UTS: Science

School of Life Sciences

Honours Projects for 2023

Open career paths and develop critical thinking skills

Contact the relevant laboratories for Honours project opportunities

What is an Honours program?

An Honours program is intended to provide students with a 'research apprenticeship' with students being integrated into existing research teams where practicable. The program is designed to ensure a thorough grounding in major methodologies common to most biomedical and medical science disciplines and will expose students to a research environment at the leading edge of new knowledge development and innovation. It is the first step towards a career in research, and a unique opportunity for students to explore their research potential.

You'll work independently on a research project of interests to you, under the supervision of an academic in the Faculty.

You'll gain advanced scientific knowledge, learn to plan, organise and find solutions, work independently and communicate your ideas and results to your peers, the scientific community and the general public

What am I supposed to do with this manual?

The goal of this manual is to provide you with a guide to the research profiles of potential supervisors in the School of Life Sciences at UTS. Please look through this manual and contact supervisors whose research you are interested.

Contact the supervisor(s) directly and arrange a time to meet to discuss your interest in undertaking Honours under their supervision.

What am I supposed to do after I have decided on a project?

1. Finalise agreement for supervision – it is important that you obtain agreement that the Academic offering the project is willing to supervise you.
2. Submit the appropriate application forms based on your degree choice, as below.
3. Download the application forms to complete and submit. (QR code link or https://bit.ly/2lMprd6).

Centre for Inflammation

Proteomics Node

Prof Phil Hansbro

Chair of Inflammation, School of Life Sciences

Faculty of Science

philip.hansbro@uts.edu.au

Dr Matthew O'Rourke

Proteomics Node Leader, Centre for Inflammation

Faculty of Science

matthew.orourke@uts.edu.au

The establishment of the Proteomics Node for the centre for inflammation is a new initiative to enhance ongoing projects in respiratory disease, under the direction of chair of inflammation Prof Phil Hansbro and proteomics Node Leader Dr Matthew O'Rourke. The Node aims to develop and implement mass spectrometry based "Omics" style techniques and apply them to the analyses of a range of respiratory diseases including Chronic Obstructive Pulmonary disease (COPD), Severe asthma and the current COVID-19 pandemic. This work will be performed in collaboration with the Centre For Inflammations and its internationally recognised mouse models and track record in single cell RNAseq and histological analysis.

Professor Phil Hansbro is an internationally recognised research leader in the study of respiratory diseases, such as asthma, COPD, (aka emphysema) and COVID-19 infections. His work is substantially contributing to understanding the pathogenesis and developing new therapies for these diseases.

Dr Matt O'Rourke Completed his PhD in 2016 and was honoured with a place on the 2017 Chancellorslist and a subsequent admission to the Royal Society of NSW. He is an emerging leader in the field of proteomics and mass spectrometry with an established track record in Imaging Mass Spectrometry (IMS), Liquid chromatography Mass Spectrometry (LC/MS) and biomarker discovery.

Keywords: COPD, Asthma, Proteomics, COVID-19, mass spectrometry

Projects Available at the Node:

- Investigating the metabolomic basis of the pathogenesis of COPD and COVID-19
- Investigating the proteomic basis for the progression of COPD and COVID-19
- Understanding the development of steroid resistance in Asthma
- Development of Multiplex MS assays for high throughput proteomics on archival tissue

Methods/Research Skills commonly utilised in the Node:

- Protein extraction and analysis
- Mass spectrometry
- Metabolomics
- Post translational modification detection
- Molecular imaging
- Bioinformatics

Collaborations:

- Dr Matt Padula – Director of the proteomics core facility and principal collaborator.

Marine Molecular Genetics (Seafood Safety Group)

Associate Professor Shauna Murray
Dr Penny Ajani
Dr Arjun Verma

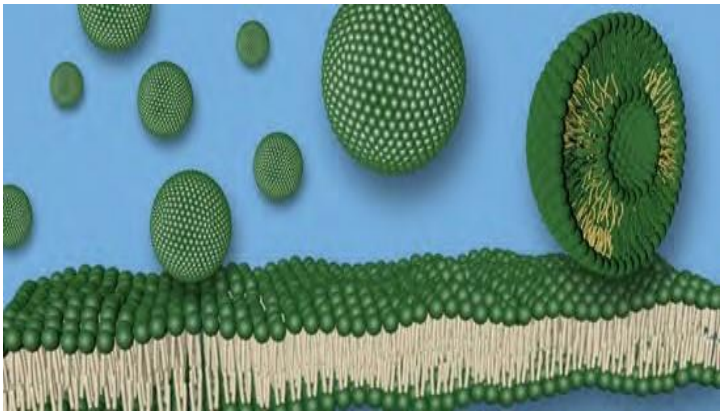
Our group researchs marine microbial organisms that impact water quality and the aquaculture and fisheries industry.

We use molecular biological techniques to understand the evolution and ecology of marine microbes, and to develop new detection technologies for them. We investigate the identities, distribution, abundance, ecology and population biology of marine microalgae impacting water quality. To date we have patented and commercialised a method that is now being used by industry, and we work directly with industry in implementing methods. We have also found many new species of toxic marine microalgae, and identified the toxins they produce.

Honours projects 2021

1. Marine community diversity and environmental change in microbial species. In this project, you will examine a multi-year dataset of molecular barcoding information on marine microbial eukaryotes from sites in the Sydney basin, Botany Bay, Sydney Harbour, and Port Hacking. This information will be used to find drivers of change in communities of these species.

2. Determining the recent evolution and speciation of harmful marine dinoflagellates. In this project, you will sequence the RNA (conduct transcriptomics) of cultures of marine dinoflagellates that may be relatively closely related, and have recently diverged from one another. You will use data based on SNPs to understand their gene trees and species trees, in order to investigate their recent evolution.



Membrane Biophysics Lab

What do honey, spider toxins and pH-responsive peptides have in common? They all have the ability to kill bacteria or cancer cells by targeting and disrupting cell membranes.

In the UTS Membrane Biophysics Laboratory we endeavour to understand the molecular details of how these and many other compounds bind to, and disrupt, cell membranes. For this, we use a number of 'wet-lab' biophysical techniques and '*in silico'* biomolecular simulations.

We also use our bioengineering skills to develop new biosensors for diseases such as *inflammatory bowel disease* (IBD).

Keywords: membranes, phospholipid bilayers, honey, spider venom, toxins, peptides, antimicrobialagents, anticancer compounds, biosensors.

Research Interests:

- Spider venom peptides and their selective capacity to target cancer cells.
- Deciphering the anti-bacterial properties of Manuka honey.
- Designing peptides that will target cancer cells by using the acidic cancer microenvironment.
- Interaction of statins (cholesterol-lowering pharmaceutical compounds) or generalanaesthetics with biological membranes.
- Development of sensors for lipid enzymes (e.g. for the detection of inflammatory boweldiseases).

Unique research techniques utilised in UTS Membrane Biophysics Laboratory include:

- Tethered phospholipid bilayers and electrical impedance spectroscopy
- Differential Scanning Calorimetry (DSC)
- SURFE^{2}R N1
- Quartz Crystal Microbalance with dissipation (QCM-D)
- Membrane bound fluorescent probes
- Single cell microfluidics systems
- Biomolecular simulations

Team members/Collaborators:

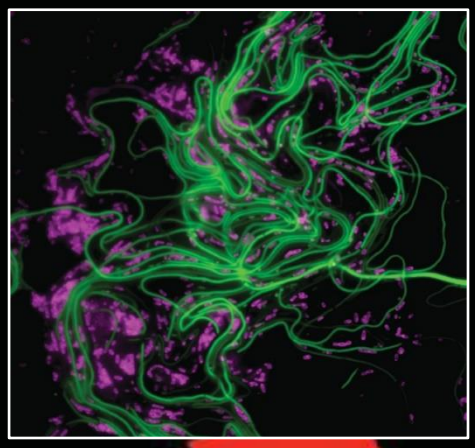
- Dr Charles Cranfield, https://www.uts.edu.au/staff/charles.cranfield
- Dr Evelyne Deplazes, UQ https://scmb.uq.edu.au/profile/1443/evelyne-deplazes
- Dr Stephen Holt, ANSTO https://www.ansto.gov.au/people/dr-stephen-holt
- A/Prof Ron Clarke, USyd https://www.sydney.edu.au/science/about/our-people/academic-staff/ronald-clarke.html

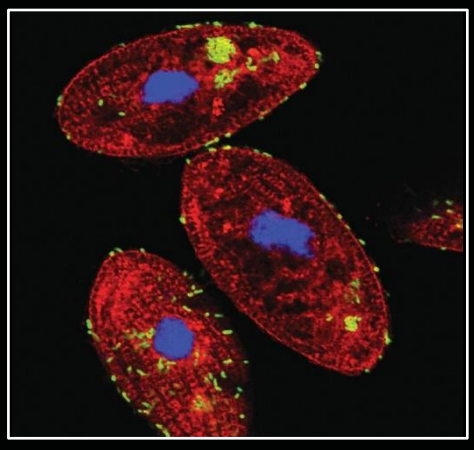
Australian Institute for Microbiology & Infection (AIMI)

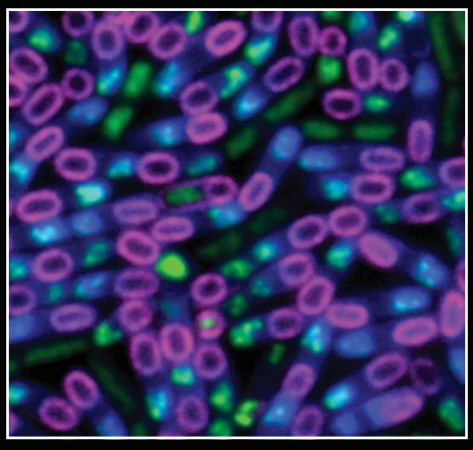
Excellence in Research Honours Scholarship

Value $2500

Students will be considered for this competitive scholarship uponstandard application for the UTS Honours program through an AIMI primary supervisor







Priority will be given to high calibre students interested in pursuing a research-rich career in microbiology or infectious disease

AIMI.uts.edu.au

Contact: AIMI@uts.edu.au

Prof David Booth

Professor of Marine Ecology,
School of Life Sciences, Faculty of Science
David.Booth@uts.edu.au

David Booth is Professor of Marine Ecology at UTS, and past-President of the Australian Coral Reef Society. He has published over 180 papers in reef-fish ecology, climate change and other anthropogenic impacts on fishes and fisheries, in the Caribbean, Hawaii, Great Barrier Reef, and studies how tropical fish travel down the East Australian Current past Sydney. He researches fishes in estuaries around Sydney, the ecology and behaviour of threatened fishes such as seadragons, seahorses, black cod and white sharks and the ecology of the deep sea. He is also a strong advocate of sustainable fisheries and marine parks.
Professor Booth is a core member of SEA SERPENT, a research collaboration between the oil and gas industry and independent scientists in the southeast Asian region. He has a strong record of applying his research to influence government policy, and is active in public communication (numerous media and public lecture appearances annually). He has researched fish recruitment, population dynamics and impacts of pollution in environments including Canadian freshwater lakes, worldwide coral reefs and Australian seagrass systems. He is a prominent researcher on the effects of climate change on marine biota, and recently lead author on a climate change report on temperate fishes. He is a core member of the Ocean Science Council of Australia (http://oceansciencecouncil.org/).

Keywords: marine fishes, climate change, biodiversity, marine ecology

Research Interest/Honours Project opportunities:

Role of artificial reefs in enhancing marine fish biodiversity
Sydney Harbour restoration
Status of key iconic species (seadragons, shaks) in SE Australia
Ecology of tropicalisation of SE Australia, inc role of expanding coral beds in SEA Australia
Impact of pollutants eg cigarette bitts on maire. Biota
Coral bleaching impacts on fish populations

Methods/Research Skills commonly utilised in Prof Booth's Laboratory include:

- Field skills/logistics: e.g., snorkelling, diving
- Aquarium fish experiment husbandry
- Analytical Skills: lipid analyses, otolith ultrastructure and microchemistry
- Technology: SeaGis stereo camera, IR lighting

Team members include

- Dr Brigitte Sommer (UTS CPRF)
- Dr Selma Klanten
- Giglia Beretta, research associate
- Dr Ash Fowler, research associate

Partners

- SeaLife Aquarium
- NSW DPI Fisheries
- Sydney Opera House
- Sydney Institute of Marine Science
- Happy Fish sustainable seafood
- Plastic Oceans Australia
- Earthwatch Australia

Website/publications: https://www.uts.edu.au/staff/david.booth

Dr Laura Bradfield

Senior Research Fellow, School of Life Sciences
Faculty of Science
laura.bradfield@uts.edu.au

Bradfield received her PhD in neuroscience from the University of New South Wales (UNSW) in 2010, then completed Postdoctoral training at both University of Sydney and UNSW. She joined UTS in 2018. Her research focuses on the behavioural and brain mechanisms of compulsivity as it applies across multiple disorders such as obsessive compulsive disorder, and substance use disorder. Her recent work, conducted in rats and mice, has demonstrated that neuroinflammation in various brain regions likely underlies the cognitive-behavioural impairments observed in compulsive disorders. Bradfield prides herself on running a diverse, friendly, and welcoming laboratory.

Keywords: obsessive-compulsive disorder, substance use disorder, neuroinflammation, neural circuits of reward-based decision-making

Research Interest/Honours Project opportunities:

- Investigating the cognitive-behavioural consequences of neuroinflammation in various brain regions (e.g. prefrontal cortex, striatum, amygdala, thalamus, hippocampus, etc).
- Determining the behavioural and brain mechanisms of sensitivity to punishment.
- Disentangling glial and neural mechanisms of compulsive-like actions

Methods/Research Skills commonly utilised in Bradfield's Laboratory include:

- Behavioural studies (operant conditioning)
- Immunohistochemistry
- Microscopy
- Cell culture
- Optogenetics and chemogenetics

Team members (optional):

- Dr. Mike Kendig: Chancellors Postdoctoral Fellow
- Dr. Joanne Gladding: Postdoctoral Fellow
- Amolika Dhungana: Research Assistant
- Arvie Abiero: PhD student
- Kiruthika Ganesan: PhD student
- Maedeh Mahmoudi: PhD student

Website/publications: https://scholar.google.com/citations?user=AIdA89UAAAAJ&hl=en

Dr Andrew Care

Chancellor's Research Fellow,
School of Life Sciences

andrew.care@uts.edu.au

Andrew Care is a Chancellor's Research Fellow who creatively blends Synthetic Biology with Nanoscience to solve problems in biotechnology and biomedicine. In the Care Lab, we are interested in re-engineering natural protein-based nanoparticles (PNPs) into unique tools for drug delivery and vaccine development. Our PNPs are derived from nature and self-assemble from multiple protein subunits into robust nanoparticles that are biocompatible, non-toxic and biodegradable. To date we have reprogrammed PNPs to package and deliver therapeutic proteins to mediate therapies *in vitro*, and research projects available in the lab will look to build upon this exciting work.

