MONASH University

MONASH INSTITUTE OF PHARMACEUTICAL SCIENCES

BETTER MEDICINES BY DESIGN

2025
ANNUAL REPORT

COMMITMENT TO INDIGENOUS PEOPLE

We recognise that our four major Australian campuses – Clayton, Caulfield, Parkville and Peninsula – are located on the unceded lands of the people of the Kulin Nations, and pay our respects to their elders, past and present.

We recognise that Australia's Indigenous people were this country's first pharmacists and scientists. We are committed to fostering a society that recognises and respects this knowledge, and includes Australia's First Peoples, cultures and broader knowledge by working with and celebrating Aboriginal and/or Torres Strait Islander peoples, and Indigenous peoples of other places where Monash has a campus or major presence.

Monash University is committed to supporting and contributing to: The Uluru Statement from the Heart process for a First Nations Voice to the Commonwealth Parliament of Australia; and Treaty discussions in the state of Victoria and the Yoo-rrook Justice Commission.

We recognise that indigenous peoples and indigenous knowledge is under-represented in MIPS. We are working to change this.

ACADEMIC FREEDOM AND FREEDOM OF SPEECH

Monash University Council adopted a new Freedom of Speech and Academic Freedom Policy in May 2021. The Policy is based on the Model Code for the Protection of Freedom of Speech and Academic Freedom in Australian Higher Education Providers (Model Code), and is applied across the Monash Group and all its related policies and procedures. The adoption of the Freedom of Speech and Academic Freedom Policy demonstrates our continuing commitment to freedom of speech and academic freedom as defining values of the University, in policy, practice and culture. In June 2021, the Federal Department of Education, Skills and Employment notified the University that it considers the University's policies to be "fully aligned" to the Model Code. Those policies, including the Freedom of Speech and Academic Freedom Policy, are available to our staff and students online, via the University's policy bank website.

Cover image: Certain peptides aggregate into insoluble fibrils that drive disease. Rather than sticking together randomly, they stack in a controlled manner to form a cross-beta sheet secondary structure. While these peptides have normal physiological functions as monomers, pathological effects occur when fibrillised. This image shows Aβ42 (PDB: 6SZF) fibrils, which are associated with Alzheimer's disease, bound by the fluorescent probe Thioflavin T. This binding causes the fibrils to light up, providing a signal for detection. Fluorescent tools that characterise these materials are essential for understanding disease mechanisms and evaluating potential treatments.

Credit: Dr Laura FitzGerald, postdoctoral research fellow, Medicinal Chemistry Theme. Dr FitzGerald works in the Kaur Group, which is focussed on the development of cutting-edge molecular imaging tools to visualise the biological world inside us.

This image was the winner of the MIPS image competition, selected by a sub-committee of the MIPS Executive.

Any enquiries or comments regarding this publication, including requests regarding use or reproduction, should be directed to MIPS.

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MIPS 2025 – BY THE NUMBERS

RANKING

#4

Worldwide, in Pharmacy & Pharmacology
(QS Ranking by Subject, 2025)

PEOPLE

330
Staff

255
Research students

RESEARCH OUTPUTS

337
Research articles

59%
International co-authorship

RESEARCH GRANTS AND CONTRACTS

60
Research grants awarded

$81.8M
Research income awarded

$61.9M
In Australian Competitive Grant funding

62
Research contracts

$17.9M
in research contracts
and international grants

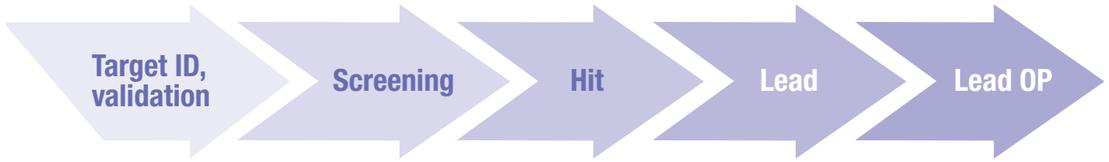
COMMERCIALISATION

23
Invention disclosures

4
Licences including
options and
assignments

3
Patents

MIPS AT A GLANCE



RESEARCH THEMES

Drug Discovery Biology

Medicinal Chemistry

Centre for Drug Candidate Optimisation

Drug Delivery, Disposition & Dynamics

Centre for Medicine Use and Safety

THERAPEUTIC PROGRAM AREAS

Cardiovascular and Metabolic Health | **Neuroscience and Mental Health** | **Global Health**

RESEARCH PLATFORMS

ABOUT MIPS

The Monash Institute of Pharmaceutical Sciences (MIPS) can trace its roots to 1881 when the Victorian College of Pharmacy opened. Monash University was established in 1958 and in 1992 the College of Pharmacy was merged with the University. In 2008 the College became the Faculty of Pharmacy and Pharmaceutical Sciences and the Monash Institute of Pharmaceutical Sciences was established.

Today, MIPS is a dynamic, innovative and ambitious centre of research and learning, with a growing emphasis on cutting edge projects to deliver societal impact.

As the home of the majority of research activity within the Monash Faculty of Pharmacy and Pharmaceutical Sciences, MIPS brings together more than 500 of the world's best scientists to research drug discovery, design, delivery and use. Our therapeutic strengths lie in neuroscience and mental health, cardiovascular and metabolic health, and global health.

We are committed to research translation and have made major contributions to collaborative drug discovery programs that have progressed more than 40 novel drug candidates into clinical development.

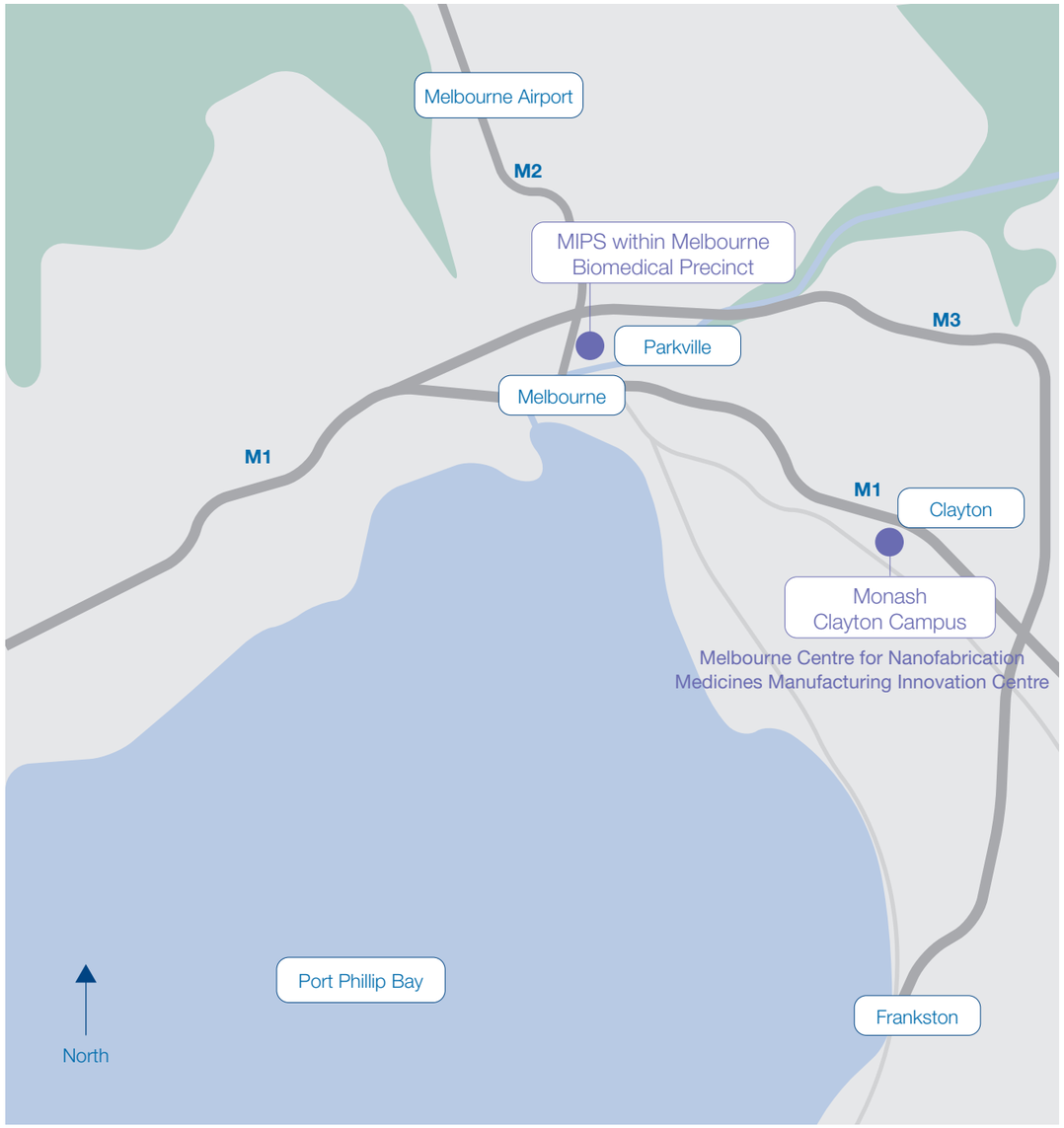
OUR VALUES

- **Innovation and impact**
  We take excellence as a given. Instead we strive for excellence that is innovative and leads to internationally recognised impact making a difference to the lives of people all over the world.
- **Collaboration**
  We achieve so much more by working with others. We actively seek collaborations within MIPS and Monash more broadly but, vitally, with national and international partners. Our research is better for it.
- **Diversity and inclusion**
  We know that diversity in our people brings better scientific and health outcomes. By fostering an inclusive environment we are developing a culture where all of our staff and students know that they are valued.
- **Integrity**
  Public trust in health research is vital. We earn the trust of our collaborators, as well as health consumers, by upholding the highest standards of integrity and honesty.

LOCATION

MIPS is housed at the Monash University Parkville campus, the university's most research intensive campus. Close to Melbourne's CBD and part of Australia's top health and biomedical precinct, our neighbours include major hospitals, the University of Melbourne, WEHI, the Florey, the Doherty Institute and CSL Limited. We have a secondary research presence in Clayton at the Melbourne Centre for Nanofabrication and the Medicines Manufacturing Innovation Centre has a node at the nearby Australian Synchrotron.

2025 has seen extensive work on the expansion of the campus to the new site at 343 Royal Parade, acquired in 2023. Work to refit the building will continue throughout 2026 with completion expected in 2027.



MIPS WITHIN THE MELBOURNE BIOMEDICAL PRECINCT PARKVILLE

DIRECTOR'S MESSAGE

Welcome to the MIPS annual report for 2025. It is a great pleasure to have the opportunity to look back over the year and to provide some commentary on our general progress and to pick out a few key highlights.

As a Faculty we continue to grow and in spite of the challenges in the sector, our student numbers continue to increase. This in turn has allowed our research programs to expand and for us to recruit new staff, bringing in new research capabilities and insight. These appointments are described in detail on page 13 and all have made fantastic contributions already.

Our progress has certainly put added pressure on space across the campus, so it is exciting to see the developments at the new MIPS site at 343 Royal Parade. Throughout 2025, the original building was largely demolished and great progress has been made in redeveloping the site. By the end of 2025 much of the external façade of the new building was completed and as we enter 2026, the main focus is now internal fit out. Progress has been excellent, with very few hurdles, and we anticipate completion by the end of 2026 or early 2027.

Our research operations have expanded across all areas with staff numbers and grant awards all increasing. Specific details of the activities of the research Themes, Platforms and Therapeutic Program Areas are summarised in the following pages, and in addition we continue to have specific focus in the areas outlined in the MIPS strategic plan, namely artificial intelligence and data science, translation and commercialisation, the challenges of climate health and support for non-traditional academic roles.

