MONASH University

MONASH
TRANSLATIONAL
MEDICINE

HONOURS IN TRANSLATIONAL MEDICINE

LAUNCH YOUR CAREER AT THE MONASH ALFRED CAMPUS, A WORLD-LEADING MEDICAL RESEARCH PRECINCT


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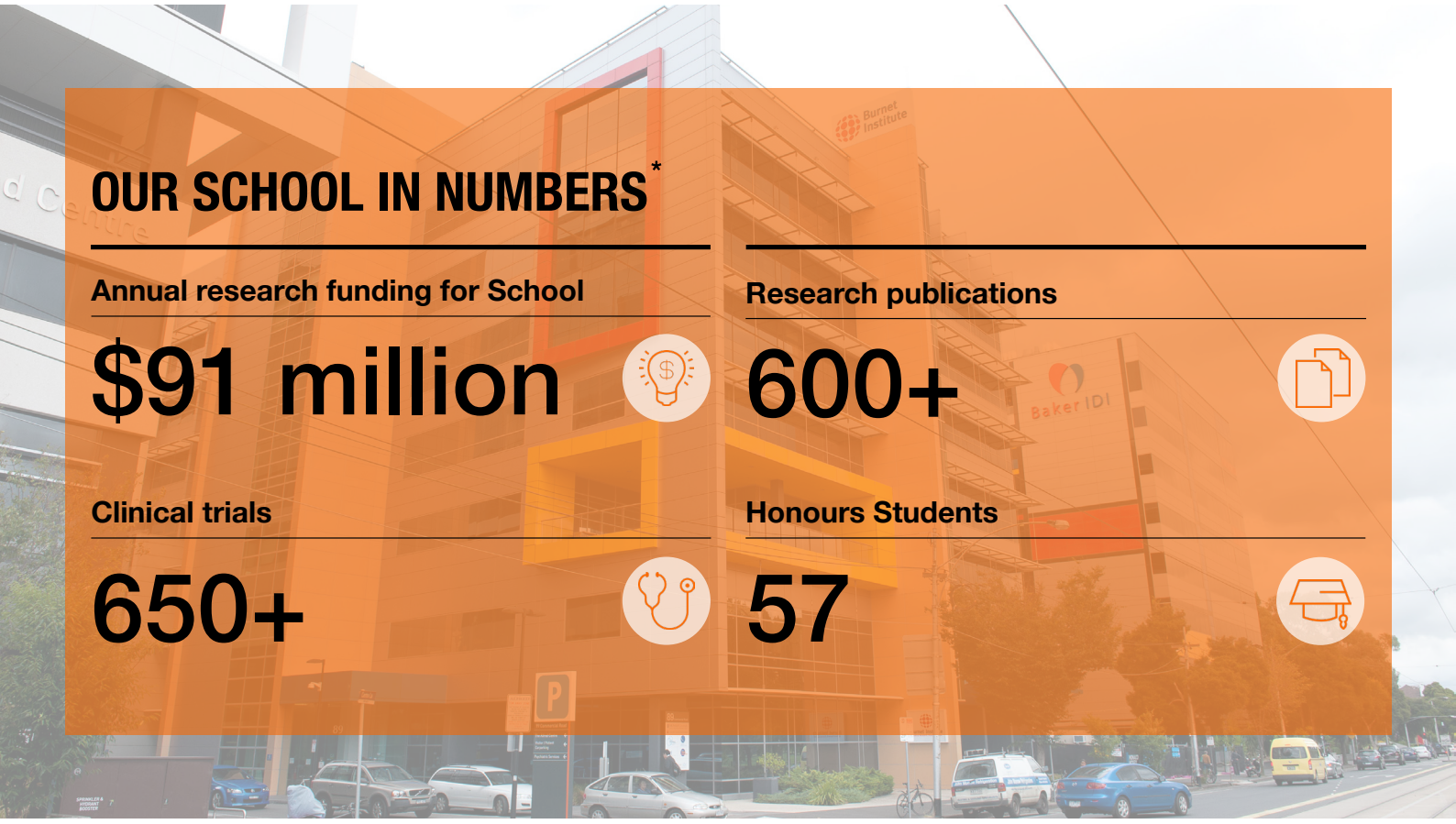
THE MONASH ALFRED CAMPUS: A WORLD-CLASS PRECINCT

At the School of Translational Medicine (STM), we're improving the human condition by closing the gap between laboratory research and clinical application. Our work spans the gamut of basic science — mechanisms of disease, drug discovery, devices, imaging, biomarkers — to clinical trials and outcomes research.