Keywords: Synthetic biology, Nanomedicine, Protein engineering, Cancer, Dementia

Research Interest/Projects in our Laboratory:

- Develop synthetic biological strategies to control protein nanoparticle structure/function
- Unravel the dynamic interactions between protein nanoparticles and the body
- Bioengineer protein nanotechnologies for applications in drug delivery and/or vaccines

Methods/Research Skills commonly utilised in our Laboratory include:

- Gene design, cloning, and protein-expression
- Protein production and purification
- Cell-based assays and flow cytometry
- Electron- and fluorescence microscopy
- Cellular and animal models of disease

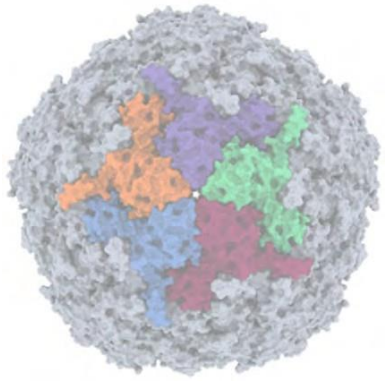
Team members:

- Dr Dennis Diaz, Senior research technician
- India Boyton, PhD student
- Nabila Morshed, PhD student
- Caitlin Sives, Masters student

Collaborations:

- Prof Nicki Packer, Centre of Excellence in Synthetic Biology
- A/Prof Lyndsey Collins-Praino, University of Adelaide
- A/Prof Yuling Wang, Macquarie University
- Dr Orazio Vittorio, Children's Cancer Institute Australia
- Prof Lars Ittner, MQ Dementia Research Centre
- Prof Stella Valenzuela, UTS

UTS Profile: https://profiles.uts.edu.au/Andrew.Care



A/Prof. Alessandro Castorina

Head of the Laboratory of Cellular and Molecular Neuroscience (LCMN)Associate Professor, School of Life Sciences
Faculty of Science
Alessandro.Castorina@uts.edu.au

Collaborations:

- Prof. Kevin Keay, Brain and Mind Centre, University of Sydney
- Prof. Filippo Drago and Prof. Giuseppe Musumeci, University of Catania, Italy
- Prof James A. Waschek, University of California at Los Angeles (UCLA)
- Dr Grant Logan, Translational Virology Group, CMRI

A/Prof. Castorina received his PhD in Neuropharmacology from the University of Catania, Italy in February 2009. In June 2009, Dr Castorina was the recipient of a post-doctoral fellowship and in 2011 was appointed as Lecturer by the same university. In 2015 Dr Castorina took on a new academic challenge and moved to Australia, where he joined the University of Sydney as a Senior Research Fellow. In 2016 he was appointedby UTS as Senior Lecturer and in 2017 he established the LCMN. His research focuses on the impact of neuroinflammation in the onset and progression of several neurological diseases, with particular interest in multiple sclerosis (MS) and demyelinating conditions. His recent studies have shown that a class of neuropeptides (PACAP and VIP) are able to reduce brain inflammation and afford neuroprotection in models of MS and Parkinson's disease.

Research Interest at the LCMN include:

- Unravelling the biological role of PACAP and VIP in models of Multiple Sclerosis (MS) andother demyelinating diseases.
- Repurposing of old drugs to reduce the inflammatory burden in models of MS.
- Identifying new environmental risk factors involved in the pathogenesis of neurodegenerative diseases

Methods/Research Skills commonly utilised at the LCMN include:

- Cell culture
- Animal models of Multiple Sclerosis and Parkinson's disease
- *Ex vivo* studies using CNS samples from MS patients
- RNA, DNA and protein extraction, end-point PCR,
- Real time quantitative PCR
- Western blot, ELISA and other biochemical assays
- RNA sequencing and Bioinformatics
- Gene manipulations/transfections
- CRISPR-Cas9 mediated gene editing

Team Members (current)

- Dr Rubina Marzagalli (Post-doc contractor/volunteer)
- Ms Margo Iris Jansen (PhD candidate)
- Mr Jordan Piper (PhD candidate – part time)
- Mr Jordan Lee (Honours student)
- Ms Xin Ying Rachel Song (Honours student)
- Mr Gerard Size (Internship student)

Website/publications: https://www.uts.edu.au/staff/alessandro.castorina

Dr Hui Chen

Professor of foetal porgamming, School of Life Sciences, Faculty of Science
hui.chen-1@uts.edu.au

Dr Chen received her Medical Degree from Nanjing University, China (2002) and PhD in neuroscience from the University of Melbourne (2006). In 2008, Dr Chen joined UTS after two years of postdoctoral research at UNSW Sydney. Her current research focuses on the impact of maternal exposure to air pollution on the development of chronic diseases in the offspring, including learning impairment, fatty liver disease, respiratory disorders, and kidney disorders.

Keywords: PM2.5, learning, memory, glucose intolerance, fatty liver, metabolism, inflammation, oxidative stress

Research Interest/Honours Project opportunities:

- Brain and liver changes due to exposure to PM2.5 or a fatty diet – tissue analysis
- Optional – animal experiments

Methods/Research Skills commonly utilised in Dr Chen's Laboratory include:

- Western blotting, real-time PCR, ELISA, immunohistochemistry
- Cell culture, Animal models

Team members (optional):

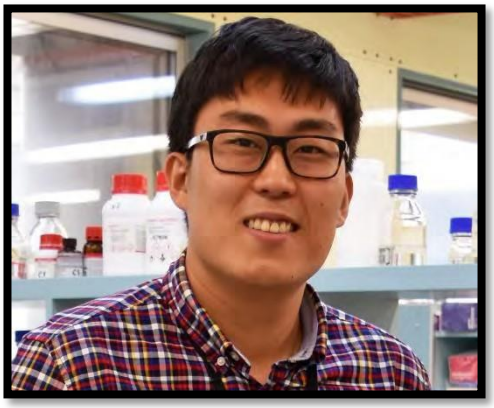
- Ms Xu Bai (PhD student)
- Dr Min Feng (PhD student)
- Dr David van Reyk
- Distinguished Professor Brian Oliver

Collaborations (optional):

- Professor Carol Pollock, Kolling Institute of Medical Research
- A/Professor Sonia Saad, Kolling Institute of Medical Research
- Drs Chantal Donovan, Richard Kim, Razia Zakarya, Mehra Haghi, UTS

Website/publications: https://www.uts.edu.au/staff/hui.chen-1
https://scholar.google.com.au/citations?user=-965Q-EAAAAJ&hl=en

Dr Jaesung Peter Choi



Chancellor's Postdoctoral Research Fellow

Lecturer, School of Life

SciencesFaculty of Science

Jaesung.Choi@uts.edu.au

Dr Choi is an emerging researcher in the field of cardiovascular research. He received his PhD from theUniversity of Sydney in 2016 and joined UTS in 2020 with Chancellor's Postdoctoral Research Fellowship. His research focuses on identifying a therapeutic targets for the commonest stroke in children: Cerebral Cavernous Malformation (CCM). His recent work includes development of a novel micro-CT imaging, identified the gut microbiome as a critical stimulant of CCM and repurposed an- FDA approved drug to treat experimental CCM.

Keywords: vascular biology, cardiovascular diseases, stroke, mouse model, genetics, micro-CTimaging

Research Interest/Honours in Dr Choi's Laboratory:

- Preventing stroke from cerebral cavernous malformations using precision microbiome(project 1) and sex hormone (project 2) therapies.

Methods/Research Skills commonly utilised in Dr Choi's Laboratory include:

- Protein extraction and analysis
- Mouse genetics
- Real-time PCR
- Micro-CT imaging
- Electron microscopy
- Fluorescent microscopy
- Flow cytometry
- Histology

Team members (optional):

- Prof Philip Hansbro, Director of Centre for Inflammation
- Mr Hamid Sadegh, PhD student

Website/publications: https://www.uts.edu.au/staff/jaesung.choi

A/Prof. Louise Cole

Director of the Microbial Imaging Facility, the Australian Institute for Microbiology & Infection (AIMI), Faculty of Science, UTS.
E-mail: Louise.Cole@uts.edu.au
Staff profile: https://profiles.uts.edu.au/34590-louise-cole

*Students may be considered for the AIMI Excellence in Research Honours Scholarship *

A/Prof Louise is the Director and Facility Manager of the Microbial Imaging Facility (MIF) in the Faculty of Science at UTS. She has a research background in plant cell biology, with a particular focus on endocytosis, plant-host pathogen interactions, long distance transport in fungal cells and cell-to-cell communication in plants. She has expertise in a wide range of light and electron microscope methods including transmitted light, fluorescence, laser microdissection, optical tweezers, confocal and multiphoton, light-sheet, super-resolution, transmission electron and cryo-electron microscopy. In addition, she has extensive experience in optimising specimen preparation of plants, animals and microbes for both light and electron microscope methods. She currently collaborates with UTS researchers on a diverse range of topics to provide her microscopy expertise that helps forward their research with impact.

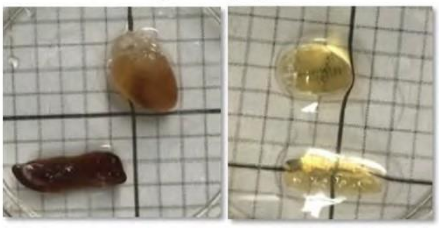
Project opportunities (please follow the links to read some published work on the topic!)**:**

1. Developing a pipeline for tissue clearing, imaging and 3D-visualisation for thick tissue slices and whole organs of healthy and diseased tissue.
2. Dissecting mechanisms that regulate inflammation and granuloma formation in Tuberculosis-infected tissue (with A/Prof. Bernadette Saunders).
3. Identification of novel disease mechanisms for their biomarker or therapeutic target potential and for treatment of pre-eclampsia or cardiovascular disease (with Dr Lana McClements).
4. Optimising tissue-clearing and microscopy methods to investigate cell-cell and cell-stromal interactions in tissues and 3D models of pre-eclampsia (with Dr Lana McClements).
5. Clearing rat spinal cord and brain tissue to investigate role of inflammatory cells in relation to neural injury and lesion formation (with Dr Cathy Gorrie).
6. Investigating the biological effects of nanoparticles on the heart (with Dr Kristine McGrath)
7. How do intracellular bacterial colonies interact with host bladder cells? (with A/Prof Iain Duggin).

Methods/Research Skills:

- Live cell imaging
- Wide-field fluorescence and deconvolution microscopy
- Confocal microscopy and spectral imaging
- Tissue clearing protocols
- Super-resolution microscopy
- High content and high-throughput imaging
- Image analysis and 3D-visualisation methods

Tissue Clearing renders samples transparent for imaging



Relevant UTS collaborators and team members:

- A/Prof Iain Duggin (AIMI): UPEC-host cell biology.
- A/Prof Bernadette Saunders (SoLS): Inflammation and granuloma formation in Tuberculosis.
- Dr Lana McClements (SoLS): Biomarkers as potential therapeutic targets for treatment of pre-eclampsia and cardiovascular disease.
- Dr Cathy Gorrie (SoLS): Neural Injury Research Unit.
- Dr Kristine McGrath (SoLS): Effects of nanoparticles on the heart

A/Prof Valery Combes

Associate Professor, School of Life Sciences
Faculty of Science
valery.combes@uts.edu.au

The Microvesicle and Malaria Research Group

I am a vascular biologist specialised in the pathogenesis of infectious diseases, notably severe malaria and the role of extracellular vesicles in these diseases. My research currently focuses on understanding the pathogenic mechanisms of the most severe complication of the malaria infection, cerebral malaria as well as finding biomarkers of severity to identify early the patients at risk of developing lethal complications. The Team also works on finding biomarkers allowing the diagnosis of Lymphangioleiomyomatosis (LAM).

Keywords: microvesicles, extracellular vesicles, malaria, pathogenesis, biomarkers, microRNA

Research Interest/Honours Project opportunities:

- Role of extracellular vesicles in the pathogenesis of severe malaria using *in vitro* systems and animal models
- Discovery of biomarkers of disease severity (malaria, Lymphangioleiomyomatosis)
- miRNA in malaria infection
- Extracellular vesicles in diseases

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- Cell culture
- RNAseq
- Proteomics
- Animal models
- Flow cytometry
- Fluorescence microscopy and cell imaging

Team members:

- Benjamin Sealy, PhD student
- Iris Cheng, PhD student

Collaborations:

- Dr Bernadette Saunders, UTS (co-supervisor LAM)

Website/publications: https://www.uts.edu.au/staff/valery.combes

Dr Camille Dickson-Deane

Senior Lecturer, Higher Education
Faculty of Science
E: camille.dickson-deane@uts.edu.au

Dr. Camille Dickson-Deane received her PhD in Learning Sciences from the University of Missouri-Columbia, USA in 2013. She is an OAS and Fulbright scholar researching **how social constructs, technology and pedagogy intersect for meaning-making in the science discipline**. Investigating how individual differences (cognitive constructs) are influenced by the pedagogical usability of digitally-infused learning environments is the research interest. Here the key is to investigate how design as an activity, the actors who use and implement it, the infrastructure, pedagogy and more…. all combine to make learning and performance uniquely achievable. This allows for inter-related, intra-related and transdisciplinary fields to be investigated.