Briefly, in AI we like all in the sector, are rapidly learning how best to use this amazing technology, and at the same time we are keeping a close eye on the challenges it throws up. A main area of focus has been in training our postgraduates and early career researchers in AI and machine learning and in high performance computing more generally. The uptake of these programs has been excellent and we are encouraged that the general level of understanding across the Institute is growing. This of course has happened in parallel with a significant (~$60m) investment by Monash in MAVERIC, Australia's first university-led AI supercomputer that is being developed in collaboration with NVIDIA, Dell Technologies and CDC Data Centres. We look forward to the potentially transformative impact these initiatives can have on drug discovery.

Within the climate health initiative, I am delighted to report that ~80% of MIPS labs progressed through implementation for 'My Green Lab' initiatives this year and should gain accreditation in 2026. We have also significantly expanded and energised the MIPS Green Lab Community of Practice through 2025 which meets regularly to exchange ideas and brainstorm research and operational initiatives. Research efforts in this area have addressed topics including temperature change related labour losses, medicine safety during extreme heat, and lower carbon medication packaging. The Faculty's education programs are also increasingly embedding sustainability and climate health principles throughout the curricula.

We continue to look at better ways to support our staff who sit in 'non-traditional' academic roles and how best to tailor performance metrics to these roles. The largest cohort of these are the fantastic scientists that run our research platforms and provide world leading expertise to a range of programs. The platforms are the backbone of our research activities, but platform scientists typically do not run their own programs, hold their own grants nor lead their own publications. Understanding how best to reward excellence under these circumstances is therefore a major area of focus for us and indeed across the University and we continue to actively contribute to that broader conversation.

In the commercialisation and translation arena I was delighted to see Phrenix, a MIPS/Florey Institute spin-out, win the research commercialisation award in the Australian Financial Review Higher Education Awards and for CUREator to back xCystence Bio, a Monash spin-out based on a collaboration between medicinal chemists here at MIPS and biologists within the Faculty of Medicine, Nursing and Health Sciences. We also saw great progress for PF-07248144, a drug co-invented by MIPS scientists and based on technology developed within the CRC for Cancer Therapeutics (CTx) - a major collaboration across key cancer and drug discovery groups in Australia. MIPS scientists led the drug design, medicinal chemistry and drug metabolism/pharmacokinetics efforts for this program within CTx and made significant contributions to the intellectual property that was ultimately licenced from CTx to Pfizer. In 2025 we received the great news that Pfizer had progressed PF-07248144 into Phase 3 clinical trials. This is a powerful example of the reach and potential impact of Australian drug discovery. We have our fingers firmly crossed for a great result in these potentially registration-enabling trials.

We were also delighted to see the Glyph lymph-targeted prodrug technology continue to progress through clinical trials. This delivery technology was developed at MIPS prior to licencing to Seaport Therapeutics and forms the basis for multiple preclinical and clinical programs. GlyphAllo™ is the lead program for Seaport and in 2025 progressed into Phase 2b studies (the BUOY-1 trial) for major depressive disorder. We continue to work with our colleagues at Seaport to develop the technology and look forward to further clinical progress. We were also encouraged to see the opening of the Monash Boston Hub. This is an innovative step forward for Monash and provides both a physical presence in Boston and a gateway to collaborators, investors and advisors across the Unites States. We are working closely with our US based colleagues to integrate their expertise and outreach across all of our drug discovery programs

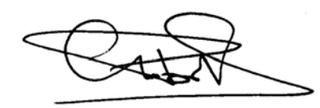
In spite of the challenges of the broader funding landscape, MIPS scientists continue to deliver and in 2025 total awarded funding was again higher than the year before. Particular highlights include five new NHMRC investigator fellowships, success in NHMRC Ideas and Development grants, ARC Discovery Projects and Future Fellowships, MRFF, FightMND, and international success with programs such as ARPA-H and the Bill and Melinda Gates Foundation.

Other research highlights for 2025 include:

- The release for public comment of the new Australian clinical practice guidelines for psychedelics. This program of work is being led by MIPS scientists in the Centre for Medicine Use and Safety on the back of the recent re-scheduling of psychedelics in Australia that allows for clinical use under controlled conditions. This puts Australia at the forefront of international efforts to harness the potential power of psychedelics, but the need for effective clinical practice guidelines in this emerging field is clear. Development of the guidelines is a large effort involving a broad group of experts including those from general practice, health economics, knowledge translation, law, lived experience of MDMA and PTSD, mental health policy, nursing, neuroscience, pharmacology, pharmacy, psychiatry, psychology, and psychotherapy. After public consultation and review we expect the guidelines to be published in 2026.
- High profile publications in Nature Nanotechnology, Nature Communications, Science Signalling, the Journal of the American Chemical Society, iScience, PNAS, JAMA network open and many others; addressing issues including optimised targeting of mRNA to specific cell types, virtual drug screening, structure-based drug design, novel catalytic methods for drug synthesis and the potential link between gabapentinoid use and hip fracture. A range of individual awards for MIPS scientists including Arthur Christopoulos and Patrick Sexton again being named as Clarivate Highly cited researchers, Natalie Trevaskis winning the University award for researcher of the year and Jie Tang receiving a Victorian Tall Poppy Award and being profiled by Nature as one of four rising stars at the forefront of cancer research. There are many more individual award winners listed in the Theme reports and we congratulate them all.

Wrapped around all of our research efforts we have very deliberately increased focus on research integrity. These activities have been driven by the research integrity working group that includes the majority of the MIPS leadership team. A key focus in 2025 has been to embed the principles of research integrity into all our major processes including performance development, academic performance standards, promotion, recruitment and HDR milestones. We have also increased the number of research integrity advisors across MIPS, established a set of research data management principles and held an all-staff forum to seek feedback on best practice. This will continue to be a focus in an effort to normalise regular conversations about how we can increase both the quality and integrity of the work we do.

In closing, our graduate student community continues to be the heart of our research efforts and we celebrate and congratulate every one of the 49 PhD students that graduated in 2025. We were also gratified to see Monash retain a strong placing in the QS World University Rankings by Subjects in Pharmacy and Pharmacology (#4 worldwide in 2025). Many congratulations to all and sincere thanks to everyone for their efforts through 2025.



Professor Christopher J.H. Porter
Director

MIPS STRATEGIC FOCUS AREAS

The MIPS Strategic Plan was endorsed by the International Advisory Board in 2024. The plan identified new areas of focus that build on our foundations of the world's best people doing world-leading science that has societal impact. Throughout 2025 we have operationalised these areas of focus to embed each area in the day-to-day activities of the Institute.

MIPS STRATEGIC PLAN SUMMARY

BREAKTHROUGH PHARMACEUTICAL SCIENCE | DRUG DISCOVERY AND DEVELOPMENT | SAFER AND MORE EFFICIENT USE

Imperatives	World-Leading Science		Societal Impact		The World's Best People	
Success Factors	A preferred home for discipline thought leaders	State-of-the-art integrative drug discovery & use capabilities	Enhanced human health outcomes	Impactful benefits on ecosystems & partners	Excellent & engaged employees	Flexible & rewarding career paths
New Areas of Focus	Artificial intelligence & data science		Enhanced translation and commercialisation	Addressing the challenges of climate health	Support for non-traditional roles	
	Research Integrity					

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

ACADEMIC LEAD: DR MATTHEW BELOUSOFF

In 2025, the Monash Institute of Pharmaceutical Sciences (MIPS) strengthened its focus on Artificial Intelligence (AI) capability development through a range of coordinated training and engagement initiatives. These efforts were designed to build foundational skills, enhance digital literacy, and support the integration of AI approaches across research and professional activities. A key highlight was the delivery of structured training programs aimed at both Higher Degree by Research (HDR) students and staff, providing practical exposure to coding, computational tools, and data-driven methodologies. Participation and feedback indicated strong interest and meaningful skill development, reinforcing the value of these initiatives in supporting the Institute's evolving research landscape.

Complementing the training programs, MIPS also launched a seminar series to foster discussion and knowledge exchange around AI applications in pharmaceutical sciences. Delivered in a hybrid format, the series attracted consistent engagement from both in-person and online audiences, reflecting a broad and growing interest in the field. These sessions provided a platform for researchers and experts to share insights, explore emerging trends, and encourage interdisciplinary collaboration. Together, the training and seminar initiatives contributed to building a more connected and informed community, better equipped to engage with AI-driven research and innovation.

Building on this momentum, MIPS has identified several priority areas for 2026 to further expand its AI and data science capabilities. Planned initiatives include the continuation of foundational and advanced training programs, the expansion of seminar and lecture series, and the introduction of regular drop-in support sessions to provide practical, hands-on guidance. These activities aim to sustain engagement, deepen expertise, and ensure that staff and students are well positioned to leverage AI in their work. Collectively, these efforts reflect MIPS' ongoing commitment to fostering a future-ready, digital research environment.

MEETING THE CHALLENGES ASSOCIATED WITH CLIMATE HEALTH

ACADEMIC LEAD: ASSOCIATE PROFESSOR LAUREN MAY

In 2025, MIPS advanced its strategic commitment to addressing the challenges of climate health through coordinated action across research, operations, training, and community engagement. A major institutional milestone was the continued transition of laboratories toward My Green Lab (MGL) certification, with approximately 80% of laboratories progressing through the implementation phase and targeting certification in early 2026. This significant uptake reflects a sustained shift towards embedding environmentally responsible laboratory practice across the Institute.

Central to this progress was the strengthening of the MIPS Green Lab Community of Practice (CoP, pictured above), which expanded its role in supporting laboratories through shared resources, coordinated implementation activities, and cross-institute engagement for sustainable operations, procurement, energy management, and OHS considerations. The CoP also coordinated training participation, with members undertaking the MGL Accredited Professional Training, contributing to a broader uplift in environmental sustainability capability across MIPS. The introduction of the MIPS Lab Sustainability Awards further strengthened engagement by recognising individuals demonstrating leadership in sustainable practice.

The inaugural Climate Health Symposium and CoP Workshop played a key role in elevating climate health research visibility and strengthening cross-disciplinary collaboration. The event attracted strong participation and featured research spanning sustainable chemistry, environmentally conscious biomaterials, and the environmental impact of medicines, reflecting the breadth of climate health activity across MIPS.

Climate-health research included world-first modelling of future temperature-related labour losses (Wen et al., 2026), life-cycle analysis to identify lower-carbon medication packaging (Loftus et al., 2025), and guidance on medicine safety during extreme heat (Australian Pharmacist, 2025). Education advances included co-designed curricula on antimicrobial resistance and equity (Lim et al., 2025), a global survey highlighting pharmacists' commitment and training in planetary health (Blackburn et al., 2025), and a study connecting student attitudes and sustainability competencies in pharmaceutical science education (Huth et al., 2025).

Collectively, these activities reflect meaningful progress towards a culture of environmental responsibility, enhanced operational sustainability, and strengthened institutional capability to respond to climate health challenges.

ENHANCING SUPPORT FOR STAFF IN NON-TRADITIONAL ROLES

ACADEMIC LEAD: PROFESSOR MICHELLE MCINTOSH

MIPS has continued to build momentum in strengthening recognition, support and career development for staff contributing to the institute in non-traditional academic and technical specialist roles. This work is now firmly embedded as a strategic priority for the Institute and reflects an important shift in how excellence is recognised and rewarded. By broadening our frameworks beyond traditional publication-driven measures, MIPS is better recognising the diverse, practice-aligned contributions that underpin contemporary drug discovery, research translation and platform-enabled science.

ENHANCED TRANSLATION AND COMMERCIALISATION

ACADEMIC LEAD: DR RUSSELL TAIT

MIPS has continued to pursue and support the translation and commercialisation of our research through the MIPS Business Development Office and the Director of Enterprise & Engagement. You can read more of the successes from 2025 in the Commercialisation and Translation section on pages 90-99.

