

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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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Dana Robaei

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

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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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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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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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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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Wayne Hawthorne

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

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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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Grant Logan

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

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Gopala Rangan

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

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

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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**

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Leigh Waddell

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

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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**

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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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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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Pierre Osteil

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

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Robyn Jamieson

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

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Samantha Ginn

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

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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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# 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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Carola Venturini

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

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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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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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Heather Medbury

**Monocyte reprogramming with increased cardiovascular disease risk**

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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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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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Julianne Djordjevic

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

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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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**Ky-Anh Nguyen**

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

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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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**Monica Miranda-Saksena**

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

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**Muhammad Kamruzzaman**

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

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Najla Nasr

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

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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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Nicole Carnt

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

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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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Philip O'Connell

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

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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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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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Ruby Lin

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

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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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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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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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# 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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Fran Evesson

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

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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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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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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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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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# 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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# Physiology

## Bone

Andrew Biggin

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

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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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## 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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James Chong

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**Repair and regeneration of the injured heart**

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## Cellular

Belal Chami

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

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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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## 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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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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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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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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Wayne Hawthorne

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

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Yuan Wang

## Glomerular Podocyte Injury and Repair Mechanisms

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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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# 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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Rachel Skinner

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

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**HPV school based vaccination of adolescence**

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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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# 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 SCIAM 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**

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