Keywords: cognitive constructs, individual differences, contextualised digital learning designs

Research Interest/Honours Project opportunities:

- Open Education Resources (OERs)
- Simulations, Games and Extended Reality (AR/VR/XR)
- Designs of assessments in Science Education

Methods/Research Skills commonly utilised include:

- Content Analysis
- Mixed-Methods (quantitative ethnography)
- Usability Evaluation
- Design Based Research

Website: https://profiles.uts.edu.au/Camille.Dickson-Deane/about

Relevant Publications:

Dennen, V., Dickson-Deane, C., Ge, X., Ifenthaler, D., Murthy, S. & Richardson, J. (2022) Global Perspectives on Educational Innovations for Emergency Situations. Springer

Dickson-Deane, C. (2021). Moving practical learning online. *Educational Technology Research and Development*, 1-3.

Vanderburg, R. & Dickson-Deane, C. (2021). The Future of Technology in Mathematics and Science Instruction. Association of Educational Communications and Technology (AECT) Annual Conference -Research and Theory Division (Virtual 2021)

Dickson-Deane, C. & Dowd, A. (2021). How can a Virtual Reality Environment allow for Transferable Learning in Science? Australian Conference on Science and Mathematics Education (ACSME).

A/Prof Sheila Donnelly

Associate Professor, School of Life Sciences
Faculty of Science
Sheila.Donnelly@uts.edu.au

A/Prof Donnelly received her PhD in Microbiology from Trinity College Dublin, Ireland many years ago! Since graduating she has developed a research career centered on understanding the relationship between infectious organisms and their hosts. In 2004, Sheila moved to UTS where she has focused more specifically on the interaction parasitic worms (helminths) and their mammalian hosts. This research has two streams: understanding the mechanisms by which helminths successfully manipulate their host's immune system; and using this knowledge to develop novel therapeutics for the treatment of autoimmune disease.

Keywords: helminths, macrophages, autoimmunity, inflammation, therapeutics

Research Interest/Honours Project opportunities:

- Understanding the mechanisms helminths utilise to modulate macrophage activity
- Exploiting parasite peptides to preserve beta cell function
- Utilising parasite peptides to prevent inflammatory disease
- Elucidating the molecular mechanisms of parasite infection

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- Cell culture
- Real time PCR
- ELISA/Multiplex
- Extracellular Flux assays
- Confocal Microscopy

Team members (optional):

- Dr Akane Tanaka, post-doctoral researcher
- Alison Ricafrente, PhD Student
- Claire Rennie, PhD Student
- Susel Lolo Quinteros, PhD student
- Inah Camaya, PhD student

Collaborations contributing to Honours Projects:

- A/Prof Bronwyn O'Brien (UTS)
- A/Prof Maria Sukkar (UTS)
- Dr Nham Tran (UTS)
- Prof John Dalton (NUIG, Ireland)
- Dr Kristine McGrath (UTS)

Website/publications: https://www.uts.edu.au/staff/sheila.donnelly

Dr Chantal Donovan

Lecturer, School of Life Sciences

Faculty of Science

Chantal.Donovan@uts.edu.au

Dr Donovan received her PhD in Respiratory Pharmacology from the University of Melbourne in 2015, followed by postdoctoral training in Respiratory Immunology at the University of Newcastle as a recipient of an NHMRC Early Career Postdoctoral Fellowship. Dr Donovan joined UTS in 2019 and her research is focused on how pharmacological agents can alter immune responses in different lung diseases.

Keywords: respiratory pharmacology, innate immune responses, lung diseases

Research Interest/Projects in Dr Donovan's Laboratory:

- How drugs targeting the lungs can alter immune responses.
- Discovery of new therapeutic targets for lung diseases targeting airway smooth muscle.

Methods/Research Skills commonly utilised in Dr Donovan's Laboratory include:

- Mouse models of lung disease
- Tissue collection
- RNA extraction/Real time PCR
- Immunofluorescence

Collaborations:

- Dr Richard Kim (Lecturer)

Website: https://www.uts.edu.au/staff/chantal.donovan

A/Prof Iain Duggin

Deputy Director, the Australian Institute for Microbiology & Infection (AIMI), UTS. e-mail: Iain.Duggin@uts.edu.au

Staff profile: https://www.uts.edu.au/staff/iain.duggin

Lab website: https://sites.google.com/view/dugginlab/home

*Students may be considered for the AIMI Excellence in Research Honours Scholarship *

A/Prof Iain Duggin leads the Microbial Morphology and Development research theme at the Australian Institute for Microbiology & Infection (AIMI), a research strength at UTS. His team utilizes the latest technology in molecular biology, genomics, and microscopy to understand how microbial cells grow and dynamically respond to their environments, including host cells. These discoveries are translated into solutions for infectious disease and biotechnology. The lab is a leader in the molecular and evolutionary cell biology of archaea (our ancient microbial cousins), and uropathogenic *Escherichia coli* (UPEC), the main cause of urinary tract infections (UTI)—a worsening global pandemic.

Project opportunities (please follow the links to read some of our published discoveries)**:**

1. What proteins carry out cell division in archaea? [in *Haloferax volcanii*, a key model organism.] And how do they interact with the cell envelope to bring about division?
2. What proteins work with the archaeal cytoskeleton to switch cell morphotypes? And how?
3. How can we utilize archaea and their components for protein and vaccine engineering?
4. What proteins regulate UPEC cell filamentation in the bladder epithelium?
5. How do UPEC colonies exist within host bladder cells?
6. What UPEC and host cell genes respond during UTI? Can they help diagnose UTI?

Methods/Research Skills:

- Recombinant DNA technology, genetic modification, and engineering
- Protein functional, structural, and evolutionary analyses, and their molecular interactions
- High-resolution fluorescence microscopy, live-cell imaging, and protein labelling
- Flow-culture systems and microfluidics; development of infection models.
- Functional genomics and next-gen DNA sequencing (transposon-insertion and RNA-seq)

Relevant UTS collaborators (potential co-supervisors) and team members:

- Dr Yan Liao (CPDRF fellow): Archaeal cell division genes and mechanism
- Dr Bill Söderström (CPDRF fellow): UPEC cell filamentation and division
- A/prof Louise Cole (Director, Microbial Imaging Facility, UTS): UPEC-host cell biology
- Prof Garry Myers (Director, AIMI): Functional genomics of UPEC
- A/prof Diane McDougald (AIMI): Diagnosis and prediction of UTI in Spinal-cord patients

EM/Prof John Ellis

Emeritus Professor,

Faculty of Science

john.ellis@uts.edu.au

Keywords: parasitology, molecular biology, bioinformatics, diagnostics, vaccines

John completed a PhD on leishmaniasis at the Liverpool School of Tropical Medicine, and subsequently did postdoctoral research on *Eimeria* vaccines at the Institute for Animal Health (U.K.) and *Babesia* phylogeny (Flinders University of South Australia). He joined UTS in 1991. His main research interests are focused on translational research that includes development of vaccines and diagnostics for parasitic protozoan diseases. This has included studies on veterinary vaccines, neosporosis in animals, diagnostics for human gastrointestinal and tropical diseases such as dientamoebiasis, cryptosporidiosis, giardiasis, amebiasis, leishmaniasis and malaria. He was awarded the higher doctoral degree of DSc by Liverpool University in 2006 for his pioneering research on the biology of cyst -forming coccidia including *Neospora caninum*. He has published over 200 peer-reviewed research papers and is an editor of the U.K. based, peer-reviewed journal *Parasitology* published by Cambridge University Press.

Research Interest/Projects in John's Laboratory:

- Diagnosis and epidemiology of human gastrointestinal diseases, including *Dientamoeba fragilis,* cryptosporidiosis and giardiasis.
- Genetic diversity in the trypanosomatidae (trypanosomes and *Leishmania*)
- Malaria and drug resistance
- Vaccines to neosporosis in cattle
- Methods for fast tracking a review of the scientific literature

Methods/Research Skills commonly utilised in John's Laboratory include:

- "omics" and bioinformatics
- Cell culture of parasites
- PCR and DNA sequencing
- Molecular phylogenetics
- Publishing, bibliometrics and methods for searching scientific literature

Collaborations:

- Dr Damien Stark, Department of Microbiology, St. Vincent's Hospital Sydney
- Dr Rogan Lee, ICPMR, Westmead Hospital

Dr Alen Faiz

Senior Lecturer, School of Life Sciences
Faculty of Science
alen.faiz@uts.edu.au

Dr Alen Faiz is a molecular biologist and geneticist who's primary focus is to understanding the biology of respiratory systems at the genetic and epigenetic levels, including under conditions of exposure to cigarette smoke and viral infection. Dr Faiz's research program has made significant contributions to the understanding of the molecular pathways that underpin the development and progression of COPD and asthma through the development of bioinformatics pipelines and advanced cell culture and genetic editing techniques.
Dr Faiz obtained his PhD at the University of Sydney, Woolcock Institute of Medical Research in 2014. He then travelled to the Department of Pathology and Medical Biology, University Medical Centre Groningen, the Netherlands (2014-18). Dr Faiz joined UTS in 2018.

Keywords: Respiratory, CRISPR, genetic editing, bioinformatics

Research Interest/Honours Project opportunities:

- Investigating the differences in human response of SAR-CoV-2 variants
- Identifying and recreating the in lab genetic variants of COPD and asthma
- Identifying prediction markers for treatment responsiveness in respiratory diseases

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- RNA/DNA extraction and analysis
- Cell culture
- CRISPR gene editing
- ELISA
- Bioinformatics

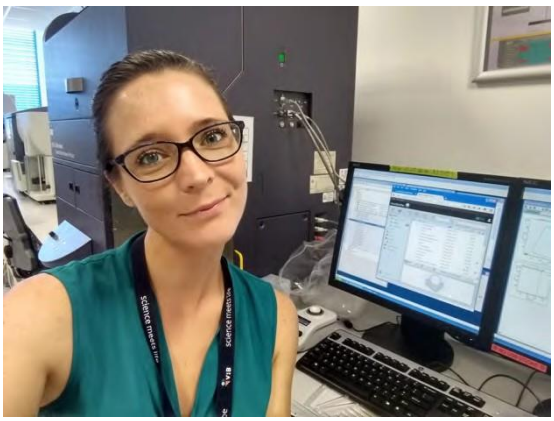
Team members (optional):

- Mr Rashad Mahbub, PhD student
- Mr Jos van Nijnatten, PhD student
- Miss Senani Rathnayake Mudiyanselage, PhD student

Collaborations (optional):

- Professor Brian Oliver, Woolcock institute of medical research

Website/publications: https://profiles.uts.edu.au/Alen.Faiz/about



Dr Caitlin Gillis

NHMRC Early Career Research Fellow

UTS/Centenary Institute Centre for Inflammation

School of Life Sciences
Faculty of Science

caitlin.gillis@uts.edu.au

Dr Gillis completed her thesis at the Institut Pasteur, Paris, on the role of neutrophils in systemic inflammation; and received her PhD in 2016. She moved to the VIB-UGent Inflammation Research Centre, Belgium, with a Marie Sklodowska-Curie Fellowship, where her research focused on dead cellclearance by macrophages. Caitlin recently joined UTS, at the Centenary Research Institute, supported by an NHMRC fellowship. Her research interests are phagocytosis biology, immune cell players such as macrophages and neutrophils, and the pathophysiology of chronic inflammatory (lung) diseases.

Billions of cells die every day throughout the body, and efficient clearance of these cells is essential to maintain tissue integrity and homeostasis. **Efferocytosis** is the process of removing cells that die by apoptosis. Macrophages, in particular, have a high efferocytosis capacity.
In disease situations, however, a grossly elevated burden of apoptotic cells or defective efferocytosis - signs of an imbalance between cell death and clearance - can worsen disease.
Inflammatory lung pathologies, such as **asthma**, chronic obstructive pulmonary disease (**COPD**) and **COVID-19** have a complex immunopathology, yet all have a high burden of dead and dying cells and defective efferocytosis. Dying cells signal for their own removal, and influence the tissue environment; and understanding where cell death occurs, as well as the responses of other cells inthe lung, could help elucidate pathways of pathogenesis and identify new therapeutic approaches.

Honours Project Opportunities:

To investigate and monitor cell death and clearance during lung disease,
employing established mouse models of (1) allergen sensitisation and challenge (asthma),
(2) acute smoke exposure (COPD), and/or (3) COVID-19 infection.

- Use of a novel theranostic to track and monitor cell death during disease induction *in vivo.*
- Apply and optimise novel approaches to monitor efferocytosis *in vivo* (via flow cytometryand a new tractable neutrophil cell line).

Primary Techniques:

- Mouse models of lung disease, tissue and organ collection
- Live imaging
- Histology
- Flow cytometry

Team members:

- Prof. Phil Hansbro (Director, Chair of Inflammation, Centenary Institute/UTS)

Collaborations:

- Prof. P. Hogg (Centenary Institute)
- Prof K. Ravichandran and Dr C. Maueroder (VIB/UGent IRC, Belgium)

Associate Prof. Cathy Gorrie

Associate Professor, School of Life Sciences
Faculty of Science
catherine.gorrie@uts.edu.au

Associate Professor Cathy Gorrie received her PhD in Neuroscience from UNSW in 2008. She joined UTS in 2011 and you may know her as a teacher in one of your subjects (Histology, Biobusiness). Her research interest is in neuroscience, in particular in **neurotrauma** (brain and spinal cord injury). She uses animal models to investigate damage to and repair of the central nervous system. She heads the Neural Injury Research Unit (NIRU) at UTS and has supervised 15 Honours students and 9 PhD students.

Keywords: Spinal cord injury, animal models, inflammation, histology, immunohistochemistry
Research Interest/Honours Project opportunities:

- Development of compression model of spinal cord injury (SCI) in neonatal rats*

Methods/Research Skills commonly utilised in Dr Gorrie's Laboratory include:

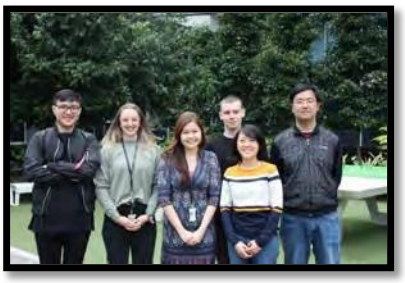
- Animal (rat) models of SCI*, surgery, behavioural assessments
- Histology and Immunohistochemistry
- Imaging techniques
- Cell culture, Real time PCR, ELISA, WB

Team members (optional):

Collaborations (optional):

Website/publications: https://www.uts.edu.au/staff/catherine.gorrie

*Animal ethics training is essential and all students must also undergo competency assessments. All experimental procedures will be conducted with appropriate UTS ethics approval.