RESEARCH INTEGRITY

ACADEMIC LEAD: PROFESSOR CHRIS PORTER

The Faculty established a Research Integrity Working Group in the latter part of 2024 to ensure that the high degree of integrity which our research is undertaken is sustained. The MIPS Director chairs the working group, which includes all Theme Leaders and Deputy Theme Leaders, as well as the Associate Dean Research and Faculty Research Manager.

Throughout 2025 the working group focussed on incorporating research integrity into all levels of the activities of the Faculty and MIPS, specifically, performance development, promotion and recruitment, and in HDR milestones. All staff and students are expected to undertake their work with integrity but the Faculty brings this to attention by including it explicitly in the Academic Performance Standards where staff are expected to demonstrate research integrity in increasingly broad contexts as they increase in seniority. We have increased the number of Research Integrity Advisors in the Faculty from two to 12, ensuring that any staff or students with questions can seek guidance from these people. The final significant piece of work was the establishment of Research Data Management Principles within the Faculty. These include a checklist to guide these principles, for all research published where the corresponding author(s) are graduate research students or members of staff in the Faculty.

The activities of the Research Integrity Working Group were presented to all staff at a forum on 9 October. We are encouraged by the attention all staff and graduate research students are giving to their research practices and we feel confident that the research that we undertake is of the utmost standard.

2025 HIGHLIGHTS & STAFF ACHIEVEMENTS

MONASH STRENGTHENS ITS STANDING AMONG THE WORLD'S BEST

In 2025, Monash University was ranked No. 4 in the world for Pharmacy and Pharmacology in the QS World University Rankings by Subject, reaffirming the University's position among the global leaders in pharmaceutical sciences. The result reflected the sustained international strength of Monash in research, education and reputation, and demonstrated the continuing impact of the Faculty of Pharmacy and Pharmaceutical Sciences on the global stage. The ranking also underscored the depth of talent across the Faculty and the collective contribution of its researchers, educators and students to advancing the future of healthcare and medicines discovery.

343 ROYAL PARADE PROJECT UPDATE

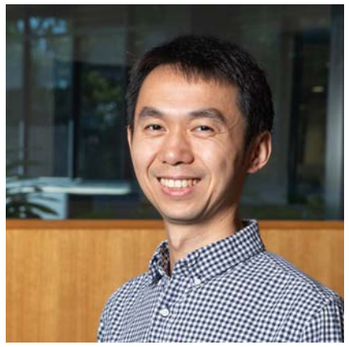
Significant progress was made in 2025 on the revitalisation of 343 Royal Parade, the future home of the Monash Institute of Pharmaceutical Sciences (MIPS). By December, demolition and structural enhancement works had been completed and the building façade was nearing completion, marking a major milestone in the transformation of the site into a world-class facility for pharmaceutical research and development. As the project moved into its next phase, the focus shifted to internal fit-out and external works, with plans well underway for overall completion in late 2026 with staff and PhD students scheduled to move into the building in early 2027.

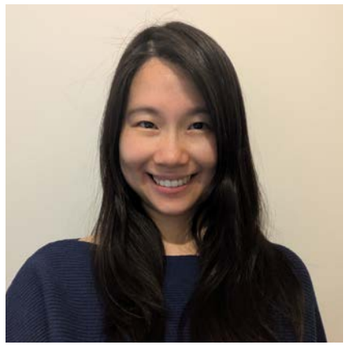
The redevelopment also highlights Monash's commitment to sustainability and future-focused infrastructure. The building has been fully de-gassed, with heating and hot water systems now running on electricity, while solar panels will be installed as part of Monash University's Net Zero plan. In addition, electric vehicle charging stations are planned for Mile Lane by the end of 2026, further supporting the sustainability ambitions of the precinct.

NEW STAFF APPOINTMENTS

In 2025, MIPS welcomed a cohort of outstanding new staff whose expertise spans computational science, medicinal chemistry, structural biology, pharmacoepidemiology and health services research. Professor Giuseppe Barca has brought his internationally recognised expertise in high-performance computing, artificial intelligence and quantum chemistry, strengthening MIPS' capability in advanced computational approaches to drug discovery. Dr Emma Watson and Dr Manuela Jörg added new strengths in biomolecule-based therapeutics and medicinal chemistry, while Dr Yun Shi brought expertise in fragment-based drug design and protein-ligand interactions.

The Institute also expanded its medicines use and safety capabilities through the appointments of Dr Richeek Pradhan and Dr Li Shean Toh. Their backgrounds in pharmacoepidemiology, medicines safety, prescribing quality, translational research and health services innovation enhance MIPS' ability to connect discovery and development with real-world health outcomes. Collectively, these appointments reflect a continued investment in interdisciplinary talent and the next generation of research leadership across the Faculty.





JIE TANG RECOGNISED BY NATURE

Dr Jie Tang was recognised by *Nature* as one of four rising stars at the forefront of cancer research, highlighting the growing international profile of her work at Monash University. Her research focuses on developing an affordable oral vaccine for colorectal cancer that can be delivered as a pill, using spiky silica-based nanoparticles designed to adhere to the gut lining and remain in place long enough to deliver vaccine antigens effectively. *Nature* highlighted both the ingenuity and translational promise of this platform, noting its potential as a scalable and practical vaccine technology.

Dr Tang's work is notable not only for its scientific originality, but also for its clear translational ambition. The nanoparticles are engineered to stimulate immune activity, helping antigens penetrate immune cells and prompting a broader immune response that could contribute to long-term protection against cancer recurrence. The recognition from *Nature* places Dr Tang among an emerging group of researchers whose work is helping shape the next generation of cancer treatment technologies.

AUSTRALIA'S FIRST CLINICAL PRACTICE GUIDELINE FOR MDMA-ASSISTED PSYCHOTHERAPY

Researchers from Monash University's Centre for Medicine Use and Safety and Neuromedicines Discovery Centre released Australia's first clinical practice guideline for the appropriate use of methylenedioxymethamphetamine-assisted psychotherapy for post-traumatic stress disorder. Issued for public consultation, the guideline was developed to support clinicians, consumers and other stakeholders in navigating a rapidly emerging area of mental health care with evidence-based advice. It represented an important national milestone in the development of clinical standards for psychedelic-assisted therapies in Australia.

The guideline includes four recommendations, 21 good practice statements and 15 research recommendations, providing a structured framework for decision-making and identifying areas where further evidence is needed. By bringing together clinical evidence and expert consensus, the work helps lay the foundation for safe, ethical and effective implementation of MDMA-assisted psychotherapy in the Australian healthcare context.

SEAPORT THERAPEUTICS ADVANCES CLINICAL DEVELOPMENT

Seaport Therapeutics continued to advance the clinical development of new neuropsychiatric medicines enabled by Monash-developed drug delivery technology. In 2025, Seaport's lead program, GlyphAllo™ dosed the first patient in a Phase 2b clinical study evaluating utility in major depressive disorder. The company's pipeline is based on the Glyph platform, pioneered by Monash researchers, which is designed to improve oral bioavailability and redirect absorption through the intestinal lymphatic system to overcome key barriers in drug delivery. The continued momentum of Seaport reflects the real-world impact of Monash translational research and its capacity to support the development of more effective therapeutic options for patients.

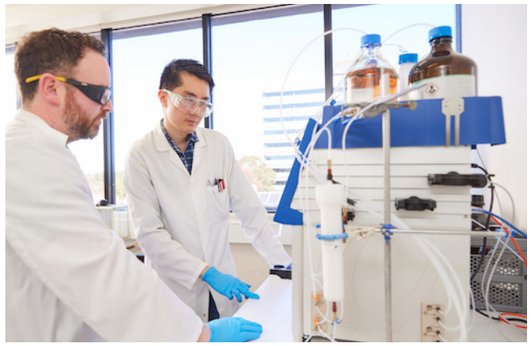
This progress also highlights the global commercial reach of Monash innovation. By underpinning Seaport's pipeline, the Glyph platform demonstrates how fundamental pharmaceutical science developed at MIPS can be translated into clinical-stage programs with the potential to improve treatment outcomes in areas of significant unmet need.

MONASH ESTABLISHES BOSTON-BASED HUB

In 2025, Monash University established a new Boston-based Hub in Cambridge, Massachusetts, to accelerate drug discovery and health innovation partnerships across North America and Europe. The Hub was created to deepen engagement with the biotechnology and pharmaceutical sectors and to strengthen pathways for translating Monash research into new medicines, technologies and companies. Its location in one of the world's most dynamic life sciences ecosystems gives Monash researchers and partners a stronger platform for international collaboration and commercialisation.

The initiative builds on Monash's strong commercialisation momentum, including the creation of more than 30 spinout companies and more than 160 licence deals over the previous five years. It also reflects the University's ambition to create a globally connected innovation network that can help accelerate research impact and bring discoveries closer to patients, industry and society.

MONASH INVENTION PROGRESSES TO PHASE 3 CLINICAL TRIAL FOR ADVANCED BREAST CANCER



A Monash invention reached a rare and significant milestone in 2025 when Pfizer commenced a Phase 3 clinical trial of PF-07248144, a potential treatment for advanced or metastatic HR-positive, HER2-negative breast cancer. The first-in-class therapy was co-invented by scientists at the Monash Institute of Pharmaceutical Sciences and selectively targets the proteins KAT6A and KAT6B, opening a new epigenetic approach to the treatment of advanced breast cancers. Its progression to Phase 3 marks a major achievement in Australian drug discovery and reflects the long-term value of collaborative translational research.

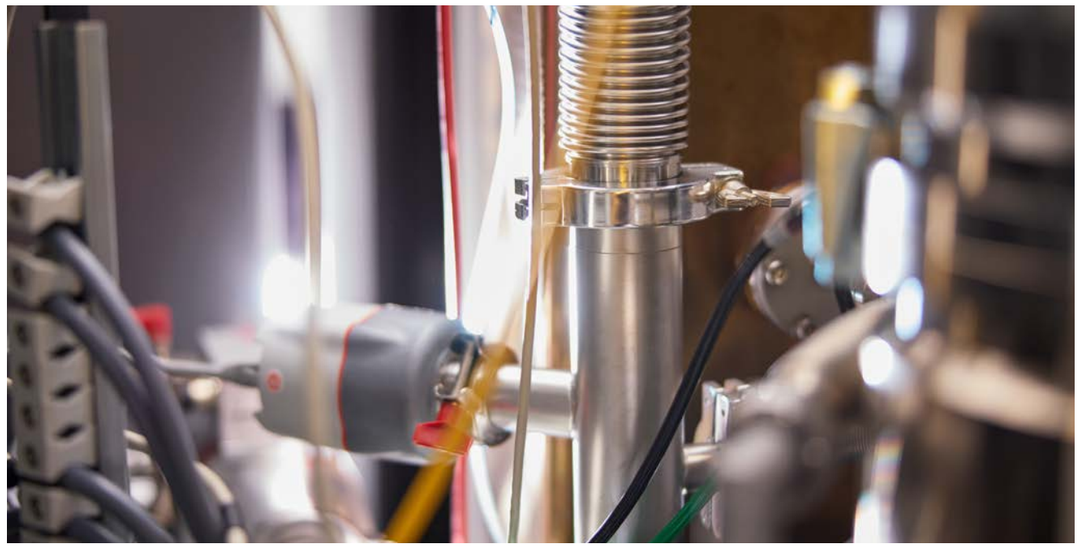
The program emerged from a national collaboration involving Monash, the Cancer Therapeutics Cooperative Research Centre and a number of leading Australian research organisations. At Monash, the medicinal chemistry program was co-led by Professor Paul Stupple and Dr Ylva Bergman Bozikis, with the Centre for Drug Candidate Optimisation, led by Professor Susan Charman, playing a critical role in the development of the KAT6 inhibitors. The milestone demonstrates how MIPS-led discovery science can progress through commercial partnerships and global clinical development toward potential patient benefit.