If your goal is to make your mark as a scientist or clinician scientist working on clinically urgent questions, you've come to the right place. We're located at the Monash Alfred campus alongside the School of Public Health and Preventive Medicine. Many of our supervisors are Alfred Health clinicians, and as a member of the Alfred Research Alliance (ARA), STM offers:

- close collaboration with The Alfred — one of Australia's biggest hospitals, and *Newsweek's* World's Best Hospitals top 100
- collaboration with the Baker and Burnet Institutes onsite in the ARA Precinct, as well as Cabrini Health and Peninsula Health
- unparalleled platforms and resources, from imaging to flow cytometry, genomic sequencing, bioinformatics and biostatistics

An Honours year with us can lay the foundations for a career in translational medicine research, deepen your clinical expertise and practice, or prepare you for a range of industry roles.



OUR SCHOOL IN NUMBERS*

Annual research funding for School

$91 million

Research publications

600+

Clinical trials

650+

Honours Students

57

GET IN TOUCH AT
stm.honours@monash.edu

monash.edu/medicine/translational/education/honours

*Figures from 2024

WHY TRANSLATIONAL MEDICINE?

Translational medicine, put simply, turns scientific discoveries into advances in medical practices. But there's nothing simple about the journey from bench to bedside, or from microscope to stethoscope: it can take as many as 35 years for a new drug to emerge from an initial academic insight.

The good news is that these are exciting times for science and medicine, and an Honours year in a hospital environment is where you get a front seat at the revolution. To quote American physician scientist Anthony Fauci, "There is so much discovery that can happen inside a laboratory and in the clinic - even when you least expect it".

An ever-growing array of disciplines, from multi omics to immunotherapy, are maturing, bringing fresh insights to longstanding research questions: how do we tailor treatment to the individual? What new drugs, or combinations of drugs can improve survival and quality of life, with fewer side effects?

The history of medicine has mostly been trial and error treatments. But now, data science is turbocharging what happens in the lab and getting us closer to precision medicine. And the old way of understanding the body as a set of largely separate systems, has given way to the realisation that we are dealing with very porous borders and multiple layers.

Our research takes place in labs, on powerful computers and in the clinic. Every day I'm excited and challenged by the research taking place at our school: from skin tissue engineering, to Artificial intelligence for epilepsy and STI diagnosis; apps to measure brain disturbance, and our people's contributions to global guidelines for disease management.

Whether your goal is a career in the laboratory, crunching data, perfecting imaging techniques or making your mark as a clinician scientist, you've come to the right place.

Welcome.

Professor Terry O'Brien
Head of School
Monash Translational Medicine

Associate Professor Jessica Borger
Director of Education
Monash Translational Medicine

> **These are exciting times for science and medicine, and Honours in a hospital environment is where you get a front seat at the revolution.**

See our list of available projects on Supervisor Connect – filter School/ Institute for *School of Translational Medicine*.

supervisorconnect.med.monash.edu/research-projects

Alfred Research Alliance

CORE RESEARCH AREAS

Anaesthesiology
Our research is internationally recognised for reducing surgical risk and improving patient recovery. Our research spans all areas of anaesthetic and perioperative care, including molecular pharmacology, clinical neurophysiology and epidemiology.
monash.edu/medicine/translational/anaesthesiology

The **Australian Centre for Blood Diseases (ACBD)** investigates blood cancers, thrombosis and bleeding disorders. Research falls into three main areas: non-malignant haematology (thrombosis and haemostasis), malignant haematology (blood cancers), and bone marrow stem cell transplantation.
monash.edu/medicine/translational/blood-disease

The **Baker Heart and Diabetes Institute** is Australia's only medical research institute focused on preventing, diagnosing and treating diabetes, heart disease and associated metabolic diseases.
baker.edu.au