Dr Cindy Gunawan

Senior Lecturer, the Australian Institute for Microbiology & Infection (AIMI), Faculty of Science
Cindy.Gunawan@uts.edu.au

Collaborations:

- Dr Mohammad Hamidian, the Australian Institute for Microbiology & Infection (AIMI)
- A/Prof Scott Rice, Nanyang Technological University, Singapore
- A/Prof Georgios Sotiriou, Karolinska Institutet, Sweden

Dr Gunawan received her PhD in Biotechnology from UNSW Sydney in 2006. Dr Gunawan had her postdoctoral training in the School of Chemical Engineering, UNSW Sydney, then joined UTS in 2015 as a Chancellor's Research Fellow. Her research focuses on the unravelling of the molecular basis of pathogen resistance to antimicrobial nanoparticles and how to solve this resistance issue. With the rapid rise of antibiotic resistance, less conventional antimicrobials, such as silver nanoparticle, have been used as alternative technologies to fight infections. Dr Gunawan's recent work demonstrated that WHO-listed priority pathogens are capable to adapt to nanoparticle toxicity. The bacteria genetically increased their capabilities to reduce the efficacy of the nanoparticle. In-depth understanding on the molecular mechanisms of the adaptation responses is key to the efforts to overcome this resistance capability

Research Interest in Dr Gunawan's Laboratory include:

- Understanding bacterial resistance in the form of biofilm growth
- Identifying genes that are responsible for the resistance characteristics
- Understanding the role of cell-to-cell communication in biofilm resistance

Methods/Research Skills commonly utilised in Dr Gunawan's Laboratory include:

- Cell culture
- Genomic analysis
- RNAseq
- Quantitative PCR
- Bioinformatics
- Microscopy

*Students may be considered for the AIMI Excellence in Research Honours Scholarship *

Dr Mehrad Hamidian

Senior Lecturer/ ARC DECRA Fellow
Australian Institute for Microbiology and Infection (AIMI)
Faculty of Science
Email: mehrad.hamidian@uts.edu.au

*Students may be considered for the AIMI Excellence in Research Honours Scholarship *

Dr Mehrad Hamidian obtained his PhD in microbiology and genomics from the University of Sydney. Dr Hamidian joined UTS in 2018 from the school of life and environmental sciences at USYD where he was a Postdoctoral Research Fellow for 4 years. His research focuses on studying antibiotic resistance and genomic evolution of the opportunistic pathogen *Acinetobacter baumannii*, which has recently been placed as number 1 in the list of World Health Organisation for development of antibiotic research. He is particularly interested in studying clonality as well as the role of mobile genetic elements, e.g. plasmids insertion sequences, transposons, integrons and genomic islands, in development and spread of antibiotic resistance in this important superbug. He applies a wide range of molecular microbiology and bioinformatics approaches including the use of whole genome sequencing to study *A. baumannii.*

Keywords: *Acinetobacter baumannii*, antibiotic resistance, Bioinformatics, whole genome sequencing (WGS), mobile genetic elements.

Research Interest/Honours Project opportunities:

- Identifying the genes involved in replication and transfer of novel plasmid classes in *Acinetobacter.*
- Evolution of antibiotic resistance in globally disseminated multi-drug resistant clones of *A. baumannii*.

Methods/Research Skills commonly utilised in Dr Hamidian's Laboratory include:

- Antimicrobial resistance testing
- Plasmid transfer analyses (conjugation and mobilisation assays)
- PCR
- Real time PCR
- Cloning
- Whole Genome Sequencing
- Bioinformatics

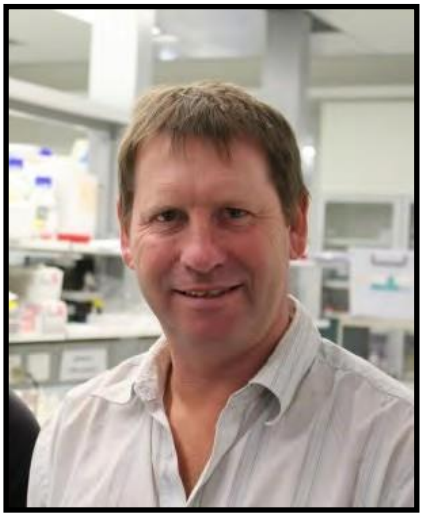
Team members:

- Oliver McNeilly, PhD student
- Jonathan Koong, PhD student
- Liam Tobin, Honours student
- Farzana Prity, visiting HDR student

Collaborations:

- Dr. Margret Lam, Monash University, Victoria, Australia.
- Dr Amy Cain, Macquarie University, NSW, Australia.
- Dr. Allison J. Lopatkin, Data Science Institute, Columbia University, USA.

Website/publications: https://profiles.uts.edu.au/Mehrad.Hamidian



Prof. Phil Hansbro

Director, Centre for Inflammation,
School of Life Sciences

Faculty of Science

Philip.Hansbro@uts.edu.au

Prof. Hansbro received his PhD in organic chemistry from the University of Leeds, UK in 1991. Prof. Hansbro, (an avid bird watcher) having seen all the birds in England embarked on a quest to secure a job in Australia in order to achieve his goal of seeing all the birds in Australia. Since his only prior knowledge of Australia was garnered from watching Crocodile Dundee, what could possibly go wrong? Prof Hansbro spent the next 6 years as a Post-doc at the Australian National University (ACT) before returning to the UK for a further 3 years. in 1999 Prof. Hansbro made the permanent move back to Australia and set up his own research group. He has now established the Centre for Inflammation in Centenary Institute (CI), the first joint initiative between UTS and CI. The Centre is making major contributions to understanding pathogenesis and developing new treatments of respiratory diseases. He has identified novel therapeutic avenues and therapies that are under further study. This is achieved through the developing new mouse models that recapitulate the hallmark features of human respiratory disease (asthma, COPD, COVID-19, influenza, IPF). He interrogates these models in integrated approaches (inflammation, immunity, histology, physiology, lung function, gas exchange analysis, microbiomes) to understand human disease and develop new treatments. His work is translational and is performed along with parallel human studies.

Keywords: COPD, asthma, infections, COVID-19

Research Interest/Projects in Prof. Hansbro's Laboratory:

- Developing new treatments for respiratory diseases such as asthma, COPD, fibrosis, infections and COVID-19.
- Investigating the pathogenesis of COPD and severe asthma using next generation multiplexed proteomics and crosslinking mass spectrometry (XL-MS)
- Investigating the metabolomic basis of the pathogenesis of COPD and COVID-19
- The Role of Mast Cell Proteases in Lung Infection
- Investigating the host-pathogen interface of Mycobacterium abscessus infection
- New guardians of the mucosa: Cell and molecular characterisation of M cell biology
- Which cells give rise to lung cancer
- Targeting bacteria as an early detection marker for lung cancer
- How UV radiation damages the cornea

- Elucidating the roles of steroid receptors in mitochondria

Methods/Research Skills commonly utilised in Prof. Hansbro's Laboratory include:

- In vivo mouse models of disease
- Protein extraction and analysis
- Cell culture
- Real time PCR
- ELISA
- Bioinformatics
- Proteomics
- Histological processing and analysis

Team members (optional):

- Centre manager
- Lab manager
- Dr Gang Lu, post-doctoral fellow
- Dr Matt Johansen
- Dr Peter Choi
- Dr Elinor Hortle
- Dr Annalicia Vaughan
- Dr Matt O'Rourke
- Dr Vrushali Chimankar
- Dr Sobia Idrees
- Dr Keshav Paudel
- Dr Caitlin Gilles
- Research assistants x 5, technical officers x 4

Collaborations (optional):

- 200 collaborators nationally and internationally

https://www.centenary.org.au/cen_program/centenary-uts-centre-for-inflammation/

Dr Dan Hesselson

Associate Faculty
Centenary Institute
d.hesselson@centenary.org.au

Dr Hesselson received his PhD in Genetics from the University of Wisconsin-Madison in 2006. After a postdoctoral fellowship in California he established an independent research lab at the Garvan Institute in 2012 focused on high-throughput drug screening using zebrafish. Dr Hesselson joined the Centenary Institute in 2020 where his zebrafish projects focus on mitigating the effects of PFAS (ultra-stable fluorinated compounds found in many products including Teflon, Scotchguard and firefighting foams that have contaminated the groundwater in NSW). PFAS bioacumulates over our lifetime and is associated with poor reproductive and health outcomes. There is currently no way of eliminating PFAS from our bodies. By screening ~1000 drugs, a current honours student has discovered that a common heart medication protects developing zebrafish from the damaging effects of PFAS exposure. An honours project is available that will combine additional screening with experiments to figure out how this drug might be repurposed to help mobilise and eliminate PFAS in our bodies.

Keywords: PFAS, drug screening, zebrafish, early development

Research Interest/Projects in Dr Hesselson's Laboratory:

- Finding new drugs to mitigate the effects of PFAS and understanding how they protect animals (and eventually humans) from this ubiquitous class of chemicals.

Methods/Research Skills commonly utilised in Dr Hesselson's Laboratory include:

- Zebrafish
- Drug screening
- CRISPR
- Real time PCR

Team members:

- Dr Kathryn Wright, post-doctoral fellow
- Miss Maegan Chin, Honours student

Collaborations:

- Professor Phil Hansbro, UTS/Centenary Centre for Inflammation Research
- Professor Greg Neely, Charles Perkins Centre, University of Sydney
- Professor Shinichi Nakagawa, UNSW Evolution & Ecology Research Centre

Dr Elinor Hortle

Postdoctoral Researcher Centre for
Inflammation School of Life Sciences
Faculty of Science UTS/Centenary Institute

elinor.hortle@uts.edu.au

Dr Elinor Hortle is a post-doctoral researcher interested in studying the host response to infection. She started her research career at the University of Tasmania, before completing her PhD at Macquarie University studying the effect of genetics on resistance to malaria in mice. She then moved into zebrafish research, investigating the ways in which platelets affect tuberculosis infection. In 2021 Elinor started her current position at the Centre for Inflammation, where she studies host-pathogen interactions in respiratory infections.

Keywords: host-pathogen interactions, infection, mast cells, inflammasomes, innate immunity

Research Interest/Projects in Dr Hortle's Laboratory:

- Understanding the role of mast cell proteases in lung infections
- Understanding the role of potassium flux and inflammasome activation in lung infections

Methods/Research Skills commonly utilised in Dr Hortle's Laboratory include:

- Microbiological techniques
- Cell culture
- Flow Cytometry
- *In vivo* and *In vitro* infections
- qPCR
- Histology

A/Prof Willa Huston

Associate Professor, School of Life Sciences
Faculty of Science
Wilhelmina.Huston@uts.edu.au

Associate Professor Huston received her PhD in 2004 from the University of Queensland, in the fields of microbiology and biochemistry. Her research is focussed on understanding bacterial pathogenic mechanisms that can be used to improve diagnosis and treatment strategies. Her research team is especially focussed on Chlamydia, and how the infection can lead to infertility and other immunopathological damage in some women. She is also interested in sexually transmitted infections, and intracellular pathogenic processes more broadly.

Keywords: Chlamydia, intracellular pathogen, sexually transmitted infection, immunopathology

Research Interest/Honours Project opportunities:

- Immunopathological factors in chlamydial disease leading to infertility.
- Pathogenic mechanism of chlamydial disease.
- Improved treatment of chlamydia.
- Novel diagnostic methods, and improved strategies to diagnose pelvic inflammatory disease

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- Protein extraction and analysis
- Cell culture
- Bacterial cultures
- Real time PCR
- ELISA
- Bioinformatics
- Microbiota
- Immunological analysis

Collaborations (optional):

- Dr Cath Burke, School of Life Sciences, UTS
- Prof Garry Myers, the Australian Institute for Microbiology & Infection (AIMI) .

Website/publications: https://www.uts.edu.au/staff/wilhelmina.huston

Dr Matt Johansen

Postdoctoral Researcher
Centre for Inflammation
School of Life Sciences
Faculty of Science
UTS/Centenary Institute
Matt.Johansen@uts.edu.au

Dr Johansen completed his PhD in Veterinary Microbiology and Immunology at the University of Sydney in 2017. In 2018, he moved to Montpellier, France where he undertook his postdoctoral training into the pathogenesis and discovery of novel therapeutic targets in non-tuberculous mycobacteria (NTM), particularly *Mycobacterium abscessus*. In 2020, he returned to Australia and joined the newly established Centre for Inflammation under the supervision of Prof Phil Hansbro. His current role is to develop the infectious diseases program within the Centre for Inflammation, which includes high-risk pathogens such as *Mycobacterium tuberculosis* and SARS-CoV-2.

Keywords: Infection, inflammation, pathogenesis, bacteria, virus, host-pathogen interactions

Research Interest/Honours Project opportunities:

- Understanding the host-pathogen factors controlling intracellular mycobacterial survival and persistence
- Dissecting the pathogenesis of SARS-CoV-2

Methods/Research Skills commonly utilised in Dr Johansen's Laboratory include:

- Animal infection models (mouse and zebrafish)
- Cell culture
- Microbiological techniques
- Fluorescence microscopy and live imaging
- Real time PCR

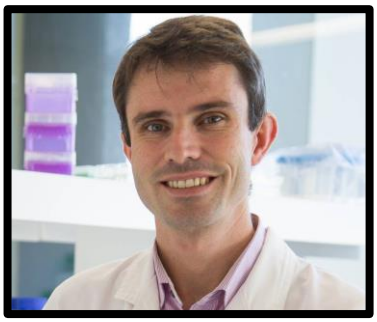
Team members:

- Prof Philip Hansbro, Supervisor/Director for the Centre for Inflammation

Collaborations:

- A/Prof Bernadette Saunders (UTS/Centenary Institute, Australia)
- Dr Stefan Oehlers (Centenary Institute, Australia)
- Dr Laurent Kremer (IRIM/CNRS, France)

Website/publications: https://www.uts.edu.au/staff/matt.johansen
https://www.researchgate.net/profile/Matt_Johansen2



Dr Ben Johnson

Adjunct Fellow, School of Life Sciences
Faculty of Science
Ben.Johnson@uts.edu.au

Dr Johnson received his PhD in molecular biology/biochemistry from the Western Sydney University, Sydney in 2015, where his research focused on the biological characterisation of novel platinum-based drugs to assess their potential utility as anti-cancer agents. Dr Johnson commenced his Postdoctoral role at the Asbestos Diseases Research Institute (ADRI) in 2019, where he is currently specialising in biomarker discovery/validation and *in vitro* 3D co-culture modelling to investigate improved diagnostic and immunotherapeutic strategies in relation to mesothelioma. Dr Johnson's current work is focused on investigating the diagnostic and disease status-monitoring potential of novel circular RNA biomarkers to facilitate an improved diagnosis of mesothelioma. Additionally, Dr Johnson's team are currently exploring the application of a 3D cell culture model to assess mesothelioma cell response to novel immunotherapy drug treatment strategies.