MIPS SCIENTISTS RECOGNISED AMONG THE WORLD'S MOST INFLUENTIAL RESEARCHERS

MIPS scientists were again recognised among the global top one per cent for citations in the field of Pharmacology and Toxicology, underscoring the sustained international influence of research conducted within the Institute. In 2025, Professor Arthur Christopoulos and Professor Patrick Sexton were identified by Clarivate as among the world's most influential researchers in their field, reflecting the exceptional quality, visibility and reach of their scientific contributions. This recognition reinforces the strength of MIPS research on the world stage and the Institute's role in shaping advances across pharmacology and drug discovery.

VICE-CHANCELLOR AWARDS SHINE A SPOTLIGHT ON HIGH ACHIEVERS

Professor Natalie Trevaskis was recognised as one of the University's standout researchers in the 2025 Vice-Chancellor's Awards, receiving the Researcher of the Year award. The honour acknowledged her outstanding research leadership and the impact of her work, which has helped strengthen Monash's reputation for excellence in pharmaceutical sciences. Her achievement also reflects the broader depth of talent across the Faculty and the important contribution of MIPS researchers to the University's research performance and culture of excellence.



2025 MIPS RESEARCH SYMPOSIUM

In December 2025, MIPS hosted the second MIPS Research Symposium at the Monash City Campus, building on the success of the inaugural 2024 event and further strengthening connections across the Institute. The 2025 Symposium attracted 220 registrants, reflecting strong engagement from researchers, professional staff and higher degree by research (HDR) candidates, and demonstrating the value of a dedicated Institute wide research showcase.

The Symposium again operated as a full day forum highlighting the breadth and impact of research across MIPS, with presentations spanning the Therapeutic Program Areas and key strategic priorities. This structure ensured that all parts of the Institute's research portfolio were represented, with a diverse range of speakers and topics showcasing the depth and variety of work underway across MIPS.

The 2025 program retained the short talk format introduced in 2024, with standard 15-minute presentations and 3-minute rapid talks. While these timeframes can limit the depth that individual presenters are able to cover, they enable a broad cross section of Institute research to be presented and discussed within a single day, giving attendees a panoramic view of activity across groups and themes. Feedback indicated that this balance between depth and breadth continues to be valued, providing rapid exposure to many areas of work while still allowing meaningful discussion during question time and breaks.

A key enhancement in 2025 was the decision to focus the plenary program on internal excellence rather than inviting a single external keynote speaker, as in 2024. Two internal plenary lectures, delivered by Simon Bell and Giuseppe Barca, provided an opportunity to spotlight research leadership within MIPS and highlight the impact of their teams' work. These plenaries anchored the scientific program and stimulated rich discussion on the future directions of pharmaceutical sciences research at MIPS and beyond.

HDR engagement was a particular feature of the 2025 Symposium. HDR candidates in the later stages of their PhD were invited to attend for the first time, offering them valuable exposure to the full spectrum of MIPS research and to Institute-wide networking opportunities. This experience has heightened interest among earlier stage HDR candidates, who are keen to progress to a point in their candidature where they can attend and contribute to future Symposia.

Throughout the day, formal sessions were complemented by well attended informal opportunities to connect, including breaks and networking periods. These sessions enabled participants to follow up on talks, explore potential collaborations and connect with colleagues they might not typically encounter in their day to day work, contributing to a more cohesive and collaborative Institute culture.

Overall feedback on the 2025 MIPS Research Symposium has been highly positive, with participants praising the organisation of the event, the diversity and quality of presentations, and the decision to feature internal plenary speakers. The strong turnout, rich scientific program and high level of engagement across all career stages underscore the Symposium's growing role as a signature event in the MIPS calendar. Building on the foundations laid in 2024, the 2025 Symposium has further cemented its position as a cornerstone for discovery, collaboration and celebration at MIPS, with planning already underway to evolve the format to best support the Institute's strategic research priorities in coming years.

A special thank-you to the Symposium Committee: Chair Professor Peter Scammells; Dr Sandra Vargas; Dr Emma Watson; Dr Nik Veldhuis; Dr Michelle Tan; and Dr Pouya Dehghankelishadi.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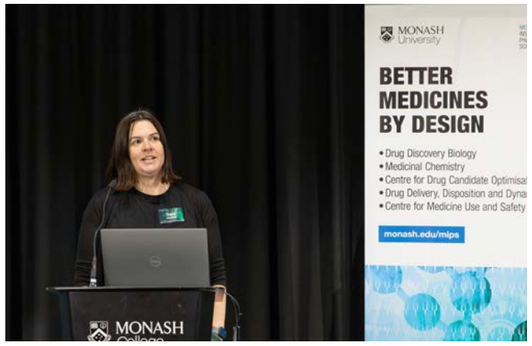
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FACULTY RESEARCH AWARDS

The annual Faculty Research Awards recognise the sustained excellence in research and graduate research of MIPS staff. Staff are nominated by their peers and winners are determined by a sub-committee of Faculty Executive, Chaired by the Associate Dean Research. The members of the sub-committee for the 2025 awards were Professor Peter Scammells (Associate Dean Research, Chair), Associate Professor Kristian Kempe (D4), Associate Professor Michelle Halls (DDB), Associate Professor Betty Extinaris (Pharmacy and Pharmaceutical Sciences Education), Associate Professor David Shackleford (CDCO), Dr Enyuan Cao (D4), Dr Russell Tait (Director of Enterprise & Engagement), Dr Leanne Hawkey (ATMCF).

The Awards were presented by the Associate Dean Research at the Faculty's annual awards ceremony in October.






FACULTY RESEARCHER OF THE YEAR AWARD


Awarded in recognition of exceptional research outcomes, embodiment of Monash University values and exceptional leadership both internally and across the wider research community.

2025 winner **- Professor Natalie Trevaskis**, Drug Delivery, Disposition & Dynamics Theme

Natalie has pioneered a new field of research investigating the central role of the lymphatics in acute, inflammatory and metabolic diseases, and developing novel drug delivery technologies to target the lymphatics to treat these diseases.

Natalie is a Clarivate Hi-Ci researcher in the field of pharmacology (2022-24). She has published ~100 peer-reviewed papers including in top-tier journals such as Nature, Nature Metabolism, Science Advances, Nature Reviews Drug Discovery, and Journal or Controlled Release. Natalie's lipid prodrug platform, co-developed over 15 years, has been licensed to PureTech Health and spun out into Seaport Therapeutics, which raised $325M in 2024. Two prodrugs are in clinical development, with SPT-300 showing success in Phase 1 and 2 trials.

Natalie leads a dynamic team of 6 postdoctoral fellows, 12 PhD and 2 honours students. She has secured over $50M in competitive funding including major grants from ARPA-H, NHMRC, MRFF and ARC. She co-leads the Centre for Optimisation of mRNA Therapeutics and a $5M NHMRC Synergy grant on long-lived vaccines.

Not only was Natalie the winner of the Faculty Researcher of the Year Award, but she was also the winner of the **Vice-Chancellor's Researcher of the Year Award.** Natalie received the University Researcher of the Year award in recognition of her exceptional science, who has pioneered lymphatic-targeted drug delivery, her leadership in equity, diversity and mentoring, and that her work exemplifies innovation, impact, and integrity.

Congratulations Natalie!

FACULTY FUTURE RESEARCH LEADER AWARD (<10 YEARS)

Awarded in recognition of excellence by an early career researcher who demonstrated research leadership potential with up to 10 years of experience post-PhD.

Prior to 2014 and between 2022-2024, this award was known as the Early Career Research Award with winners being nominated for the corresponding Vice-Chancellor Award.

2025 winner - **Dr Jie Tang**, Drug Delivery, Disposition & Dynamics Theme

Jie is an NHMRC Emerging Leadership Fellow and Lecturer at D4. Her research focusses on developing nanoparticle-based platforms for mucosal vaccine delivery, via oral routes or inhalation, with a particular emphasis on cancer immunotherapy. In 2025, she was named one of Nature Index's "Four Rising Stars at the Forefront of Cancer Research".

Jie has published 50 research papers (20 as first/co-first author; 10 as co-corresponding), with >4850 citations and an h-index of 38. Her work features in Nature Reviews Materials, Angewandte Chemie, Journal of the American Chemical Society, Nano Today, Biomaterials, and Nano Letters, etc. Jie has secured > $4M in external funding as CI, including an NHMRC EL1 fellowship, two ARC DPs (CIA, CID), MRFF EMCR grant (CIE), Cumming Global Centre for Pandemic Therapeutics Foundation Grants (CIB), Tour de Cure Mid-Career grant (CIA). Her nanovaccine platforms have been licensed to industry partners including AstraZeneca, attracting over £1.2M and €2M to advance DNA and mRNA vaccine technology toward clinical trials for cancer immunotherapy.

FACULTY EARLY CAREER RESEARCHER AWARD (<5 YEARS)

Awarded in recognition of excellence and impact by an early career researcher (less than 5 years post-PhD) who has achieved research excellence. Winners were nominated for the corresponding Vice-Chancellor Award.

Between 2022-2024, this award was called the Emerging Early Career Research (ECR) Award. Prior to 2014, this award was known as the Young Investigator Award.

2025 winner - **Dr Aeson Chang**, Drug Discovery Biology Theme

Aeson's research focuses on understanding the impact of neural signalling in metastatic triple negative breast cancer to identify novel strategies that target these pathways to improve treatment of the disease. To achieve this, he collaborates with scientists from different disciplines globally and nationally.

To date, Aeson has published 15 peer-reviewed articles: 5 as first author and 2 as senior author. Some notable publications include high-impact articles in Science Translation Medicine, Journal of National Cancer Institute and Nature Cancer Reviews. Aeson has received invitations to present in global and national meetings including Keystone Symposia and Australasian Neuroscience Society Meeting. In the last 3 years, Aeson has successfully secured approximately $3 million in research funding, including prestigious national competitive grants (2x NHMRC Ideas) and an international competitive award (Gilead Sciences Research Scholars Program Grant).

Aeson's research approach is grounded in core values including integrity, mentorship, and collaboration. He fosters intellectual curiosity and critical thinking in his students and staff, and creates an inclusive environment in his lab, while promoting high-quality research practices. His interdisciplinary collaborations have led to major grants, demonstrating the importance of pursuing impactful, cross-disciplinary research.

FACULTY GRADUATE RESEARCH SUPERVISION AWARD

Awarded to staff who have demonstrated exceptional supervision, mentoring and training practices to benefit and enrich the experiences of their graduate research students. Winners were nominated for the corresponding Vice-Chancellor Award.

2025 winner - **Associate Professor Cornelia Landersdorfer**, Drug Delivery, Disposition & Dynamics Theme

Cornelia Landersdorfer enables her PhD students, almost all women, to conduct highly successful PhD research as demonstrated by their excellent publications in leading journals (33 papers including PhD students since 2020) and numerous major awards, including: Vice Chancellor's Commendation for PhD Thesis Excellence, ASCEPT Garth McQueen Prize, ASCEPT Neville Percy Prize, PAGANZ Nick Holford prize (x3), Cyril Tonkin PhD scholarship, IATDMCT Best Young Scientist poster, AFR Top100 Future Leader.

All of her PhD students have had successful milestone reviews. Importantly, after graduation Connie's PhD students have transitioned to highly successful careers as R&D scientists at world-leading pharmaceutical companies, including: Director Clinical Pharmacology, Principal Scientist PKPD Modelling, Senior PK Research Scientist.

Notably, Cornelia previously received the 2023 Monash University Graduate Supervisor of the Year awards, out of 64 nominated supervisors, further demonstrating her substantial contributions to research training.