The **Burnet Institute** operates in some of the world's poorest, most remote and most challenging locations to protect the fundamental human right to good health in their communities via three core research programs: Disease Elimination; Health Security and Pandemic Preparedness; and Maternal, Child and Adolescent Health.
burnet.edu.au

Cancer Medicine
See page 13

Diabetes is Australia's fastest growing chronic disease. Our department is the first – and only – university department in Australia solely dedicated to research on diabetes and its complications, including kidney disease, heart disease and blindness. monash.edu/medicine/translational/diabetes

Gastroenterology
One of the most comprehensive departments in Australia hosts the globally renowned Monash FODMAP group, inflammatory bowel disease experts, hepatologists, and gastrointestinal cancer expertise investigating genetic causes and prevention. Research includes technical expertise in molecular biology, genomics, animal models of disease and organoids, development of novel pathogenically driven diet strategies for gut health, functional and inflammatory bowel disease.
monash.edu/medicine/translational/gastroenterology

Immunology spans basic and translational research including allergy, autoimmunity, inflammation, immunodeficiency, lupus, fibrosis, cancer and infection. The department also explores emerging fields such as treatments harnessing regulation of microbiota, or the impacts of exercise on immunity.
monash.edu/medicine/translational/immunology

Infectious Diseases has active research programs in HIV, viral hepatitis, infections in the immunosuppressed, influenza, drug-resistant organisms, antibiotic use and infection prevention and hospital epidemiology. The Department integrates clinical services with clinical and basic science research, with laboratories based within the Burnet Institute building.
monash.edu/medicine/translational/infectious-diseases

Medicine programs include skin cancer, multiple sclerosis, dermatology, developmental biology, endocrinology, neuroscience and oncology. Many programs are closely integrated with clinical services at Alfred Health, which allows findings to be rapidly translated to therapeutics and health care.
monash.edu/medicine/translational/medicine-alfred

Peninsula Clinical School (Frankston) researchers study chronic conditions affecting the ageing population and partner with Peninsula Health to host the National Centre for Healthy Ageing (ncha.org.au). Our expertise spans clinical medicine, bioinformatics and imaging, health services research including data linkage, and biostatistics. Major areas of research include dementia, frailty, delirium, health services models of care, and the use of large electronic health data to support such work.
monash.edu/medicine/translational/medicine-alfred/research/srikanth-group

Neuroscience
Australia's first dedicated university department of Neuroscience has over 200 researchers and graduate students working on neurological, neuroscience, neurobehavioural, pharmacological and imaging-based projects on cognition and various brain disorders. These include epilepsy, neuroinflammation, neurodegenerative diseases, brain tumours, stroke and traumatic brain injury.
monash.edu/medicine/translational/neuroscience

Psychiatry
We host one of Australia's largest clinical research centres in psychiatry including the **HER (Health Education Research)** Centre Australia.
monash.edu/medicine/translational/psychiatry | monash.edu/medicine/her-centre

Respiratory Research develops and tests novel treatments across the spectrum of lung diseases, from asthma and COPD to pulmonary fibrosis, pulmonary hypertension and lung transplantation.
monash.edu/medicine/translational/respiratory-research

Surgery
Surgical techniques and applications are constantly evolving. Our research includes trauma, burns, cardiothoracic, colorectal, endocrine, upper gastrointestinal, urology, orthopaedics, spine injury, general surgery and neurosurgery specialisations. The Department of Surgery is closely associated with the **National Trauma Research Institute**.
monash.edu/medicine/translational/surgery-alfred | ntri.org.au

Melbourne Sexual Health Centre (MSHC) specialises in preventing, diagnosing and treating and managing STIs. It conducts epidemiological, public health, and clinical research primarily aimed at improving the services offered at MSHC and to advance standards of sexual health in the community.
mshc.org.au

> **Translational medicine is the cornerstone of new approaches to patient care.**
>
> Prof Stephen Jane, Dean, Translational Medicine & Public Health

TECHNOLOGIES

Monash University at the Alfred Research Alliance (ARA) offers state-of-the-art platform technologies to undertake cutting-edge research. These include the:

- ARA FlowCore flow cytometry facility
- Monash MicroImaging (MMI@ARA)
- Purpose-built ARA-MBI Preclinical Imaging Facility, and
- Monash Histology Platform.