Keywords: Mesothelioma, biomarker discovery, immunotherapy drug, circular RNA, 3D co-culture.

Research Interest/Honours Project opportunities:

- Investigating the potential utility of circular RNA's as novel biomarkers to facilitate an improved diagnosis of mesothelioma.
- Investigating the application of an *in vitro* 3D cell culture technique to improve the translational potential of novel immunotherapy drug treatment strategies for mesothelioma.

Methods/Research Skills commonly utilised in Dr Johnson's/associate investigator's laboratory include:

- *In vitro* cell culture (3D spheroid co-culture) and immunotherapy drug treatment
- Cell proliferation/cytotoxicity assays
- Immunohistochemical analysis of protein biomarker expression
- RNA extraction from human cells, tissue and blood
- Quantitative real time PCR (RT-qPCR) analysis of biomarker/gene expression
- Droplet digital PCR (ddPCR) biomarker detection
- Circulating tumour cell isolation from patient blood/pleural effusions
- Circular RNA primer/probe assay design

Team members:

- A/Prof Sonja Klebe, Research Director and Pathologist
- Dr Peter Shi, Postdoctoral Research Fellow
- Dr Steven Kao, Oncologist
- Mr Ta-Kun Yu, Research Assistant
- Mrs Ling Zhuang, Technical Officer
- Ms Kristine Deang, Biobank Officer

Website/publications: https://scholar.google.com.au/citations?hl=en&pli=1&user=jUv49zgAAAAJ

Dr Richard Kim

Lecturer, School of Life Sciences

Faculty of Science

Richard.Kim@uts.edu.au

Dr Kim is a respiratory immunologist and completed his PhD in Immunology and Microbiology and postdoctoral training at the University of Newcastle/Hunter Medical Research Institute in 2015. Dr Kim then received the Lung Foundation Australia Boehringer Ingelheim Research Fellowship and joined UTS in 2019. Dr Kim's research aims to identify new therapeutic targets and treatments for chronic lung diseases, including severe asthma, chronic obstructive pulmonary disease, and respiratory infections, and is strongly focused on interrogating innate immune responses.

Keywords: respiratory immunology, severe asthma, infection, innate immunity, chronic lung diseases

Research Interest/Projects in Dr Kim's Laboratory:

- Interrogation of immune responses in lung disease development and exacerbation and identification of new therapeutic targets.

Methods/Research Skills commonly utilised in Dr Kim's Laboratory include:

- Mouse models of lung disease (i.e. severe asthma, infections)
- Tissue collection and processing
- RNA extraction/Real-Time qPCR
- Immunofluorescence
- Protein analysis (ELISA, immunoblot)

Collaborations:

- Dr Chantal Donovan (Lecturer)

Website: https://profiles.uts.edu.au/Richard.Kim

Assoc Professor Andy Leigh

Plant ecologist, School of Life Sciences, Faculty of Science
andrea.leigh@uts.edu.au

Andy conducted her PhD research on the functional significance of leaf form at the Australian National University (ANU). Andy commenced as a full-time academic at UTS in 2007, where she has been a researcher, supervisor and educator in environmental science ever since. She is fascinated with plants living in extreme environments, like deserts and alps. Andy's lab group are uncovering how plants cope with temperature stress, so that we can better understand their response to climate change.

Keywords: plant ecology, thermal tolerance, climate change, desert, temperature extremes

Research Interest/Honours Project opportunities:

- Plant tolerance to hot and cold temperature extremes, including glasshouse studies at ANU, Canberra, or at Australian Botanic Gardens, Mt Annan.
- How do droughted plants cope with heat extremes.
- Potential for co-supervised projects at University of Wollongong (UoW), University of Western Sydney (WSU) or University of Tasmania (UTas).

Methods/research skills commonly utilised in Andy's laboratory include:

- Leaf function and response to temperature stress using chlorophyll fluorometry;
- Leaf gas exchange (photosynthesis, conductance, transpiration, respiration) using an Infrared Gas Analyser and/or Porometer;
- Leaf temperature using infrared thermography and/or dataloggers;
- Potted plant or seed germination experiments (experimental garden in Port Augusta, UTS rooftop, Australian Botanic Garden, Mt Annan, or UoW);
- Leaf morphological measurements and plant identification in the field.

Team members (present and *recent* past):

- Dr Alicia Cook, PhD (2016-2021) and postdoctoral fellow (present)
- Pip Alvarez, PhD (2021-present)
- Lisa Danzey, Honours (2021-22) and PhD (2022-present)
- Shae Jones, PhD, co-supervised at UoW (2021-present)
- Rosie Harris, PhD, co-supervised at ANU (2020-present)
- Dr Kirsty Milner, PhD (2016-2020)
- Dr Eli Bendall, PhD, co-supervised at UoW (2016-2020)

UTS web profile, including publications and further links to videos and podcasts:
https://profiles.uts.edu.au/andrea.leigh

Dr Yan Liao

Chancellor's Postdoctoral Research Fellow
Australian Institute for Microbiology & Infection
Faculty of Science
yan.liao@uts.edu.au

Dr Liao received her PhD in Microbiology and Immunology from the University of New South Wales in 2017. Dr Liao then joined UTS and is now a Chancellor's Postdoctoral Research Fellow. Her research aims to decipher the principles of cell division in Archaea – ancient microorganisms that are of central importance to understanding the emergence of complex life. More recently, she has led the breakthrough discoveries on molecular mechanisms of cell division in Archaea. Dr Yan Liao's work is improving our understanding of archaeal fundamental biology and providing important insights into early life evolution.

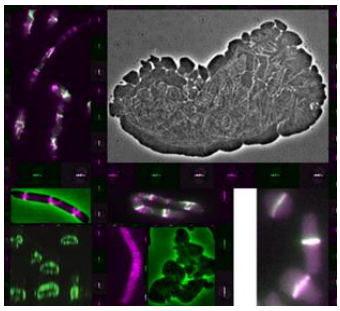
Keywords: cell division, archaea, genetic modification, microscopy imaging

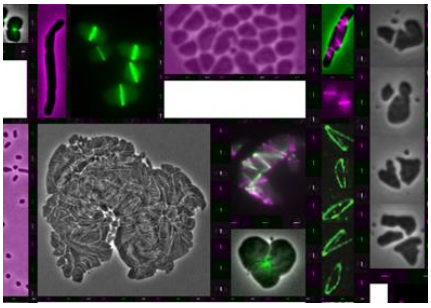
Research Interest/Honours Project opportunities:

- Identify new proteins for cell division of Archaea
- Characterize the structure and function of a multi-protein complex central to archaeal cell division

Methods/Research Skills commonly utilised in Dr Liao's Laboratory include:

- Genetic modification
- Plasmid construction and protein expression
- Fluorescence microscopy
- Super-resolution microscopy (confocal, 3D-SIM)





Collaborations:

- A/Prof Iain Duggin, Australian Institute for Microbiology & Infection
- Dr Bill Söderström, Australian Institute for Microbiology & Infection

Website/publications: https://profiles.uts.edu.au/Yan.Liao

Dr Gang Liu

Lecturer, School of Life Sciences,
Leader of fibrosis node, Centre for Inflammation,
Faculty of Science
gang.liu@uts.edu.au

Dr Liu received his PhD in immunology and microbiology at the University of Newcastle (UoN) in 2016. His PhD research is about airway and lung remodelling in lung diseases, including idiopathic pulmonary fibrosis (IPF), chronic obstructive pulmonary disease (COPD) and chronic asthma. Dr Liu conducted his research to understand the role of mast cells (a type of immune cells) in COPD as a postdoctoral researcher in Hunter Medical Research Institute (HMRI) at UoN. He then moved to priority of centre of digestive system in HMRI as postdoctoral research fellow (2017-2019) to study the link of immune response and microbiota in gut fibrosis of inflammatory bowel disease and understand the gut and lung cross talk. Dr Liu joined in Centre for inflammation at UTS and Centenary Institute as the leader of fibrosis program in 2019.

Fibrosis and remodelling are a severe stage of many diseases in almost every organ in human and it contribute to other diseases, such as cancer. However, current treatments have little effects to halt the fibrosis development. Currently, Dr Liu focuses on tissue remodelling and fibrosis in lungs, and expend in many different organs, including respiratory systems, digestive organs (intestine and gut). His works are to understand the relationship of fibrosis and inflammation in these fibrotic diseases using experimental models and clinical samples. These will identify novel therapeutic targets for these fibrotic disorders. Dr Liu has published his works in many high-impact journals, including Lancet [impact factor (IF)=202.7], Lancet Infect Dis [IF=71.4], Eur Respir J [IF=33.8], Am J Respir Crit Care Med [IF=30.5], Pharmacol Ther [IF=13.4], JCI Insight [IF=9.5] etc.

Keywords: remodelling, fibrosis, inflammation, lung, gut

Research Interest/Honours Project opportunities:

1. The role of mast cells in regulating pathogenesis of lung fibrosis
2. Extracellular matrix proteins (structure proteins) regulate tissue remodelling in lung fibrosis
3. Understand of gut fibrosis in inflammatory bowel disease

Methods/Research Skills commonly utilised include:

- Histological analysis for remodelling and fibrosis
- Protein extraction and immunoblot
- Immunohistochemistry and immunofluorescent
- Cell culture
- Animal handling and models
- RNA extraction from mouse tissues and cells
- Real time PCR and qPCR
- ELISA

Website/publications: https://www.uts.edu.au/staff/gang.liu

Dr Laurence Luu

CPDRF Fellow, School of Life Sciences
School of Life Sciences
laurence.luu@uts.edu.au

Dr Laurence Luu received his PhD in medical microbiology and immunology from the University of New South Wales in 2018. Here, he investigated the evolution of *Bordetella pertussis* (which causes whooping cough) to vaccines. In 2020, he joined Dr. Natalia Castaño Rodríguez's and A/Prof. Nadeem Kaakoush's lab at UNSW as a postdoc where he studied host, microbiome and pathogen interactions in inflammatory bowel diseases and gastrointestinal cancers. Dr Luu then joined UTS as a CPDRF research fellow in A/Prof Willa Huston's group. His current research investigates chlamydia host-pathogen interactions using a systems biology approach (transcriptomic, proteomic and functional genomics) to better understand how chlamydia infection leads to infertility.

Keywords: *Chlamydia*, bacterial pathogens, genomics, proteomics, molecular biology

Research Interest/Honours Project opportunities:

- *Chlamydia trachomatis* persistence and infertility
- Genetic manipulation of *Chlamydia*
- Genomic typing of pathogenic *Chlamydia* species

Methods/Research Skills commonly utilised in Dr Luu's Laboratory include:

- Systems biology (genomics, RNA-sequencing, proteomics)
- Molecular biology (PCR, qPCR, ELISA, cloning etc.)
- CRISPR
- Cell culture
- Bioinformatics

Collaborations:

- A/Prof Willa Huston, School of Life Sciences, UTS
- Prof Ruiting Lan, School of Biotechnology and Biomolecular Sciences, UNSW
- A/Prof Nadeem Kaakoush, School of Medical Sciences, UNSW
- Dr Natalia Castaño Rodríguez, School of Biotechnology and Biomolecular Sciences, UNSW

Website/publications: https://profiles.uts.edu.au/Laurence.Luu

Professor Deborah Marsh

Discipline Leader, Medical Science
Lab Head, Translational Oncology Group
School of Life Sciences
Faculty of Science
Deborah.Marsh@uts.edu.au

Professor Marsh is a cancer researcher trained in cell and molecular biology, genetics and epigenetics. Her PhD was awarded by the University of Sydney and she undertook postdoctoral studies at the Dana Farber Cancer Institute, Harvard Medical School, Boston, USA (1996-99). She joined UTS in August 2018 from the Kolling Institute, Royal North Shore Hospital and University of Sydney, and holds the honorary title of Professor of Molecular Oncology with the Faculty of Medicine and Health, University of Sydney. She has a broad research interest in malignancies that affect women, with a predominant focus on ovarian cancer. This includes research into familial cancer syndromes and sporadic tumours. Her recent work is focussed on understanding genetics, epigenetics / epigenomics and the interplay between the two, as drivers of malignancy and in overcoming drug resistance. Her group has a particular interest in molecular target drugs for precision medicine and therapeutic targeting of DNA repair pathways.

Keywords: cancer, women's cancers, ovarian cancer, drug resistance, targeted cancer therapy, DNA repair, tumour suppressors, molecular and cell biology, precision medicine

Research Interest/Honours Project opportunities:

- Using 3D cell culture to investigate targeted therapies in ovarian cancer
- Elucidating interactions between genetic and epigenetic changes in ovarian cancer

Methods/Research Skills commonly utilised in Prof Marsh's Laboratory include:

- Cell culture: live cell imaging, transfection, cell survival assays, 3D bio-printing (new)
- Molecular techniques: cloning, gene editing (CRISPR-Cas9)
- Protein extraction and analysis, e.g. immunoblotting, ELISA; Real time PCR

Team members (current):

- Ms Kristie Dickson, Research Associate
- Mr Yue (Daniel) Ma, PhD student
- Mr Mohammed (Nimeree) Muntasir, Honours Student
- Ms Ramla Roohi, Honours Student (with A/Prof Willa Huston's group at UTS)
- Ms Audrey Nadalini, Honours Student (with Dr David Gallego-Ortega, Garvan Institute)
- Ms Tharathip Hikasem (undergraduate intern)

Academic Profile: https://www.uts.edu.au/staff/deborah.marsh

Dr Lana McClements

Senior Lecturer, School of Life Sciences

Faculty of Science

lana.mcclements@uts.edu.au

Dr McClements is a clinical pharmacist with a PhD in molecular therapeutics from Queen's University Belfast, UK. Since the beginning of her research career, she has been involved and carried out translational research studies working with 3D cell models, patient samples, and various pre-clinical models. Her research focuses on understanding the pathogenic mechanisms of cardiovascular complications in pregnancy (i.e. preeclampsia) and beyond. Identification of new pathogenic mechanisms leads to translation into novel biomarkers or targets, which can be explored for disease prediction, early diagnosis or treatment. Dr McClements is also investigating the therapeutic potentialof mesenchymal stem cells and associated extracellular vesicles in cardiovascular diseases.