FACULTY RESEARCH ENGAGEMENT AND IMPACT AWARD

Awarded in recognition of excellence in achieving, exceptional impact, particularly through transdisciplinary challenge-led research. The award celebrates success in collaborative working, partnerships, engagement and knowledge mobilisation activities that have led to significant community benefit. Winners were nominated for the corresponding Vice-Chancellor Award.

2025 winner - **Associate Professor (Practice) Pete Lambert**, Drug Delivery, Disposition and Dynamics Theme

Substantial investments have been made to improve healthcare infrastructure and systems in low- and middle-income countries (LMICs), however the prevalence of substandard and falsified medicines remains unacceptably high. Pete Lambert founded the Monash Quality of Medicines Initiative (QoMI) to support global efforts to address this issue.

QoMI investigates the root causes of poor-quality medicines and provides evidence to support international and local policy change and regulatory action against substandard products. In addition, QoMI works with local stakeholders to build capacity and increase the resilience of local supply chains.

Since the launch of QoMI in 2023, studies in 14 LMICs (in sub-Saharan Africa and South Asia) have led to the removal of a number of poor-quality products from local markets, informed new WHO guidelines and resulted in national policy change. QoMI has also provided technical training to more than 300 government officials, clinicians and supply chain managers in sub-Saharan Africa and the Pacific Islands.

RESEARCH THEMES

The MIPS Themes are the home of our research expertise. Each Theme contributes to the drug discovery, development, and use activities of the Institute.

RESEARCH THEMES

Drug Discovery Biology

Medicinal Chemistry

Centre for Drug Candidate Optimisation

Drug Delivery, Disposition & Dynamics

Centre for Medicine Use and Safety

DRUG DISCOVERY BIOLOGY

Theme Leader: **Professor Rebecca Ritchie**
Deputy Theme Leader**: Associate Professor Michelle Halls**

The Drug Discovery Biology Theme (DDB) has a major focus on pharmacology and drug discovery with sustained impact on the understanding and treatment of major global health burdens.

DDB research is based on four major multidisciplinary and complementary areas of expertise: Pharmacology, Structural Biology, Target Identification and Translational Science. DDB's principal therapeutic focus areas are neurological disease, cardiovascular disease and metabolic disease, with researchers also active in pain, inflammatory disease and cancer.

DDB continues to serve as the headquarters of the ARC Industrial Transformation Training Centre for Cryo-Electron Microscopy of Membrane Proteins for Drug Discovery, a national training centre with university and industry collaborators across Australia, having completed its fourth year of operation. The Theme also welcomed a new research group led by DDB alumni Dr Anh Nguyen, whose lab investigates GPCR signalling through the dual lens of drug discovery and environmental toxicology.

Grants & research contracts awarded
23

Staff
100

Awarded research income
$16,479,651

Publications
83

Graduate research students
44

PhD completions
13

Research highlights of the year included significant advances in cancer biology, particularly in cell growth regulation and targeted treatment strategies, and in metabolic disease, uncovering new pathways implicated in obesity and diabetes. On the industry and translation front, DDB expanded its long-term research partnership with Laboratoires Servier, and DDB researchers founded Phrenix Therapeutics, which secured significant seed investment.

MAJOR RESEARCH & ACHIEVEMENTS OF 2025

AWARDS

DDB researchers received a wide range of prestigious awards, honours and appointments in 2025, recognising excellence across research, education, commercialisation and community engagement, including (in alphabetical order):

- Dr Jo-Anne Baltos, Bridge Program Pitch Competition Winner
- Dr Jason Cao, American Chemical Society 2025 Gordon Hammes Scholar Award
- Dr Aeson Chang, Faculty Early Career Researcher Award
- A/Prof Karen Gregory, A/Prof Lauren May, Faculty Education Excellence Award for Outstanding Contributions to Student Learning
- Dr Laura Humphrys, British Pharmacological Society Pickford Award
- Prof Chris Langmead and Dr Gregory Stewart, Australian Financial Review Higher Education Award for Research Commercialisation
- Prof Chris Langmead, Honorary Fellow of the British Pharmacological Society
- Dr Annabel Manoleras, Australasian Society for Autonomic Neuroscience Best ECR Talk
- Dr Sarah Piper, JG Russell Award
- Prof Rebecca Ritchie, Board Member, Heartbeat Victoria
- Dr Abhipree Sharma, ASCEPT New Investigator Award, ASCEPT-BPS Outstanding Investigator Award
- A/Prof Celine Valant, ARC College of Experts
- Prof Denise Wootten, 2025 Nadine Watson Lecturer
- Prof Owen Woodman, ASCEPT Achievement Award
- Dr Aeson Chang, A/Prof Betty Exintaris, Dr Elva Zhao, Dr Sheng Yu Ang, Dr Helena Qin, Dr Narges Mahdavian, Faculty Equity, Diversity and Inclusion Award for MOSAIC

Our students also excelled in 2025, earning recognition for their research achievements and science communication across a range of national and international forums, including:

- Australian Pain Society Annual Scientific Meeting 3MT Prize - Eric Le
- Best Poster Presentation, MechBio2025 - Frankie Zhang
- Faculty 3MT People's Choice - Bhavika Rana
- Faculty Honours Prize - Shaqayeq Ramazani
- Fred Mitchelson Award (top Honours student) - Bodhi Hemsley-Oades
- DDB Student Symposium award winners - Frankie Zhang, Bethany Lei, Melitta Allen, Caitlin Owyong, Elaine Jiang
- Best Oral Presentation, Monash Physiology Student Symposium - Dhanya Shanmuganathan
- Trans Tasman Bursary, Asia Pacific Microscopy Congress - Matthew Rowe

FELLOWSHIPS AND GRANTS

DDB researchers secured a number of prestigious fellowships in 2025 across a range of funding schemes. A particular highlight was the award of four NHMRC Investigator Grants, which support outstanding researchers for five years with salary and research funding. GPCRs featured strongly across the fellowships awarded, underscoring DDB's international standing in this field; as targets of approximately 30% of all medicines, GPCRs are central to the Theme's drug discovery mission. Highlights include:

Dr Jason Cao - *Structural approaches to assist the development of selective antagonists of adrenomedullin receptors* (NHMRC Investigator Grant)

A/Prof David Thal - *Harnessing protein allostery to accelerate drug discovery* (NHMRC Investigator Grant)

Prof Mark Febbraio - *Uncovering the molecular mechanisms associated with exercise to develop therapies to treat obesity-related diseases* (NHMRC Investigator Grant)

Prof Arthur Christopoulos - *Allosteric modulation of muscarinic receptors for the treatment of neurocognitive deficits* (NHMRC Investigator Grant)

Dr Chengxue Helena Qin - *How does ageing affect GPCR signalling: Focussing on pro-resolving receptors* (ARC Future Fellowship)

Across the Theme, researchers were awarded 22 grants and contracts, including:

- ARC Discovery Projects: Prof Mark Febbraio, Dr Nimna Perera
- NHMRC Ideas Grants: A/Prof Nicholas Veldhuis, A/Prof Daniel Poole, Prof Erica Sloan
- Medical Research Future Fund (MRFF): A/Prof Karen Gregory, A/Prof Lauren May, A/Prof Michelle Halls, A/Prof Celine Valant, Prof Arthur Christopoulos

RESEARCH SNAPSHOTS

DDB researchers contributed to >80 publications in 2025, spanning our research strengths in GPCRs and structural biology, and the molecular mechanisms that underlie pathologies such as metabolic disease, cardiovascular disease, neurological disease, cancer and inflammation, as well as emerging areas including exercise biology and enteric neuroscience.

Key research advances from our teams included:

The development of virtual screening that accounts for receptor-membrane interactions to identify positive allosteric modulators of the A1 adenosine receptor without unwanted cardiac side effects, a key advance for the development of therapeutics for ischaemia-reperfusion injury and neuropathic pain (Nguyen, Thai, Chia, Lu, Hellyer, Langiu, Gregory, White, Christopoulos, May in *Proceedings of the National Academy of Sciences*; doi: 10.1073/pnas.2421687122).

Determination of cryo-electron microscopy structures of the human A3 adenosine receptor to reveal a unique activation mechanism and a previously unknown cryptic binding pocket, establishing a structural foundation for more selective therapeutics for inflammatory diseases, cancer and glaucoma (Zhang, Mobbs, Bennetts, Nguyen, Christopoulos, May, Thal in *Nature Communications*; doi: 10.1038/s41467-025-62872-x).

Identification of high expression of Hox-C12 as a key driver of $ß_2$-adrenoceptor-mediated invasion in triple-negative breast cancer, suggesting Hox-C12 as a potential biomarker to identify patients most likely to benefit from beta-blocker therapy (Lam, Cardwell, Liu, Peng, Spark, Sursock, Nowell, Chang, Keen, Sloan, Halls in *Science Signaling;* doi: 10.1126/scisignal.adq8279).

Evidence that exercise-derived extracellular vesicles carry a distinct miRNA profile and proteins linked to mitochondrial biogenesis, providing new insights into the mechanisms by which exercise protects against neurodegeneration (Fuller, McLennan, Egan, Perera, Terry, Telles, Smeuninx, Scott, Febbraio in *iScience*; doi: 10.1016/j.isci.2025.111752).

Demonstration that deficiency of the pro-resolving mediator annexin-A1 exacerbates angiotensin II-induced cardiovascular remodelling in a sex-specific manner, uncovering female-specific pathways in blood pressure control that highlight the importance of sex as a biological variable in cardiovascular disease research (Singh, Jackson, Tang, Parker, Chen, Nowell, Woodman, Ritchie, Qin in *Communications Biology*; doi: 10.1038/s42003-025-08291-6).

TWO HIGHLIGHT PAPERS

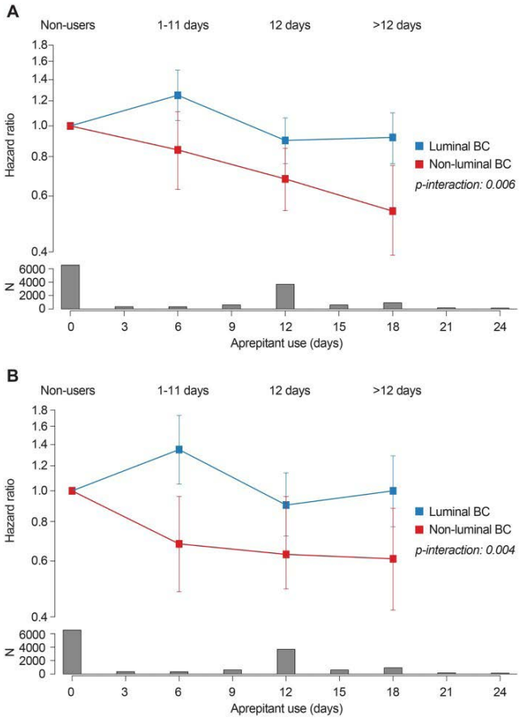
APREPITANT USE DURING CHEMOTHERAPY AND ASSOCIATION WITH SURVIVAL IN WOMEN WITH EARLY BREAST CANCER

Edoardo Botteri, Sarah Hjorth, Fabio Conforti, Vincenzo Bagnardi, Bettina K Andreassen, Nathalie C Støer, Sameer Bhargava, Giske Ursin, Sara Gandini, Erica K Sloan*, Aeson Chang*

*co-corresponding authors

Journal of the National Cancer Institute, 117, 2249-2258 (2025). DOI: https://doi.org/10.1093/jnci/djaf178

Aprepitant is a drug commonly used to prevent nausea and vomiting during chemotherapy, and acts by blocking a receptor called the neurokinin 1 receptor (NK1R). This large observational study investigated whether aprepitant use during chemotherapy was associated with improved survival outcomes in women with early breast cancer. The study found that women who received aprepitant had significantly better survival compared to those who did not, suggesting that blocking NK1R signalling during treatment may have anti-tumour benefits beyond its anti-nausea effects. These findings open an exciting new avenue for repurposing an existing, well-tolerated drug to improve breast cancer outcomes. Following this discovery, Dr Aeson Chang was awarded a Gilead Research Scholars grant to further investigate the underlying mechanisms.