For more information visit:

alfredresearchalliance.org.au/resources/platform-technologies-capabilities/pre-clinical-clinical-research-platforms/

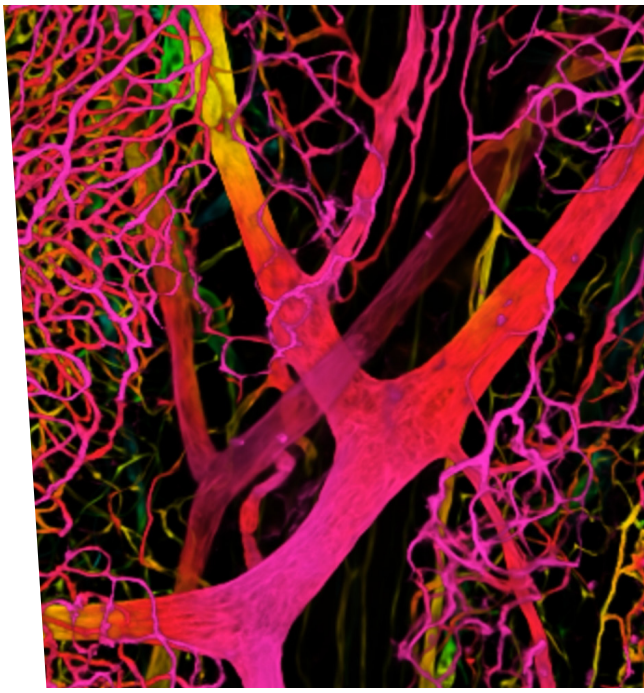


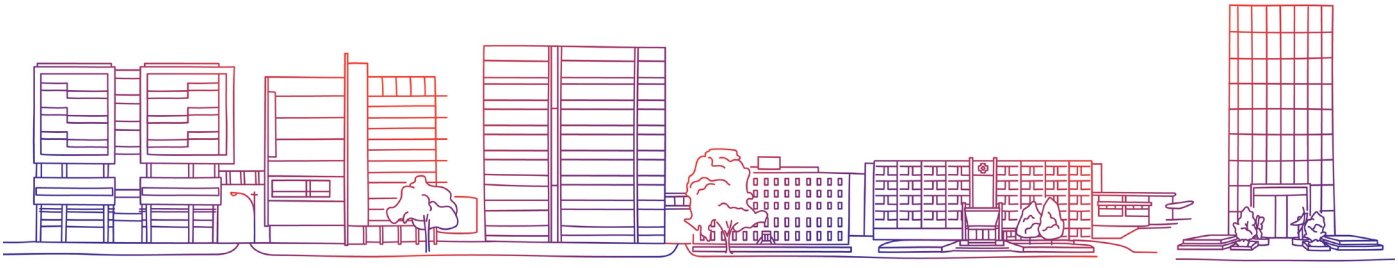
Image: A depth-coded projection of the CD31-positive vasculature present in mouse ureter. Image collected on the Nikon A1R confocal microscope at MMI@ARA by **Gemma Schlegel** (2023 Honours student in the Department of Immunology).

Theranostics: diagnosis and therapy on a tiny scale

Theranostics combines diagnostic and therapeutic capabilities in one single agent for more specific, individualised therapies, with fewer side effects. Recent advances in nanoscience offer opportunities to design and combine targeting, diagnosis and therapy within one nanoparticle — infinitesimally smaller than a human hair.

Incorporating a targeting biomolecule, such as an antibody or peptide, also allows precision delivery of a drug payload that can distinguish between healthy and diseased tissue.

“Our research uses a multidisciplinary approach, developing novel theranostics to characterise and treat cancer and inflammatory disorders,” says Dr Karen Alt, leader of the Translational Medicine NanoTheranostics lab. **“Using targeted, drug-loaded nanoparticles to deliver therapies to pathological sites holds a lot of promise.”**



MY HONOURS YEAR

JURIE TASHKANDI BBiomedSc

Jurie attended the Honours information night and chose a research area she'd never encountered before — nanotechnology. Her project, using nanoparticles to target platelets linked to stroke, has led to PhD studies using the same techniques to detect tumours.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/jurie-tashkandi

CORE SKILLS

During your Honours year you will learn or undertake the following:

- Research design
- Critical literature analysis
- Research ethics
- Human and animal model research
- Data collection
- Data analysis (qualitative and quantitative)
- Biostatistics
- Production of a thesis
- Project management
- Communications
- Public speaking
- Team work
- Writing

Depending on your research area, you could learn:

Dry lab work

- Coding
- Dataset analysis
- Modelling analysis
- Computer system
- In silico multiomics

Wet lab work

- Analysis of biological specimens
- Histopathological studies
- Immunological techniques
- Molecular and cellular biology methods
- Sterile technique and cultivation of cells
- Learning to operate sophisticated machines

Multiomics

- Genomics
- Transcriptomics
- Proteomics
- Metabolomics
- Epiomic

HONOURS FOR SCIENCE AND BIOMEDICAL SCIENCE STUDENTS

Medicine is benefiting enormously from the application of new technologies and the convergence of many historically distinct scientific disciplines. An Honours year in Science or Biomedical Science is a great way to apply your scientific knowledge to real clinical problems, and to contribute to the foundational knowledge that may ultimately lead to clinical innovations, improvements and cures.

Whether you're aiming to progress your medical career, or test your appetite and aptitude for a research career, Honours will give you many skills, including:

- understanding how to design and implement a research project.
- executing and analysing wet-lab or dry-lab studies.
- developing proficiency in data acquisition, analysis and presentation.
- critically reviewing literature.
- potentially publishing your findings.

Honours considerably strengthens your undergraduate qualification, through fostering the development of skills like project development and implementation, critical thinking, meeting key milestones and deadlines, oral and written communication, and working both independently and collaboratively in a team.

Some students find in their Honours year that their aspirations take an unexpected turn, as a result of their exposure to the enormous breadth and depth of biomedical research taking place on this precinct.

Doing BSc or BBiomedSc Honours at the Alfred precinct will bring you in close proximity to leading clinicians and academics with a passion for discovery research. Scan the projects available on Supervisor Connect and talk to staff, current students and alumni.

See our list of available projects on Supervisor Connect – filter School/Institute for *School of Translational Medicine*.

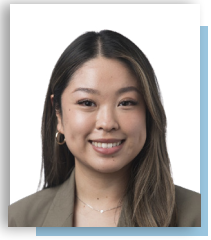
supervisorconnect.med.monash.edu/research-projects

HONOURS COORDINATORS

A/Prof Ross Dickins

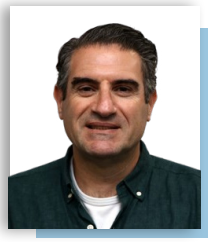
A/Prof Stuart McDonald

A/Prof Margaret Hibbs



Dr Eveline Mu

Dr Omer Gilan



Dr Raffi Gugasyan

MY HONOURS YEAR

LACHLAN BRADBURY BSc Advanced - Research (Hons)

Lachlan is using blood samples from patients with inflammatory bowel disease to check antibody and Memory B cell levels at various periods after they receive a COVID-19 vaccine, to see the strength and durability of response to the vaccine.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/lachlan-bradbury

MELTEM KARADENIZ BSc

Meltem's goal is to find a biomarker that can distinguish between relapse and remission in Multiple Sclerosis. This would clarify a critical area of uncertainty for people living with the disease.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/meltem-karadeniz

YIXUAN WANG BBiomedSc

Yixuan came to an Honours Night and learned about Professor Merlin Thomas's work in RNA therapy and its potential to treat chronic inflammatory diseases. Now, she's exploring how to use Antisense Oligonucleotides (ASOs) as a therapy delivered via an inhaler.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/yixuan-wang

"I knew I wanted to do translational research – I wanted an Honours project that involved developing a drug or therapy that could help people improve their health. To design a drug that actually helps cure someone – that would be the most exciting achievement.

Yixuan Wang, BBiomedSc(Hons) student (diabetes)

HONOURS FOR MEDICAL STUDENTS

Many great leaps in medical knowledge — including nearly 40 per cent of Nobel Prizes in Physiology or Medicine — have been the work of clinician scientists.

Breakthroughs, from penicillin to chemotherapy to the HPV vaccine, have started with doctors who've identified problems in the clinic and turned to the lab for answers.

Clinician scientists combine clinical skills with research, generating new insights into disease, treatments, disease management guidelines, and new models of patient care.