Keywords: vascular biology, preeclampsia, diabetes, cardiovascular disease, heart, stem cells

Research Interest/Honours Project opportunities:

- 3D models of placenta and vascularised tissues
- Novel biomarkers and targets in pre-eclampsia
- Mesenchymal stem cells as a therapy for pre-eclampsia
- Novel biomarkers/mechanisms in cardiac fibrosis and heart failure
- Mechanisms of diabetic cardiomyopathy

Methods/Research Skills commonly utilised in Dr McClements' Laboratory include:

- Protein/mRNA/miRNA extraction and analysis
- Genetic manipulations/transfections (CRISPR, siRNA, plasmid. RALA)
- Cell culture
- Western blotting/Immunofluorescence and histology/RT qPCR/ELISA
- *In vivo/ex vivo*

Team members:

- Mr Michael Chorr, PhD student
- Ms Sahar Ghorbanpour, PhD student
- Mrs Claire Richards, PhD student
- Mrs Dinara Alfrose, PhD student
- Ms Claire Rennie, Research Assistant
- Mr Dillan Pienaar, PhD candidate

Collaborations:

- Dr Kristine McGrath (Science, UTS)
- Dr Matthew Padula (Science, UTS)
- Prof Majid Warkiani (FEIT, UTS)
- Prof Deborah Marsh (Science, UTS)
- Dr Peter Su (FEIT, UTS)
- Dr Carmine Gentile (FEIT, UTS)

Website/publications: https://www.uts.edu.au/staff/lana.mcclements; www.drlanamcclements.com

A/Prof Diane McDougald

The Australian Institute for Microbiology & Infection (AIMI), Faculty of Science
diane.mcdougald@uts.edu.au

*Students may be considered for the AIMI Excellence in Research Honours Scholarship *

Associate Professor McDougald received her PhD from the University of New South Wales and leads the Microbial Ecology and Evolution group located at the Australian Institute for Microbiology & Infection (AIMI). McDougald's major research interests are the mechanisms of survival and persistence of pathogens in the environment, and what impact these mechanisms have on virulence and pathogenicity in the host. The team investigates the drivers and consequences of bacterial adaptation to stresses, including interactions with higher organisms.

Research Interest/Project 1: The team is conducting a multicentre longitudinal study on catheter-associated urinary tract infections (CAUTI) in people with spinal cord injuries (SCI). Our aim is to develop a predictive diagnostic tool to predict CAUTIs and develop prevention and intervention tools, to improve quality of life, reduce mortalities, reduce spread of drug-resistant bacteria in high-risk populations. This Honours project will investigate the pattern of antibiotic resistance in bacterial communities of asymptomatic SCI patients.

Keywords: UTIs, catheter-associated infections, prediction, prevention, antibiotic resistance, probiotic

Research Interest/Project 2: The team investigates the interactions of prokaryotes and eukaryotes using several model systems to investigate the impact of predation by protozoa on microbial communities and how evolution of grazing defences drives the evolution of pathogenicity in the environment. This Honours project will investigate protozoa as a transmission vector for *Vibrio cholerae* and *Legionella pneumophila*.

Keywords: pathogenicity, predation by protozoa, evolution of virulence, *Vibrio cholerae, Legionella*

Methods/Research Skills commonly utilised in the laboratory include:

- Molecular biology (cloning, mutagenesis, qPCR etc)
- High throughput sequencing (RNA and DNA sequencing) and analysis
- Biofilm flow cells
- Tissue culture assays
- Protozoan grazing assays
- Virulence factor bioassays
- Single cell transcriptomics

Team members:
Dr Gustavo Espinoza-Vergara Dr Parisa Noorian
MD Mozammel Hoque

Collaborations:
Ass Prof. Scott Rice (Nanyang University)
Assoc. Prof. Iain Duggin (AIMI, UTS)
Dr Bonsan Bonne Lee (Prince of Wales Hospital) Professor Andrew Camilli (Tuft University) Professor Fitnat Yildiz (UC at Santa Cruz)

Website/publications: https://www.uts.edu.au/staff/diane.mcdougald

Dr Kristine McGrath

Senior Lecturer, School of Life Sciences
Faculty of Science
Kristine.Mcgrath@uts.edu.au

Dr McGrath received her Bachelor of Science (Hons) from University of Western Australia (1998) and PhD (2006) from the University of Sydney for a thesis entitled "Molecular pathways of androgen action in the male cardiovascular system". Dr McGrath was a postdoctoral research fellow at the Heart Research Institute before she was awarded the UTS Chancellor's Research Fellowship in 2011. There are two research arms that the McGrath laboratory focuses on. The first focuses on investigating the impact of diet and air pollutants (diesel, nanoparticles, e-cigarette vapour) that can increase the risk for the development of the pathologies - type 2 diabetes, atherosclerosis and Alzheimer's disease. The second is focused, in part from using the knowledge gained from the first arm, on the discovery of targets/compounds that can target chronic inflammation and oxidative stress to reduce the risk for the development of the subsequent pathologies.
Keywords: inflammation, oxidative stress, gene expression, animal models, type 2 diabetes, cardiovascular disease, Alzheimer's disease

Research Interest/Honours Project opportunities:

- Investigating the molecular mechanism of honey-treated diabetic wounds: Exploring 3D bio-printed skin models.
- Investigating the effects of e-Cigarette vaping in atherosclerosis and type 2 diabetes.
- Developing novel strategies to reduce acute atherosclerosis-associated inflammation.

Methods/Research Skills commonly utilised in Dr McGrath's Laboratory include:

- *In vitro* cell culture / *In vivo* animal models
- Gene expression (e.g. Real time PCR, ELISA, Western blotting)
- Histology and immunohistochemistry
- Molecular biology (e.g. luciferase assays, chromatin immunoprecipitation)

Team members:

- Miss Gihani Manodara, PhD Student
- Miss Claire Rennie, PhD Student
- Miss Charlotte Fleming, PhD student
- Dr Hermily Geronimo, PhD student
- Mr Michael Chhor, PhD student

Collaborations contributing to Honours Project:

- A/Prof Sheila Donnelly (SoLS, UTS)
- Dr Cindy Gunawan (AIMI, UTS)
- Dr Lana McClements (SoLS, UTS)
- Dr Sarah Bajan (SoLS, UTS)
- Dr Ashish (Heart Research Institute)
- Dr Sanjay Patel (Heart Research Institute)

Website: https://www.uts.edu.au/staff/kristine.mcgrath

Assoc. Prof. Brad Murray

Discipline Leader of Environmental Sciences
School of Life Sciences
Faculty of Science
Brad.Murray@uts.edu.au

Brad has research interests in fire ecology and the conservation of native biodiversity. His research team, the Biodiversity Conservation Lab, focuses on the collection of fresh ecological data using carefully designed observational and manipulative fieldwork and laboratory studies. The lab's research seeks to understand fundamental ecological and evolutionary patterns and processes with an eye to providing applied solutions for conserving flora and fauna in disturbed landscapes. Brad is particularly interested in devising land management strategies that ensure native biodiversity conservation under projected climate change and wildfire regimes.
Keywords: biodiversity, botany, conservation, ecology, evolution, invasion ecology, invertebrates, plant flammability, rare and threatened species, wildfire

Honours Project Opportunities

- Experimental projects to determine the flammability of native and exotic plant species
- Field-based projects in wildfires, vegetation ecology and/or invertebrate biodiversity
- Population ecology studies of native plants in the Sydney region

Methods/Research Skills Commonly Utilised in Brad's Lab

- Experimental skills in assessing leaf and shoot flammability of plants
- Field skills in plant identification, vegetation surveys and invertebrate biodiversity surveys
- Experimental design and statistical analysis (in R)

Team Members

- Dr Dan Krix, Post-Doctoral Research Fellow
- Mr Kieran Young, Research Assistant
- Ms Nicola Huber-Smith, MSc student
- Ms Molly Wallace, MSc student
- Ms Elisabeth Morley, Honours student
- Mr Andrew Tweed, Research Internship student

Collaborations

- Other academics in Environmental Sciences including Prof. Jonathan Webb, Dr Leigh Martin, Assoc. Prof. Andy Leigh
- A range of industry partners including Environmental Trust, NSW Rural Fire Service

Website: https://profiles.uts.edu.au/Brad.Murray/about

Prof.

Simon Mitrovic

School of Life Sciences

Faculty of Science

simon.mitrovic@uts.edu.au

I am Professor of Freshwater Ecology in the School of Life Sciences. I lead the Freshwater and Estuarine Research Group where we do applied research focusing on freshwater ecology, cyanobacterial blooms, environmental flows and plant ecotoxicology. I work closely with government departments to solve environmental issues and this also ensures that students are exposed to industry related issues and undertake research relevant to industry needs. In this way research students develop skills to be placed into government and industry positions.

Keywords: freshwater toxic algal blooms, environmental flows, water plant management and ecotoxicology

Research Interest/Projects in Dr Snow's Laboratory:

- How macrophytes (water plants) can control toxic algae
- Environmental flows and how they improve river health
- How nutrients influence toxic blue-green algae growth and toxin production.

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- Field studies of rivers and lakes
- Boat and shore-based work
- Lab experiments
- Microscope ID and counting of algae
- Lab analysis of nutrients

Team members:

- Dr Jordan Facey, post-doctoral fellow
- Dr Anne Colville, Research Manager

Collaborations:

- Dr Simon Apte, Senior Principal Research Scientist, CSIRO
- Dr Craig Boys, NSW Fisheries
- Doug Westhorpe, NSW DPIE
- Dr David Bishop (UTS MaPS)
- Dr Ken Rodgers (SoLS)

Dr Najah Nassif

Senior Lecturer
Subject coordinator | Leader, Cancer Biology Group
School of Life Sciences
Faculty of Science
Najah.Nassif@uts.edu.au

Dr Nassif received her PhD in molecular and evolutionary biology from the University of New South Wales. After postdoctoral fellowships at Sydney University and the University of New South Wales, Dr Nassif commenced at UTS. Her primary research interests are in the investigation of the genetic and molecular basis of colorectal and other cancers with the aim of developing diagnostic and/or prognostic biomarkers and future novel therapies for cancer. Her current research is focused on understanding how dysregulation of the PTEN tumour suppressor leads to cancer. Her current research focuses on determining how dysregulation of PTEN tumour suppressor gene expression and/or function, contributes to the development and/or progression of cancer. This includes includes examining the role of gene/pseudogene, and miRNA, interactions in regulation of PTEN. Dr Nassif also collaborates with other researchers at UTS and externally.

Keywords: Molecular biology, cancer biology, gene expression, polymerase chain reaction (PCR, RT-PCR, real time PCR), mutation, polymorphism, genome variation.

Research Interest/Honours Project opportunities:

- Examining the effect(s) of PTEN mutations on PTEN function with analysis of the cellular consequences of cancer-associated PTEN mutations.
- Investigating the role(s) of the PTEN pseudogene (PTENP1) in the regulation of PTEN expression and cellular abundance through competition for microRNA binding and direct transcriptional regulation.
- Determining the effect of *PTEN* gene mutations on PTEN protein structure.

Methods/Research Skills commonly utilised in Dr Nassif's Laboratory include:

- Molecular biology
- DNA/RNA extraction and analysis
- Cell culture
- Cloning
- Real time quantitative and digital PCR
- Bioinformatics

Team members:

- Glena Travis, PhD student
- James Favaloro, MSc student)
- Tamara Fraser, MSc student
- Olivia Aitkens, Honours student
- Additional co-supervised PhD and Honours students

Collaborations and collaborative research projects:

- Prof Ann Simpson (UTS) - development of gene therapy as a cure for diabetes.
- A/Prof Marina Kennerson (ANZAC Research Institute, and USYD) - characterising the functional effects of gene mutations using *in vivo* models of inherited neurological disorders.

Website/publications: https://www.uts.edu.au/staff/najah.nassif

Professor Brian Oliver

A/Prof, School of Life Sciences
Faculty of Science
Brian.Oliver@uts.edu.au

Dr Oliver was initially trained in the UK. Following his work at Imperial College, UK, he completed his PhD in respiratory virology at The University of Sydney (2005). 7M AUD of funding, a few fellowships, and 150 publications later he now knows a thing or two about respiratory diseases. His group (around 20 people) carries out research spanning basic to clinical in all aspects of respiratory medicine.

Keywords: Asthma, COPD, CF, Lung Cancer, breathing

Research Interest/Honours Project opportunities:

- Understanding why people develop asthma and COPD focusing upon epigenetics
- Clinical research into biomarkers of disease

Methods/Research Skills commonly utilised in A/Prof Olivers' Laboratory include:

- Cell culture
- Molecular biology (qPCR, RNAseq, ChIP ect)
- Cell signalling cascades (Western blotting, Confocal Microscopy, inhibitor experiments)
- In-vitro / ex-vivo / in-situ models of disease
- Clinical cohort studies

Team members:

- Dr Jeremy Chan, NHMRC post-doctoral fellow (maternal programming)
- Dr Xia Zenaki, post-doctoral fellow (Lung Cancer)
- Dr Raj Allum, post-doctoral fellow (models of asthma and COPD)
- Dr Joel Ma, post-doctoral fellow, (immunology)
- Dr Penny Dalla, post-doctoral fellow (proteomics)
- Dr David van Reyk, research associate (free radical biology)

Collaborations (optional):

- Dr Sanjay Chotamali (NTU – micobiome)
- Dr Ian Adcock (Imperial – epigenetics)
- Dr Rama Krishnan (Harvard – biomechanics)

Website/publications:

http://respiratoryresearchgroup.org
https://scholar.google.com.au/citations?user=xWsnVmoAAAAJ&hl=en

Dr Matt Padula

Senior Lecturer, School of Life Sciences
Faculty of Science
Matthew.padula@uts.edu.au

Matt received his PhD in Proteomics from the University of Technology Sydney in 2008, and has been at UTS since 1997 as a Research Assistant, Laboratory Manager, Technical Specialist, and now Senior Lecturer. He is the Director of the Proteomics, Lipidomics and Metabolomics Core Facility and the Program Director for Masters of Medical Biotechnology. His research focuses on developing techniques and technologies for system-wide analysis of biomolecules using chromatography, electrophoresis and mass spectrometry, using microorganisms and antibiotic resistance as models for these developments. In addition, Matt undertakes numerous collaborative projects with researchers seeking to perform biomolecular analysis on a wide range of samples and organisms.