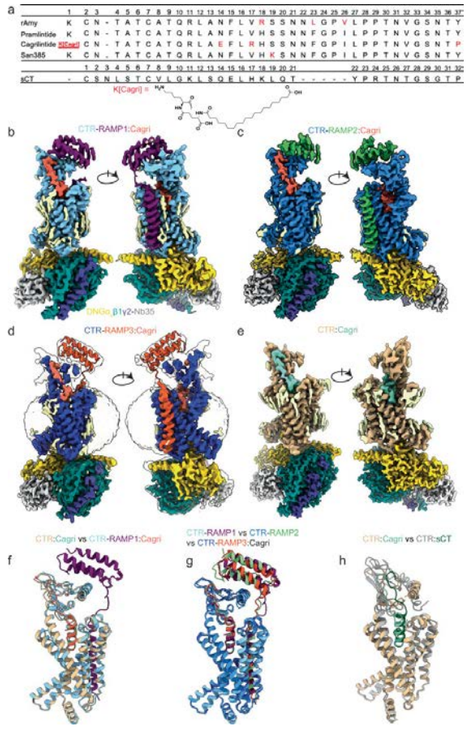
STRUCTURAL AND DYNAMIC FEATURES OF CAGRILINTIDE BINDING TO CALCITONIN AND AMYLIN RECEPTORS

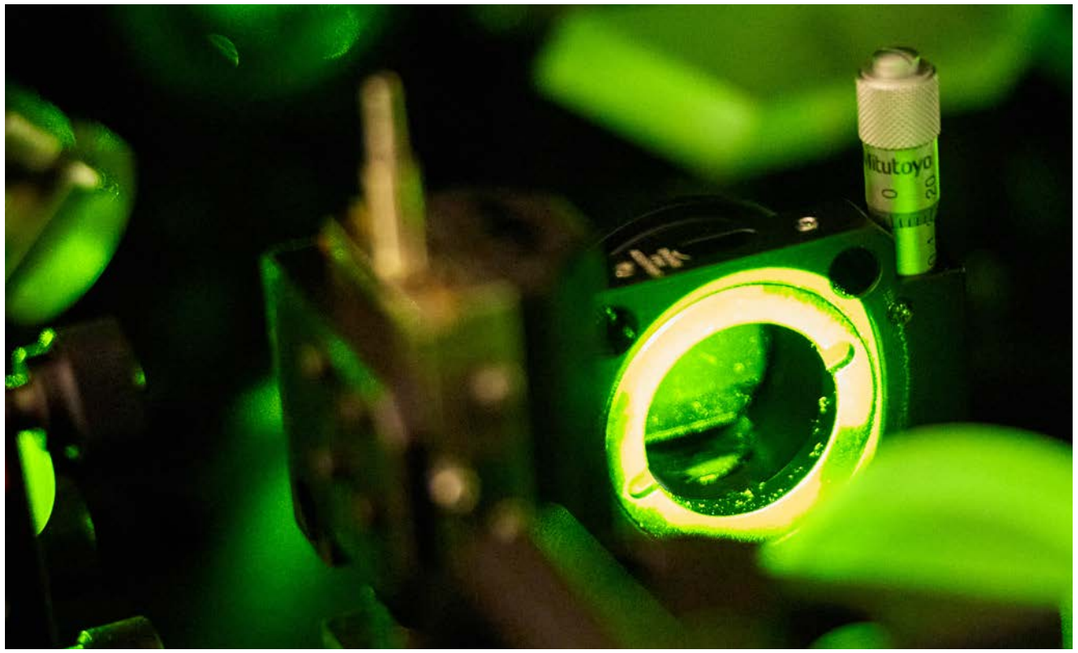
Jianjun (Jason) Cao, Matthew J Belousoff, Rachel M Johnson, Peter Keov, Zamara Mariam, Giuseppe Deganutti, George Christopoulos, Caroline A Hick, Steffen Reedtz-Runge, Tine Glendorf, Borja Ballarín-González, Kirsten Raun, Charles Bayly-Jones, Denise Wootten*, Patrick M Sexton*

*co-corresponding authors

Nature Communications, 16, 3389 (2025). DOI: https://doi.org/10.1038/s41467-025-58680-y

Obesity is a major global health burden, and new medicines that can safely and effectively promote weight loss are urgently needed. Cagrilintide is a long-acting amylin analogue currently in clinical development for obesity treatment. This study used cryo-electron microscopy to determine the three-dimensional structures of cagrilintide bound to two related receptors, the calcitonin receptor and the amylin receptor, revealing the molecular basis of its dual receptor activity. These structural insights provide a blueprint for designing next-generation dual receptor agonists with improved potency, selectivity and duration of action for the treatment of obesity and related metabolic diseases.





MEDICINAL CHEMISTRY

Theme Leader: **Professor Martin Scanlon**
Deputy Theme Leader: **Dr Dan Priebbenow**

Research in the Medicinal Chemistry Theme (Med Chem) is focused on the design and synthesis of small molecules as new therapeutic candidates or tool compounds for better understanding biological mechanisms. Research encompasses computational chemistry, synthetic medicinal chemistry, peptide science, chemical biology and structure-based drug design. Our research is highly collaborative in nature and extends across many target classes and therapeutic areas.

Grants & research contracts awarded
18

Staff
56

Awarded research income
$10,986,596

Publications
65

Graduate research students
43

PhD completions
13

As well as the significant number of academic groups conducting cutting edge basic and translational research, the Medicinal Chemistry (Med Chem) Theme is home to two of Monash University's state-of-the-art Research Platforms. The Monash Fragment Platform (MFP) conducts early stage hit identification and uses a range of different biophysical methods to characterise binding interactions. The Australian Translational Medicinal Chemistry Facility (ATMCF) supports hit optimisation and hit-to-lead programs. The Med Chem Theme also headquarters the MRFF-funded initiative MedChem Australia, which, in partnership with both WEHI and the University of Sydney, provides medicinal chemistry capability to support drug discovery at a national level.

MAJOR RESEARCH & ACTIVITIES OF 2025

NEW APPOINTMENTS IN MEDICINAL CHEMISTRY

Medicinal Chemistry welcomed some new recruits in 2025. Professor Giuseppe Barca joined the MIPS research community, bringing with him expertise in high-performance computing, artificial intelligence and quantum chemistry. Professor Barca's team was awarded the 2024 ACM Gordon Bell Prize, the highest global accolade in the field of HPC, for pioneering quantum-accurate biomolecular simulations and achieving the first exaflop-scale double-precision calculations. In 2025, he received the Dirac Medal from the World Association of Theoretical and Computational Chemists, the highest international award in the field for scientists under 40, recognising his pioneering contributions to high-performance quantum chemistry. His expertise will further accelerate the University's drug discovery capabilities. In addition, Dr Yun Shi joined the Theme. Dr Shi is a current ARC DECRA fellow and NHMRC Investigator whose research focuses on the discovery and characterisation of protein-small molecule interactions for drug design.

PROTEIN MISFOLDING AND DISEASE

Proteins are the backbone of the biological world. As we age, some proteins misfold and accumulate in the brain causing devastating diseases like Alzheimer's Disease. The fine details of how and why this happens are unknown. Dr Amandeep Kaur was awarded a NHMRC Investigator grant to develop molecules that will allow us to 1) detect the identity and 2) see the molecular-level details of the misfolded proteins to unravel some of these mysteries. This research could lead to better diagnostics and effective treatments for diseases such as Alzheimer's.

NEW APPROACHES TO THE TREATMENT OF MALARIA

Malaria remains a significant global burden with an estimated 263 million malaria cases in 2023, which is an increase in 11 million cases from the previous year. This resulted in an estimated 597,000 deaths with 74% of these being children aged under 5 years. Clinically, malaria is managed by extensive use of artemisinin-based combination therapies (ACTs). Alarmingly, resistance to ACTs, manifested as delayed parasite clearance and clinical failure, has spread rapidly and threatens to derail recent success in reducing malaria mortality. The World Health Organisation has called for effective new drugs that operate by known but novel mechanisms of action which are able to treat clinical disease, as well as block parasite transmission.

Professor Peter Scammells, Associate Professor Sheena McGowan (Biomedicine Discovery Institute) and a team of researchers in the Medicinal Chemistry Theme at MIPS have developed potent antimalarial agents that act via the dual inhibition of two enzymes (M1 and M17 aminopeptidases) that the malaria parasite uses to access amino acids for growth and survival. The team's preferred compounds have shown potent antiparasitic activity *in vitro* and are also highly effective *in vivo* after oral administration. Furthermore, these compounds are active against artemisinin resistant parasites and are active against both *Plasmodium falciparum* and *vivax* parasites. A NHMRC Development grant was awarded in 2025 (commencing 2026) to complete proof of concept studies relating to *in vivo* efficacy, pharmacokinetic (PK) and safety profiles with the current preferred compound whilst developing second generation compounds with improved drug-like properties and fully optimised PK profiles.

NEW THERAPIES FOR PULMONARY ARTERIAL HYPERTENSION

Dr Kieran Stockton from the Australian Translational Medicinal Chemistry Facility (ATMCF) and Dr Chengxue Helena Qin received AEA Ignite funding to progress a breakthrough drug for the treatment of pulmonary arterial hypertension (PAH), which targets the chronic underlying inflammation that drives the disease. Characterised by high blood pressure in the lungs, PAH disproportionately affects women and drastically decreases their quality of life in terms of capacity for physical activity and often progresses to heart failure and death, with an approximate 50% 5-year mortality rate. Drawing on additional expertise from MedChem Australia, the Centre for Drug Candidate Optimisation and the National Drug Discovery Centre, the research aims to progress a novel technology to *in vivo* proof-of-concept studies as a monotherapy and add-on to standard of care. Given the central role of our protein target in inflammation cascades, this technology has the potential to find broad utility in a wide range of inflammatory disorders.

NOVEL TREATMENTS FOR FIBROTIC DISEASE

A research effort led by Professor Bernard Flynn was awarded AEA funding for A Novel Drug Treatment for Fibrotic Disease. Under this AEA-Ignite grant, the team is undertaking a series of biophysical and biochemical studies to characterise the molecular interactions of the antifibrotic drug CIN244 for its molecular target. A greater understanding of the potency and selectivity of CIN244 for its target will help define its translational pathway by providing a better understanding of the safe and effective dosing to be used in clinical trials.

DEVELOPMENT OF PAN-FLAVIVIRAL PROTEASE INHIBITORS

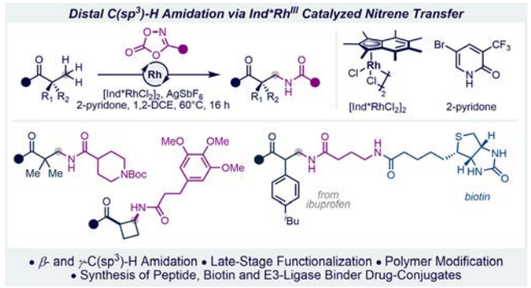
Flaviviruses constitute a family of human pathogens that infect over 400 million people annually. There is currently no specific antiviral therapy to treat infections with any of the flaviviruses. Flavivirus outbreaks of epidemic proportion are increasing in geographical distribution and frequency and are predicted to increase further alongside climate change. Therefore, there is an urgent need to develop therapeutics both to reduce flavivirus infection burden and to prepare for future outbreaks of (re)emerging viruses. A research team led by Prof Martin Scanlon, Dr Manuela Jörg and Dr Indu Chandrashekaran were awarded an NHMRC Ideas grant aimed at developing broad-spectrum inhibitors of the flaviviral protease enzymes using our DNA-encoded library (DEL) screening approach. Building upon our previous screening results and leveraging a set of fully characterised proteases from ten viruses, this research aims to discover pan-flavivirus protease inhibitors.