Taking a year out of your clinical studies to undertake a fourth year of Honours in Medical Science is a great way to taste a research career and work on real-life medical challenges.

Our students say their Honours year has enabled them to connect with experienced clinicians in their area of interest, publish and present their results, and witness the impact that research can have on patient care… cementing their passion for medicine.

Whether you're steeped in lab work or interacting with patients and families in a hospital setting, you'll broaden your skillset, often in ways you wouldn't have predicted.

BMedSc (Hons) is the first step in an academic clinician career, but will also strengthen your understanding of evidence in your clinical practice.

HONOURS COORDINATORS

Prof Merlin Thomas

Prof Melinda Coughlan

MY HONOURS YEAR

TASH NEWMAN BMedSc (Hons)

One in 14 Australians are estimated to have a thyroid disorder. Many people have half or their entire thyroid removed. Is it worth it? Tash leveraged data analysis tools such as REDCap and STATA to explore quality of life-trade offs.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/tash-newman

Find out more:

monash.edu/medicine/translational/education/honours

ARA HONOURS SCHOLARSHIP

The Alfred Research Alliance (ARA) Honours Scholarship is for students enrolled through the School of Translational Medicine, the School of Public Health and Preventive Medicine.

Each scholarship is worth $6000:

- Two for students enrolled full time in the Bachelor of Biomedical Science (Honours), Bachelor Science (Honours) or Bachelor of Science Advanced - Research (Honours).
- One for a Bachelor of Medical Science (Honours) student.

Read more:
monash.edu/arascholarship

MY HONOURS YEAR

THIRIMADURA VISHNA MENDIS BBiomedSc (Hons)

My honours year with the support of the Alfred Research Alliance scholarship was the first step towards a career in an exciting frontier of biomedical research: the interface of nanotechnology and diabetes. Professor Christoph Hagemeyer and Dr Rong Xu at the Australian Centre for Blood Diseases (ACBD) are world pioneers in smart insulin delivery, which offers life-changing potential for people living with diabetes. This is a great precinct, and I'm thrilled to now be making solid progress towards my academic career.

Read more: monash.edu/arascholarship

See our list of available projects on Supervisor Connect – filter School/ Institute for *School of Translational Medicine*.

supervisorconnect.med.monash.edu/research-projects

SPOTLIGHT ON DISCOVERY PROGRAMS

Our body's systems are interdependent, and so are the health challenges we face as a society, from metabolic diseases to autoimmune conditions. Our Discovery Programs link researchers across disciplines, to embrace different ways of seeing a problem, and employ different methods, for deeper understanding, innovation and translational impact.

The School of Translational Medicine has three Discovery Programs:

Gastroenterology, Immunology and Neuroscience (GIN)

What does the gut have to do with chronic headache? Or with asthma and allergies? Plenty, as it turns out. **Ninety per cent of chronic diseases are linked to interactions between the gut, immune system and the brain.** Research in this area is critical for breakthroughs to treat and prevent an array of conditions – from digestive disorders to neurological conditions. By investigating things in isolation, we often miss the intricate interplay between different domains of the body. Drawing researchers from all three disciplines, the GIN program is pioneering a shift towards an integrated approach, centering on the gut-immune-brain axis.

Bladder and Kidney Health

Tests for urinary tract infections (UTIs) have barely changed since they were first developed 50 years ago, and miss more than half of positive infections. For people with recurrent UTIs - primarily women - this means chronic pain and sometimes dangerous kidney or bloodstream infections. "We are lacking the correct diagnostics to allow our clinicians to actually say yes, this is an infection, so we should be treating with antibiotics," says program director Dr Malcolm Starkey. His team is developing new diagnostics and targeting the host immune response to one day replace or complement current antibiotic therapies that are being left behind by increasingly resistant bacteria.

Skin Inflammation, Informatics and Neoplasia (SkIIN)

The skin is our largest organ: it's the boundary between the body and the environment, and the immune system's first line of defence. **Skin conditions can be an important marker of systemic illness. They are one of the most common reasons to seek medical advice and cause significant psychosocial burden.** Critical advances in our understanding of genomics and immunology are transforming our ability to explore and develop new therapeutics, and enhance existing treatments. In this joint Discovery Program with the School of Public Health and Preventive Medicine, we use cutting edge technologies to gain insights into disease processes and develop novel approaches to management.