Keywords: Systems Biology, Proteomics, Metabolomics, Lipidomics, Anti-microbial resistance.

Research Interest/Project opportunities:

- Development and application of techniques for system-wide analysis of biomolecules.

Methods/Research Skills commonly utilised in Matt's Laboratory include:

- Biomolecule (protein, metabolites, lipids) extraction and analysis.
- Fractionation by chromatography and electrophoresis.
- Mass spectrometry analysis of biomolecules.
- Bioinformatics.

Team members:

- Stephanie Town – Technical Officer, Core Facility.
- David Gertner – PhD student.
- Luke Farrell – Internship student.
- Rachel Smith – Volunteer researcher.

Collaborations:

- Professor Diane McDougald. Co-incubation of model pathogen bacterium *Vibrio cholerae* with the model ciliated protozoa *Tetrahymena pyriformis*, producing Expelled Food Vacuoles to reveal their surface proteomic nature and propose candidate proteins as markers for environmental detection.
- Dr Lacey Johnson (Lifeblood). Improving the quality of platelets during cryopreservation through the use of targeted inhibitors and Understanding the effect of refrigerated storage on the platelet releasate.
- Dr Denise Marks (Lifeblood). Characterisation of serum eye drops for patients with dry eye disease.

Dr Keshav Raj Paudel

Postdoctoral researcher,
School of Life Sciences, Faculty of Science, UTS
keshavraj.paudel@uts.edu.au

Dr Paudel received his PhD in pharmacology from the Mokpo National University, South Korea in 2017. He joined UTS from University of Texas Health Science Centre at Houston, Texas, USA where he was a postdoctoral researcher working in the field of circadian rhythm and breast cancer using mice models and cell lines. His current research focuses on investigating miRNAs as a diagnostic marker of lung cancer. His lung cancer research group uses cigarette smoke to develop lung's adenocarcinoma in mice and analysis various parameter involved in pathogenesis of lung cancer.

Keywords: lung cancer, asthma, miRNA, airway inflammation

Research Interest/Honours Project opportunities:

- miRNA as a diagnostic markers of lung cancer.
- Role of extracellular vesicles on cancer progression.
- Role of bushfire smoke/ambient dust particles in pathogenesis of chronic respiratory diseases.

Methods/Research Skills commonly utilised by Dr Paudel's in laboratory include:

- Protein extraction and analysis
- Cell culture (A549, Calu3, THP-1) and cell based in vitro assay
- Real time PCR
- ELISA
- Smoke/Carcinogen induced mice model of lung cancer
- Histology (Immunohistochemistry, H&E staining, PAS staining)
- InExpose system for aerosol, fine dust induced airway disease model

Team members:

- Professor Philip Hansbro, Mentor
- Dr. Kamal Dua (collaborator)
- Prof. Mary Bebawy (collaborator)
- Mr Vamshikrishna Malyla, PhD student

Website/publications: https://scholar.google.com.au/citations?user=v1Y-RswAAAAJ&hl=en&oi=sra
https://publons.com/researcher/1181927/dr-keshav-raj-paudel/
https://www.uts.edu.au/staff/keshavraj.paudel

Dr Katherina Petrou

Associate Professor, School of Life Sciences
Faculty of Science
Katherina.Petrou@uts.edu.au

Associate Professor Katherina Petrou is a phytoplankton ecophysiologist, and leader of the Petrou Lab in the School or Life Science. Her research combines micro- and macro-scale biology and ecology, taking a fine scale-approach including single-cell and sub-cellular analyses to target questions on broad scale ecological consequences of environmental change. To achieve this, she primarily employs manipulative experimental approaches, often combining an extensive array of specialised techniques (see below) to assess photomechanistic effects, metabolic, biochemical and macromolecular compositional changes at the single cell and community level, as well as measure production and consumption of metabolic sulfur compounds such as DMSP and DMS.

Keywords: phytoplankton, ecophysiology, marine sulfur dynamics, response to climate change

Research Interest/Honours Project opportunities:

- Effects of climate change on diatom silica production
- Evaluating diatom sinking rates (and therefore C and Si flux) under environmental change
- Nutrient retention and use in diatoms
- Phytoplankton stress physiology and the role of DMSP
- Physiological mechanisms underpinning coral symbiosis

Methods/Research Skills commonly utilised in Dr Petrou's lab include:

- Cell culture
- Fluorometry
- FTIR microspectroscopy
- Confocal and fluorescence microscopy
- Flow cytometry
- Gas chromatography

Collaborations:

- Dr Ruth Eriksen (CSIRO, marine and atmospheric research)
- Dr Mark Tobin (Australian Synchrotron, ANSTO)
- A/Prof Kai Schulz (Southern Cross University)
- A/Prof Brook L Nunn (Washington University, Seattle)
- Dr Kim Thamatrakoln (Rutgers, New Jersey)

Website/publications: https://www.katherinapetrou.com

A/Prof Ken Rodgers

Head, Neurotoxin Research Group
Associate Professor, School of Life Sciences
Faculty of Science
kenneth.rodgers@uts.edu.au

Dr Rodgers received his PhD from the Faculty of Medicine at the University of the Sydney. He was then a Pfizer post-doctoral fellow at the University of Bristol in England. He joined UTS from The Heart Research Institute in Sydney where he was leader of the Cell Biology Research Group. His research now focuses on neurotoxins and encompasses both understanding their mechanisms of toxicity and analyses of toxins levels in the environment to determine human exposure. In addition, his group are interested in developing treatments to protect the human brain against a range of toxic molecules.

Keywords: neurotoxicity, cell biology, non-protein amino acids, environmental toxins, motor neurone disease, Parkinson's disease

Research Interest/Honours Project opportunities:

- Understanding how toxins produced by cyanobacteria (blue-green algae) damage neurons.
- Testing compounds that protect or reverse damage to neuronal cells.
- Monitoring rivers and lakes to determine levels of cyanobacterial neurotoxins.
- Developing better therapeutic strategies to treat Parkinson's disease.

Methods/Research Skills commonly utilised in Dr Rodgers' Laboratory include:

- Protein extraction and analysis
- Cell culture
- Real time PCR
- Mass spectrometry and metabolomics
- Western blotting
- Microscopy and live-cell imaging

Team members:

- Kate Samardzic, PhD student
- Carly Italiano, PhD student
- Joel Steele, PhD student
- Jake Violi, PhD student
- Lisa Pu, Masters student

Collaborations (UTS):

- Dr David Bishop, Analytical Chemistry, MaPS
- Dr Simon Mitrovic, Environmental Scientist, SoLS

Website/Publications: https://www.uts.edu.au/staff/kenneth.rodgers

Dr Jerran Santos

Group Leader, Stem Cell Futures Fellow,
Advanced Tissue Engineering and Stem Cell Biology Group, School of Life Sciences Faculty of Science
Jerran.Santos@uts.edu.au

Dr Jerran Santos is the Group Leader of the Advanced Tissue Engineering and Stem Cell Biology Group at the University of Technology Sydney and holds an Honorary Professorship at the University of Toulouse. His research focus is on regenerative and precision medicine, utilizing stem cells and biomaterials in developing translational clinical applications. His primary interests are in a systems biology focus of molecular biology examining the shift in stem cells phenotype during the differentiation into the targeted cell types. The interactions and changes of various molecules, proteins, nutrients, metabolites, and RNA over time play an important role in the overall functionality and endpoint cell type. Understanding the underlying molecular mechanisms, pathways and their interactions have a significant role in downstream applications. His interests extend to utilizing stem cells in developing models for degenerative diseases and biomarker discovery to expand the knowledge database by identifying key pathways in developing diseases.

Keywords: Stem Cells, Tissue Engineering, 3D printing, Systems Biology, Molecular Biology, Bioinformatics, regenerative medicine, degenerative diseases, neurobiology

Research Interest/Honours Project opportunities:

- Project 1: Investigating Bone Tissue Regeneration utilising Stem Cells and synthetic biomimetic scaffolds
- Project 2: Identifying of key protein interactions and function in a neurodegenerative disease
- Project 3: Neuronal differentiation potential of Mesenchymal Stem Cells
- Project 4: Molecular analysis of cartilage differentiated from adult stem cells
- Project 5: Exploring neuronal markers expressed on neural stem cells and progenitor ependymal spinal cells

Methods/Research Skills commonly utilised in Dr Snow's Laboratory include:

- Cell culture, Protein extraction and analysis, 1D/2D SDS PAGE, Cytokine analysis, Metabolic assays, Proteomics, Bioinformatics

Team members (optional):

- Em/Prof Bruce Milthorpe (Tissue Engineering), Em/Prof Besim Ben-Nissan (Biomaterials), Neus Gomila Pelegri (PhD student), Nancy Li (Masters student)

Collaborations (optional):

- Prof Cathy Gorrie (Neuro), Dr Matt Padula (Proteomics), Dr Tom Lawson (Chemical Engineering Macquarie University), Prof Brian Oliver (Respiratory Research),
- Various Industry, commercial and hospital collaborations

Website/publications: https://profiles.uts.edu.au/Jerran.Santos/publications

A/Prof Bernadette Saunders

Senior Lecturer, School of Life Sciences

Faculty of Science

bernadette.saunders@uts.edu.au

I am a cellular immunologist specialising in infectious diseases. My current research projects include:

- dissecting the mechanisms by which macrophages control infection and regulate inflammation
-identifying new biomarkers to aid the diagnosis of lung diseases including tuberculosis.
- identifying new drugs for tuberculosis and the non-tuberculosis mycobacteria, which are a major problem for individuals with cystic fibrosis.
- Understanding how inflammation in the lung disease LAM develops and testing new biomarkers

Keywords: tuberculosis, macrophages, infection, cystic fibrosis, lung inflammation, microRNA, biomarkers, drug discovery

Research Interest/Honours Project opportunities:

- Developing new drugs to treat tuberculosis and related infections
- microRNA and macrophage activation
- Biomarkers of TB disease
- Developing new biomarkers of LAM (lymphangioleiomyomatosis) disease

Methods/Research Skills commonly utilised in Dr Saunders Laboratory include:

- Microbiology
- Cell culture (human macrophages, cell lines)
- Immune assays (including ELISA, Cytometric Bead Assays, flow cytometry)
- Real time PCR, sequencing,
- In vivo infection studies with mice

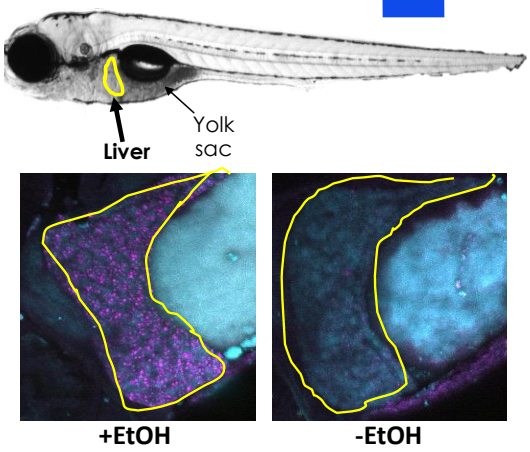
Team members (optional):

- Giang Le, PhD student
- Maxwell Stevens, PhD student
- Liberty Conyers PhD student
- Cleo Hall-Strom PhD Student
- Dr Nilesh Bokil, adjunct researcher

Collaborations (optional):

- Prof Warwick Britton, Centenary Institute (co-supervisor TB projects)
- A/Prof Valery Combes, UTS (co-supervisor LAM Project)
- Prof Phil Hansbro and Dr Matt Johansen -Non tuberculous mycobacteria projects

Website/publications: https://www.uts.edu.au/staff/bernadette.saunders



Lipid droplets (pink) in liver

Dr Devanshi Seth PhD, MPH, MSc, BSc (Honours)

Dr Devanshi Seth PhD, MPH, MSc, BSc (Honours)

Principal Scientist

Edith Collins Centre (Translational Research in Alcohol Drugs and Toxicology), Sydney Local Health District

Associate Professor, Centenary Institute, Faculty of Medicine & Health, USYD

Visiting Professor, School of Life Sciences, UTS

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UTS contact: Prof Ann Simpson, Ann.Simpson@uts.edu.au

Dr Devanshi Seth is an internationally recognised leader in the field of alcohol-induced liver diseases, with a strong leadership directing several national and international projects to success. She is the founding leader of a unique Alcoholic Liver Disease Program in Australia (2008-present) and a multinational and multidisciplinary GenomALC Consortium (2011-present), pioneering the genetics of these diseases. Her most recent and novel discoveries demonstrate that (i) underlying risk genes are shared between alcohol- and fat-induced liver diseases and (ii) majority of the genetic variants associated with risk of cirrhosis are linked to the lipid pathway Whitfield JB,..**Seth D.** *J Hepatology 2022;* Schwantes-An T-H, …**Seth D.** *Hepatology 2021*). Therefore, lipid storage is a central pathology in these diseases. Fatty liver being the starting point of both these chronic diseases, linking genes to lipid storage biology and targeting lipids before the onset of an unstoppable and irreversible march to cirrhosis are the focus in the current projects. This project will use Seth laboratory's innovative zebrafish genetic models of fatty liver that show increased lipid in the liver with single exposure of alcohol (EtOH) (see figure above; Oehlers S,…. **Seth D**. *American Association for Study of Liver Diseases (AASLD).* Abstract LP16, pg 32; Fathima S,..**Seth D.** 2021 *Gordon Research Conference*).