TWO HIGHLIGHT PAPERS

DISTAL C(SP3)H AMIDATION VIA IND*RHIII CATALYZED NITRENE TRANSFER

Hannah J. Ross, Yihui Yu, Liselle Atkin, Milad Ghorbani, Kelly Mint, Nicole Warne, Kristian Kempe, and Daniel L. Priebbenow*
J. Am. Chem. Soc. 2025, 147, 24734–24746. DOI: 10.1021/jacs.5c06232

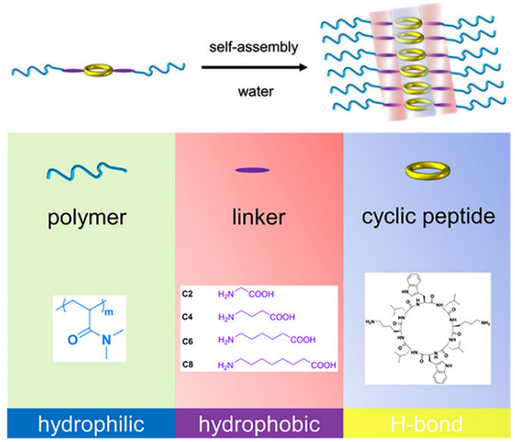
Nitrogen-containing functional groups, in particular amides, are highly prevalent in pharmaceutical compounds, where they play a critical role in molecular recognition, stability, and biological activity. In this work, MIPS scientists developed a new catalytic method using a highly active rhodium metal catalyst that selectively converts inert C(sp³)–H bonds into valuable nitrogen-containing functional groups. The work demonstrated that this catalytic system could be used in the modification of challenging primary and secondary C–H sites across a diversity of small molecule building blocks. It also demonstrated the application of this method in the late-stage functionalisation of pharmaceutical derivatives and the rapid synthesis of drug conjugates. In collaboration with A/Prof Kristian Kempe and his group (D4), we discovered that this catalytic method could be used to selectively functionalise the side chains of biomedically relevant polymers, highlighting broad potential applications across medicinal chemistry and materials science.



HYDROPHOBICITY-CONTROLLED SELF-ASSEMBLY OF SUPRAMOLECULAR PEPTIDE NANOTUBES IN WATER

Min Zeng, William Parsons, Yixuan Chen, David K. Chalmers, Sébastien Perrier
Angew. Chem. Int. Ed., 2025, 64, e202423828. DOI: 10.1002/anie.202423828

New materials, made by combining polymers with self-assembling peptides, have enormous potential as molecular machines or for advanced drug delivery. However, one factor that limits the development of these materials is having fine control of the peptide assembly process. This collaboration between the MIPS Medicinal Chemistry Theme and Warwick University Department of Chemistry combined chemical synthesis and stability studies with extensive computer modelling and has developed a new technique to regulate the assembly of peptide/polymer nanotubes. By adding a short hydrocarbon linker between the polymer and peptide, we created a hydrophobic ‘inner shell’ that keeps water from disrupting the peptide structure, enabling fine control nanotube stability. This study was published in the leading chemistry journal Angewandte Chemie and was nominated as a ‘Very Important Paper’ by the reviewers.



CENTRE FOR DRUG CANDIDATE OPTIMISATION

Theme Leader: **Professor Joe Nicolazzo**
Deputy Theme Leader: **Associate Professor David Shackleford**

The Centre for Drug Candidate Optimisation (CDCO) fosters drug discovery innovation through multidisciplinary collaboration with commercial partners, not-for-profit organisations and academic research institutes. The CDCO specialises in characterising physicochemical, metabolic, biopharmaceutical and pharmacokinetic properties of candidate molecules to guide and inform medicinal chemistry and biology and translate promising molecules into drug candidates suitable for clinical development.

Grants & research contracts awarded
24

Total research income
$4,310,082

Publications
12

Staff
19

The CDCO utilises industry-standard approaches and protocols for in vitro ADME and in vivo pharmacokinetic platforms to fulfil candidate selection and progression criteria. These include in vitro chemical screens to assess solubility, partitioning, ionisation, and stability; in vitro assays to assess drug metabolism, enzyme inhibition, permeability, and protein binding, and in vivo assessment of drug absorption, disposition, clearance and bioavailability.

The CDCO contributes to the discovery and optimisation of drug candidates to treat infectious diseases, cancer, CNS disorders, cardiovascular and metabolic disease. Since its establishment in 2003, the CDCO has contributed to the advancement of 43 compounds into clinical development and the registration of three new drugs.

MAJOR RESEARCH & ACTIVITIES OF 2025

CDCO CONTRIBUTES TO THE PROGRESSION OF PF-07248144 TO CLINICAL TRIAL FOR TREATMENT OF ADVANCED BREAST CANCERS

In a rare and significant milestone for an Australian-discovered therapy, Pfizer Inc has commenced a Phase 3 clinical trial to study a potential new medicine for advanced breast cancer, based on pioneering research from Monash University and the Cancer Therapeutics Cooperative Research Centre (CTx). This program was a multidisciplinary and collaborative effort including Australian researchers from MIPS, WEHI, Peter MacCallum Cancer Centre, CSIRO, Griffith University, St Vincent's Institute of Medical Research, and Children's Cancer Institute.

The first-in-class therapy is being studied as a treatment in adults with HR+, HER2- advanced or metastatic breast cancer whose disease progressed following prior treatments. The potential medicine, referred to as 'PF-07248144' and co-invented by scientists from MIPS, blocks two proteins – KAT6A and KAT6B – which help control how genes are switched on and off. Because these proteins influence how cells grow and develop, finding ways to block them can 'turn down the volume' on those genes and slow the cancer's ability to grow and spread. From MIPS, the project was co-led by medicinal chemists, Professor Paul Stupple and Dr Ylva Bozikis. A critical element for the progression of PF-07248144 was the evaluation of the ADME-PK properties of compounds developed through this program, which was led by the previous CDCO Director Professor Sue Charman. The advancement to Phase 3 clinical trials is supported by highly encouraging Phase 1 results, where PF-07248144, in combination with fulvestrant (a type of hormone therapy), achieved a 37 per cent objective response rate in patients. The KAT6 platform was licensed to Pfizer through the CTx commercialisation partner Oncology One in 2018, and Pfizer progressed the program to ultimately deliver PF-07248144.

PROF JOE NICOLAZZO JOINS AS NEW CDCO DIRECTOR

Prof Joseph (Joe) Nicolazzo commenced as the Theme Leader and Director of CDCO in February 2025, with the retirement of Professor Susan Charman who was central to establishing the Centre in 2003. Though the CDCO role is new to Professor Nicolazzo, he has a rich history with Monash University encompassing more than two decades of research, teaching and various leadership positions. It's this combination of skills and experience, including his in-depth knowledge of MIPS and deep links to the pharmaceutical sciences community across Australia and around the world, that made Joe a natural fit for the CDCO Theme Leader and Director position. For Joe, maintaining CDCO's position as the premiere, go-to destination for drug candidate optimisation in Australia and the Asia-Pacific is central to his vision for the future. Additionally, he is excited to continue pushing the frontiers of the Centre's potential to evolve new medicines of the 21st century. Joe's leadership role is supported by the appointment of A/Prof David Shackleford as the Deputy Theme Leader and recently-appointed Research Director of the CDCO.

CDCO SUPPORTS RESEARCH PAVING THE WAY TOWARDS A NEW TREATMENT FOR LONG COVID

Researchers from CDCO contributed to a WEHI-led study that could lead to a new drug to prevent long COVID symptoms. The preclinical study, published in Nature Communications, describes how a new drug candidate, developed by WEHI researchers, can prevent long COVID symptoms in mice. The CDCO team, led by previous Director, Professor Sue Charman, has been collaborating with WEHI since 2020 to evaluate the biopharmaceutical properties of the antiviral compound. The program was established when WEHI researchers first identified the compound could block a key COVID protein called 'PLpro'. The CDCO conducted in vitro and in vivo profiling of the new compound to define its physicochemical, metabolism and pharmacokinetic properties, critical to ensuring efficacy, safety and a convenient dosing regimen. In the world-first study, the team found mice treated with the antiviral compound were protected from long term brain and lung dysfunction – key symptoms of long COVID.

TWO HIGHLIGHT PAPERS

STRUCTURE-BASED DISCOVERY AND DEVELOPMENT OF HIGHLY POTENT DIHYDROOROTATE DEHYDROGENASE INHIBITORS FOR MALARIA CHEMOPREVENTION

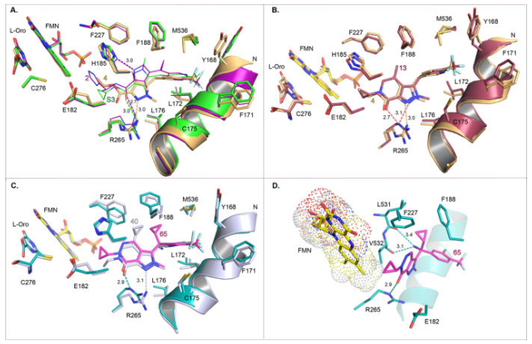
Nie Zhe, Roger Bonnert, Jet Tsien, Xiaoyi Deng, Christopher Higgs, Farah El Mazouni, Xiaoyu Zhang et al.
Journal of Medicinal Chemistry 68, no. 1 (2024): 590-637.
DOI: 10.1021/acs.jmedchem.4c02394

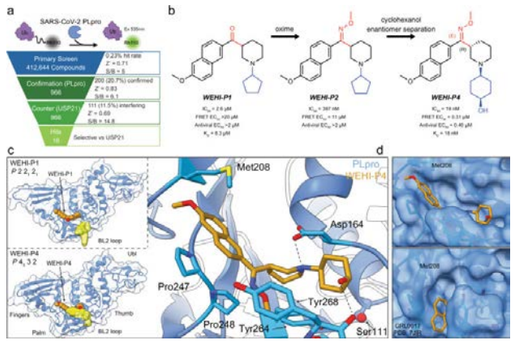
Malaria remains a serious global health challenge, yet treatment and control programs are threatened by drug resistance. Dihydroorotate dehydrogenase (DHODH) was clinically validated as a target for treatment and prevention of malaria through human studies with DSM265, but currently no drugs against this target are in clinical use. This study used structure-based computational tools including free energy perturbation (FEP+) to discover highly ligand efficient, potent, and selective pyrazole-based Plasmodium DHODH inhibitors through a scaffold hop from a pyrrole-based series. Optimized pyrazole-based compounds were identified with low nM-to-pM Plasmodium falciparum cell potency and oral activity in a humanized SCID mouse malaria infection model. The lead compound DSM1465 is more potent and has improved absorption, distribution, metabolism and excretion/pharmacokinetic (ADME/PK) properties compared to DSM265 that support the potential for once-monthly chemoprevention at a low dose. This compound meets the objective of identifying compounds with potential to be used for monthly chemoprevention in Africa to support malaria elimination efforts.