SPOTLIGHT ON CANCER MEDICINE

Every four minutes, a new case of cancer is diagnosed in Australia.

Genomics and immunotherapy have transformed cancer diagnosis and treatment, but there are still many cancers with survival rates that have barely moved in decades, such as pancreatic cancer. For others, like lung cancer, major treatment advances have occurred, but benefit only a minority of patients.

From his office in the new Paula Fox Melanoma and Cancer Centre, Professor Mark Shackleton says bringing together patients, researchers and clinicians is key to future breakthroughs in cancer research.

"Precision oncology involves matching cancer medicine/treatment to each patient using information from genomic profiling of their tumour," Mark says. "It has enabled hundreds of patients to access genetic testing of their cancers, linking the results to therapies that they would not otherwise have received."

But genomic testing alone has limitations, and the need to understand each individual patient's tumour more comprehensively is clear — so Mark and his colleagues have their work cut out for them. Keeping the conversation close between clinicians and scientists is central to their approach.

GROUP LEADER
Prof Mark Shackleton
Cancer Development and Treatment Laboratory

> **"I see patients and their problems every week. This guides the science and experiments I do, and the type of projects we undertake in the lab.**

SVETLANA BRILLANTES BBiomedSc

Svetlana Brillantes is matching wits with cancer, "an intelligent disease that knows how to take advantage of our body and to become aggressive". She's hoping to shed light on the function of a specific gene implicated in the development and progression of gastric cancer.

Read more: monash.edu/medicine/translational/education/honours/honours-profiles/svetlana-brillantes

MAKING THE MOST OF YOUR HONOURS YEAR

Honours is not like your previous undergraduate experience. It's not about lectures and assignments with an intense end-of-year exam. Being embedded in a research group and working on a real problem makes it a richer, more personal experience.

The independent research project is individual, making your experience of Honours unique.

It's an intense program, but one that has the potential to transform your life (and you can have fun too)!

GETTING STARTED

STEP 1

Check the entry requirements for your program

Bachelor of Science (Honours) - Faculty of Science

Bachelor of Biomedical Science (Honours) - Biomedicine Discovery Institute (BDI)

Bachelor of Medicine (Honours) - Monash School of Medicine

The information below is general - check the website for your program above, as there may be additional, specific requirements and information.

STEP 2

Find a research project and supervisor

Finding a supervisor and a project is YOUR responsibility… and it's the key to an enjoyable and successful Honours year. This takes time, so start early!

You should choose a project that really interests and excites you. You'll need to do your 'due diligence' – review the project listings in Supervisor Connect, talk to potential supervisors, talk to current Honours and even doctoral students, and staff.

Once you've chosen an area of interest, it's also your responsibility to contact relevant staff and arrange a particular project and supervisor. This can be time-consuming, so make sure you start well before the application closing date.

You must make contact with your prospective supervisor BEFORE you submit your application forms.

STEP 3

Submit your research project application form

Having discussed your proposed research project with your prospective supervisor, submit your **Project Application Form**.

STEP 4

Formally apply

With some exceptions, all students must formally apply using Monash University's **e-admission form**.

monash.edu/admissions/apply/online

- S3701 Bachelor of Science (Honours)
- M3702 Bachelor of Biomedical Science (Honours)
- M3701 Bachelor of Medical Science (Honours)

CONTACT US

If you have a query about the application process, please contact:

- Monash Connect at monash.edu/students/support/connect
- 1800 MONASH (1800 666 274) or
- The School's Honours administrator at the email below

SENIOR STUDENT COORDINATOR

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VIC 3004
AUSTRALIA

FOLLOW US

linkedin.com/company/monash-translational-medicine

twitter.com/MonashSTM

monash.edu/medicine/translational

STM is located on Bunurong Land in Melbourne, opposite stately Fawkner Park. Easy to get to by public transport, we're a short walk from Chapel and Greville streets — synonymous with food, fashion and entertainment (and described by Visit Victoria as "independent, proud and a little bit fancy").

Image: courtesy of Chapel Street Precinct Association.


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monash.edu/medicine/translational/education/honours
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