Keywords: Fatty liver, lipids, zebrafish, alcohol, cirrhosis, genetics, CRISPR gene editing, live imaging

Research Interest/Honours Project opportunities:

- Understanding the genetic regulation of hepatic lipotoxicity *in vivo* in fatty liver disease models of zebrafish.
- Targeting lipids/lipid pathways to reduce oxidative stress and inflammation in above models.

Methods/Research Skills commonly utilised in Dr Seth's Laboratory include:

- Zebrafish gene- and disease-specific modelling (CRISPR-Cas9)
- Feeding alcohol and fat to animal models
- Real time PCR
- Live Imaging
- 'Omics' (genomics, lipidomics, MicroRNA profiling

Team members (optional):

- Dr Fathima Shihana, post-doctoral Research Officer

Collaborations (optional):

- Professor Ann Simpson, Professor of Biochemistry, University of Technology Sydney
- Dr Stuart Fraser, School of Biomedical Engineering, Faculty of Engineering, University of Sydney

Websites: www.centenary.org.au; https://www.edithcollinscentre.org.au/
https://www.sydney.edu.au/medicine-health/about/our-people/academic-staff/d-seth.html

Professor Justin Seymour

Professor, Climate Change Cluster
Faculty of Science
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Professor Seymour leads the **Ocean Microbiology Group**, within the Climate Change Cluster. The over-arching goal of his research is to understand how the sea's smallest inhabitants – marine bacteria, archaea, phytoplankton and viruses - control the productivity and biogeochemistry of the Ocean, influence the health and ecology of marine animals and plants, cause disease in aquaculture and impact human health.

Keywords: Marine Microbial Ecology, Oceanography, Water Quality, Bacteria

Research Interest/Honours Project opportunities:

- Characterising the causes of poor water quality and Sydney beaches using molecular microbiological tools
- Assessing anthropogenic impacts on coastal microbiomes
- Phytoplankton-bacteria symbiosis: characterising the ecological interactions at the base of the marine foodweb
- Defining the links between marine heat waves and outbreaks of marine pathogens

Methods/Research Skills commonly utilised in Prof. Seymour's Laboratory include:

- Molecular microbiology
- Ecogenomics
- Microfluidics
- Microbial Source Tracking
- qPCR

Team members:

- Dr Jean-Baptiste Raina, Post-doctoral Fellow
- Dr Nahshon Siboni, Post-doctoral Fellow
- Dr Anna Bramucci, Post-doctoral Fellow
- Dr Martin Ostrowski, Senior Research Fellow

Collaborations:

- NSW Department of Planning, Industry and Environment
- Beachwatch
- NSW Department of Primary Industries
- Australian Microbiome Initiative
- Integrated Marine Observing System

Website: https://www.uts.edu.au/staff/justin.seymour

Prof. Ann Simpson

Prof. of Biochemistry,
School of Life Sciences
Faculty of Science
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Professor Simpson has a BSc (Hons) and a PhD (Veterinary Science) from the University of Sydney. She joined the staff at UTS in 1994 and since 2002 has held the position of Professor of Biochemistry. She is Director of the UTS Research Centre for Health Technologies. Her areas of expertise are biochemistry, molecular biology and cell biology. Her work focuses on novel strategies to deliver the insulin gene directly to the liver of diabetic animals, so far reversing diabetes with normal glucose tolerance in chemically-diabetic rats, spontaneously diabetic mice, humanised mice and a diabetic pig model by direct delivery of the insulin gene to the animal's livers using a viral vector.

Keywords: Type 1 diabetes, gene therapy, viral vectors,

Research Interest/Honours Project opportunities:

Expression of insulin and beta cell transcription factors in liver cells to induce pancreatic transdifferentiation

Methods/Research Skills commonly utilised in Dr Simpson's Laboratory include:

- Protein extraction and analysis
- Cell culture
- Real time PCR
- ELISA
- Immunohistochemistry and Immunofluorescence

Team members (optional):

- Dr Binhai Ren, post-doctoral fellow
- Mr Vijit Saini, PhD student
- Ms. Fahmida Abdi, PhD student
- Ms. Alexandra Mahoney, PhD student

Collaborations (optional):

- Dr. Najah Nassif
- A/ Prof. Bronwyn O'Brien
- A/ Prof. Anand Hardikar, Western Sydney Uni
- Prof. Ian Alexander, Children's Medical Research Institute, Westmead
- A/ Prof. Devanshi Seth, Centenary Institute, Visiting Professor UTS

Website/publications: https://www.uts.edu.au/staff/ann.simpson

Dr Bill Söderström

Australian Institute for Microbiology and infection, Faculty of Science

Chancellor's Research Fellow
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Lab website:
https://soderstrombill.wixsite.com/billslab

Bill leads the Bacterial Super-Resolution Microscopy Lab at the Australian Institute for Microbiology and infection. His team works interdisciplinary at the intersection between bacteriology, infection biology and biophysics.

Our lab is primarily interested in bacterial cell division and morphology during Human Urinary Tract Infections (UTIs). We use advanced imaging technologies together with microfluidics devices to examine the organization and dynamics of specific components within macromolecular protein complexes at the nanoscale.

Students in my group can apply for the AIMI Excellence in Research Honours Scholarship

Keywords: Super-resolution microscopy, Microfluidics, Pathogens, UTI, Infection, Cell division

Research Interest/Honours Project opportunities:

1. **Single-molecule and high-resolution imaging of bacteria during infection of human cells**
2. **Behaviour of multispecies bacterial communities in UTIs**
3. **Molecular analysis of the bacterial cell division machinery**

INTERESTED to know more? Reach out for a chat about our work and for specific hons project info!

Methods commonly utilised in the Bacterial Super-Resolution Microscopy Lab include:

- Super-resolution (PALM/STORM and SIM) and time-lapse microscopy
- Model Infections
- General bacteriology, Basic biochemistry and Cell culture

Current Lab members:

- Dr. Alaska Pokherl, Postdoc
- Matthew Pittorino, PhD Student
- Emma Westlund, Master's student
- Ariana Costas, Honours student
- Charlotte Abell-King, Honours student

Collaborators:

- A/Prof. Iain Duggin, UTS
- Prof. Majid Warkiani, UTS

Website/publications: https://www.uts.edu.au/staff/bill.soderstrom

A/Prof Fraser Torpy & Dr Peter Irga

Plants and Environmental Quality Research Group

School of Life Sciences, Faculty of Science

School of Civil and Environmental Engineering, FEIT

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Exposure to air pollution is an emerging world-wide problem, with growing evidence that it is a major cause of morbidity worldwide. Plant-based systems are gaining recognition as a possible adjunct to standard mechanical air pollutant management systems for the management of urban air pollution. An additional recent research direction focusses on the development and testing of biobased building materials for improving the urban carbon economy.

The UTS Plants and Environmental Quality Research Group has 20 years' experience in studying the role that botanical systems play in ameliorating many forms of air pollution. We produce world leading research targeting the potential of phytosystem technology to contribute to urban sustainably. We are an industry-focussed group, and collaborate actively with private industry and government to develop, trial and credential biological air pollution mitigation systems ranging from portable devices to large infrastructure projects. Our projects are national and international in scope, and gave gained wide recognition for directly addressing a range of emerging UN SDGs. Projects within both the Science and Engineering Faculties, or cross-disciplinary research between Faculties, including the Faculty of Design, Architecture and Building, will be welcomed.

Keywords: biofiltration, phytotechnology, air pollution, green buildings, sustainability

Research Interest/Honours Project opportunities:

- Horticultural biotechnology for mitigating air pollutants
- Functional active green wall technology development
- Botanical systems for improving urban amenity: noise attenuation, aesthetics, water use, temperature, photovoltaic solar energy production, stormwater quality
- Biobased materials for improving the carbon economy of cities
- Geospatial analysis of the determinants of urban air quality
- Urban aerobiology, with an emphasis on pathogenic fungi
- Urban agriculture, urban forestry, urban greening
- Other projects related to Urban Sustainability more generally can be negotiated

Methods/Research Skills commonly utilised in our Laboratory include:

- Air pollutant generation and instrumental quantification
- GIS
- Flow dynamics
- Statistical data analysis
- Microbial identification and quantification (culture-based and molecular)

Team members:

- Dr Fraser R Torpy, Director (Science)
- Dr Peter J Irga, DECRA fellow (FEIT)
- Dr Nic Surawski (FEIT)
- Prof Sara Wilkinson (FEIT)
- Ashley Douglas, PhD student (Science)
- Robert Fleck, PhD student (Science)
- Raissa Gill, PhD student (Science)

Collaborations:

- Junglefy P/L
- Ambius International
- Australian Hemp Masonry Company
- Delos Living LLC (New York)
- Lend Lease
- Transport for NSW
- Transurban
- Fulton Hogan
- Randwick City Council
- Campbelltown City Council
- North Sydney Council
- The City of Sydney Council
- Horticulture Innovation Australia
- Bravolinear Tech Ltd (Hong Kong)
- Rural Development Administration (Republic of Korea)
- ORNATEC (People's Republic of China)

Website/publications: https://peqresearch.wordpress.com

Dr Annalicia Vaughan

Post-doctoral researcher, UTS Centre of Inflammation, Centenary Institute
Faculty of Science
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Dr Vaughan received her PhD in biomedical research from the University of Queensland in 2018. Dr Vaughan joined UTS from the UQ Thoracic Research Centre where she studied the role of the gut-lung axis in COPD. She is currently a post-doctoral researcher and Node Leader for Clinical Research at the UTS Centre for Inflammation, which is based at the Centenary Institute. Her research focuses on defining the role of gut bacteria and the gut-lung axis in the development of chronic respiratory diseases, which includes the identification of novel targets to treat these chronic diseases.

Keywords: Inflammation, microbiome, COPD, diet

Research Interest/Honours Project opportunities:

- Functional role of bacteria along the gut-lung axis
- Dietary interventions to reduce airway inflammation in COPD

Methods/Research Skills commonly utilised in Dr Vaughan's Laboratory include:

- Bacterial culture
- Cell culture
- Real time PCR
- ELISA
- Histology
- Extraction of microbial DNA from clinical samples

Team members:

- Professor Philip Hansbro (Director, UTS Centre for Inflammation)
- Dr Nadia Amorim (post-doctoral researcher)
- Dr Rajib Majumder (post-doctoral researcher)

Website/publications: https://www.centenary.org.au/research/programs/centenary-uts-centre-for-inflammation/

Professor Jonathan Webb

Professor of Environmental Science,

School of Life Sciences

Jonathan.webb@uts.edu.au

Jonathan is a wildlife ecologist with expertise in conservation biology, wildlife management, and animal behaviour. He is passionate about conserving our unique fauna, and has over thirty years of experience working on a diversity of wildlife including snakes, lizards, freshwater crocodiles, and native mammals. Jonathan has published over 150 peer-reviewed papers in scientific journals, and his current research focuses on evaluating the impacts of the 2020 mega-fires on threatened reptiles in NSW. He is also working with Central Coast Council to understand how antipredator behaviour and habitat complexity influences the persistence of threatened mammals on the Central Coast of NSW. Jonathan's group also carries out laboratory experiments to understand how thermal conditions during embryogenesis influences the phenotypic traits of hatchling lizards.

Keywords: conservation biology, animal behaviour, reptiles, mammals, wildlife ecology, ecophysiology, evolution

Honours project opportunities:

- How do potoroos persist in urban bushland on the Central Coast of NSW?
- Can lizard embryos tolerate thermal spikes during heatwaves?
- Is habitat restoration a feasible approach for conserving rock-dwelling reptiles?
- What was the impact of the 2020 mega-fires on reptiles?
- Are the conservation lands on the Central Coast effective for conserving threatened wildlife?

Methods/Research skills commonly utilised in Prof Webb's laboratory include:

- Field skills including off road driving, bushwalking, and setting traps and remote cameras
- Handling lizards and mammals to estimate rates of survival in wild populations
- Identifying animals in the field and with remote cameras
- Video analysis of locomotor performance and behaviour
- Measuring thermal tolerance in the field and laboratory
- Quantifying behavioural traits of wild animals
- Analysing complex mark-recapture data

Collaborators and industry partners:

- Professor Mike Letnic, University of NSW; Dr Brad Murray, UTS
- Central Coast Council, NSW National Parks and Wildlife, NSW Department of Primary Industries and the Environment, SSSafe

Website/publications: https://www.wildlifeconservationbiology.com/

Dr Qiaoyun Xie

Chancellor's Postdoctoral Research Fellow,
School of Life Sciences, Faculty of Science
Qiaoyun.Xie@uts.edu.au

Dr Xie received her PhD in Cartography and GIS in 2017, jointly trained by Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences and University of Southampton, UK. Dr Xie joined UTS in 2017 as a Research Associate, and transferred to a Chancellor's Postdoctoral Research Fellow in 2020. Her main research interest is using satellite data for vegetation monitoring, including vegetation parameter retrieval, vegetation dynamics, landscape phenology processes, and their shifting seasonalities with climate variability. She also uses remote sensing data and field measurements to observe land surface responses and interactions with climate, land use activities, and major disturbance events. Currently, her research involves using remote sensing and field measurements to understand the phenology patterns of the grassland across Australian landscapes, and to study the association among pollen, allergens, and human health.

Keywords: Remote sensing, Geographical Information System, Vegetation, Plant phenology, Climate change, Pollen, Air quality

Research Interest/Honours Project opportunities:

- Pollen studies: Using remote sensing and field measurements (time-lapse camera data) to understand the phenology patterns of the grassland across Australian landscapes, and to study the association among pollen, allergens, and human health.
- Vegetation Phenology: Developing vegetation phenology products using satellite data (MODIS, VIIRS, Sentinel-2, Himawarri-8), to support researches and managements, e.g. ecosystem resilience to climate change, bushfire fuel accumulation, crop yields, airborne allergens, native vegetation condition, and agricultural management.

Methods/Research Skills commonly utilised in Dr X's Laboratory include:

- Geospatial analysis
- Remote sensing image processing
- Time-lapse camera
- Aerodynamics
- Programming skills, e.g., Python, R, Matlab.

Collaborations (optional):

- Distinguished Professor Alfredo Huete, University of Technology Sydney
- A/Prof Paul Beggs, Macquarie University
- Prof Janet Davis, Queensland University of Technology
- Prof Jadu Dash, University of Southampton, UK

Website/publications: https://www.uts.edu.au/staff/qiaoyun.xie