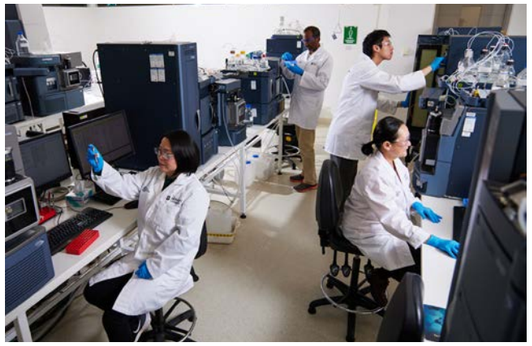
A NOVEL PLPRO INHIBITOR IMPROVES OUTCOMES IN A PRE-CLINICAL MODEL OF LONG COVID

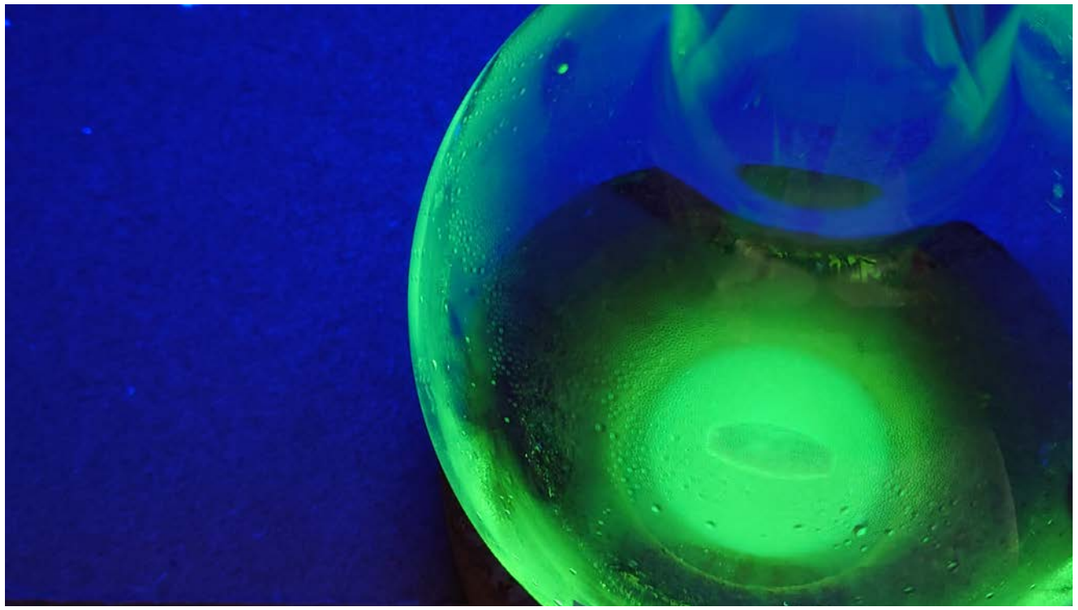
Stefanie M. Bader, Dale J. Calleja, Shane M. Devine, Nathan W. Kuchel, Bernadine GC Lu, Xinyu Wu, Richard W. Birkinshaw et al.
Nature Communications 16, no. 1 (2025): 2900. DOI: 10.1038/s41467-025-57905-4.

The COVID-19 pandemic caused by the coronavirus SARS-CoV-2 has highlighted the vulnerability of a globally connected population to zoonotic viruses. The FDA-approved coronavirus antiviral Paxlovid targets the essential SARS-CoV-2 main protease, Mpro. Whilst effective in the acute phase of a COVID infection, Paxlovid cannot be used by all patients, can lead to viral recurrence, and does not protect against post-acute sequelae of COVID-19 (PASC), commonly known as long COVID, an emerging significant health burden that remains poorly understood and untreated. Alternative antivirals that are addressing broader patient needs are urgently required. This study reports drug discovery efforts to target PLpro, a further essential coronaviral protease, and describes a novel chemical scaffold that targets SARS-CoV-2 PLpro with low nanomolar activity, and which exhibits activity against PLpro of other pathogenic coronaviruses. The lead compound shows excellent in vivo efficacy in a mouse model of severe acute disease. Importantly, the mouse model employed recapitulates long-term pathologies matching closely those seen in PASC patients. The lead compound offers protection against a range of PASC symptoms in this model, prevents lung pathology and reduces brain dysfunction. This provides proof-of-principle that PLpro inhibition may have clinical relevance for PASC prevention and treatment.









DRUG DELIVERY, DISPOSITION AND DYNAMICS

Grants & research contracts awarded
43

Staff
95

Total research income
$20,172,498

Publications
145

Graduate research students
45

PhD & MPhil completions
17

Theme Leader: **Professor Michelle McIntosh**
Deputy Theme Leader: **Associate Professor Kristian Kempe**

The Drug Delivery, Disposition and Dynamics (D4) Theme focuses on advancing how medicines are designed, delivered and distributed within the body to maximise therapeutic benefit. D4 research aims to ensure drugs reach their intended biological targets at the appropriate time and concentration, across a range of administration routes including oral, inhaled and injectable delivery.

Researchers within D4 are internationally recognised leaders in drug delivery and nanomedicine, with particular depth of expertise in lipid-based delivery systems and lymphatic transport. The Theme brings together multidisciplinary capability to address key challenges that limit the effectiveness of current medicines.

Major research programs within D4 span strategies to enhance lymphatic targeting for immune and metabolic diseases; reduce reliance on injectable therapies by enabling alternative delivery routes; and improve understanding of intracellular and subcellular drug trafficking. Additional focus areas include tumour-targeted delivery of anticancer therapies, transport of drugs across the blood–brain barrier, identification of novel mechanisms of action and resistance in pathogens, and formulation approaches for drugs with very low aqueous solubility.

MAJOR RESEARCH & ACHIEVEMENTS OF 2025

In 2025, research across Drug Delivery, Disposition and Dynamics (D4) at Monash continued to translate foundational pharmaceutical science into meaningful clinical and technological advances. The year was marked by strong progress in drug formulation and delivery, pharmacokinetics and pharmacodynamics, advanced materials, biosensing technologies, and vaccine delivery platforms. Together, these activities reinforced the central role of enabling pharmaceutical sciences in improving therapeutic outcomes across diverse patient populations.

FUNDING SUCCESS

D4 researchers were successful in securing competitive national and international funding in 2025. Natalie Trevaskis and Darren Creek, together with colleagues from MIPS and international partners, received further support from the Advanced Research Projects Agency for Health (ARPA-H) for the project *Non-invasive functional imaging of the digestive lymphatic system*. D4 investigators also attracted ARC and NHMRC funding, reflecting the strength and breadth of the Theme's research programs.

Kristian Kempe was awarded an ARC Discovery Project as CIA for work focused on macromolecular design of sustainable polymeric materials. Angus Johnston, as CIA, together with D4 colleagues, received a highly competitive NHMRC Ideas Grant for research on targeted mRNA approaches for precise depletion of metastatic cancer. Additional NHMRC funding was secured by interdisciplinary teams involving Michael Whittaker, Jie Tang, Darren Creek and Kristian Kempe. Cornelia Landersdorfer was also part of an international team awarded an NHMRC Clinical Trials and Cohort Studies Grant for the EARSHOT study examining the risk of hearing loss in children receiving antibiotics.

PHYSIOLOGICALLY INSPIRED DRUG DELIVERY FOR INFANTS

A major highlight of 2025 was internationally recognised work led by Professor Ben Boyd and the *Monash Milk Team*, demonstrating the potential of human milk as a natural oral drug delivery vehicle for infants. Published in the *European Journal of Pharmaceutics and Biopharmaceutics*, the study showed that oral bioavailability of the poorly soluble antimicrobial clofazimine increased more than 2.5-fold when administered with human milk in preclinical models.

By leveraging the complex lipid and colloidal structures present in milk, the research addressed a long-standing challenge in paediatric drug delivery: improving absorption while avoiding synthetic excipients that may pose risks to neonates. Similar effects observed with bovine milk highlighted the translational relevance of this approach, particularly for low- and middle-income settings.

ADVANCING ANTIBIOTIC DOSING IN CRITICALLY ILL PATIENTS

Important advances were also made in understanding drug disposition in vulnerable patient populations. Associate Professor Cornelia Landersdorfer and colleagues reported new insights into the pharmacokinetics of antibiotics in critically ill patients with acute kidney injury. The work demonstrated how altered physiology and rapidly changing renal function can significantly affect drug exposure, underscoring the limitations of standard dosing approaches in intensive care settings.

These findings support the need for more individualised dosing strategies informed by pharmacokinetic and pharmacodynamic principles and strengthen the evidence base for optimising antimicrobial therapy in high-risk populations.

ENABLING DIAGNOSTICS FOR CHRONIC PAIN

At the interface of delivery-enabled technologies and diagnostics, Professor Nico Voelcker and collaborators developed a novel device capable of distinguishing between different types of chronic pain. By enabling more objective classification of pain states, the technology addresses a critical unmet need in pain management, where diagnosis is often subjective and treatment selection challenging. The work highlights how advances in materials science and device engineering can open new avenues for precision diagnostics.

POLYMER SCIENCE AND DELIVERY PLATFORM INNOVATION

Leadership in delivery-enabling materials science was recognised with Associate Professor Kristian Kempe receiving the David Sangster Polymer Science and Technology Award. His research continues to advance the design of functional polymers for controlled drug release, improved stability and enhanced biological performance. These platforms underpin multiple D4-relevant applications, including nanoparticle drug delivery systems and vaccine carriers.

VACCINE DELIVERY AND GLOBAL HEALTH IMPACT

Vaccine delivery and regulatory science remained key areas of impact for D4 in 2025. Professor Colin Pouton's team contributed to an Australian-led study demonstrating the potential of a novel mRNA vaccine for tuberculosis, highlighting the importance of advanced delivery systems for effective cellular uptake. In parallel, D4 researchers contributed to the identification of a new vaccine target to block malaria transmission, supporting strategies focused on disease prevention and eradication.

Complementing these advances, the Quality of Medicines Initiative (QoMI), led by Associate Professor (Practice) Pete Lambert, strengthened engagement with regulatory and global health partners. QoMI became a formal partner in the Therapeutic Goods Administration (TGA) Indo-Pacific Regulatory Strengthening Program and continued to support the TGA Pacific Medicines Testing Program.

QoMI also led negotiations for Monash University to join the TGA Academic Outreach Program, with a Memorandum of Understanding finalised in late 2025. The first project under this agreement focuses on improved detection of potentially fatal glycol contaminants in cough syrup products. In addition, QoMI continued collaboration with the World Health Organization, reinforcing D4's contribution to international efforts to improve medicine safety and quality.

TRANSLATION AND EMERGING TECHNOLOGIES

Translational impact was further demonstrated through a clinical trial update announced by Seaport Therapeutics, progressing a lipid-based drug delivery technology invented at Monash. In addition, D4 researchers reported development of the first microneedle-based biosensor for real-time monitoring of fish freshness, illustrating the versatility of microneedle and sensing platforms with potential relevance to healthcare and biopharmaceutical applications.

RECOGNITION OF EXCELLENCE

Recognition of excellence remained strong in 2025. Jie Tang received the Victorian Tall Poppy Award, while Natalie Trevaskis was awarded the Vice-Chancellor's Researcher of the Year. International recognition was also achieved by D4 students. Yining Xie, who received a Journal of Pharmaceutical Sciences award for outstanding scholarly contribution. Thu A Hoang, awarded the 2025 Molecular Pharmaceutics Early Career Best Paper Award, highlighting the global impact of Monash research and training in formulation and delivery science. Dominika Fuhs was awarded the Nick Holford Prize for best student oral presentation at the 2025 PAGANZ conference in Singapore. Siobhonne Breen received the Young Scientist Prize for best poster at the 2025 IATDMCT conference.

OUTLOOK

In 2025, the D4 program continued to demonstrate how fundamental advances in drug delivery, disposition and dynamics underpin successful translation of medicines and diagnostics, reinforcing Monash's mission to improve health outcomes through pharmaceutical innovation.

TWO HIGHLIGHT PAPERS

A VERSATILE ANTIBODY CAPTURE SYSTEM DRIVES SPECIFIC IN VIVO DELIVERY OF MRNA-LOADED LIPID NANOPARTICLES

Moore Z. Chen, Daniel Yuen, Victoria M. McLeod, Ken W. Yong, Cameron H. Smyth, Bruna Rossi Herling, Thomas. J. Payne, Stewart A. Fabb, Matthew J. Belousoff, Azizah Algarni, Patrick M. Sexton, Christopher J. H. Porter, Colin W. Pouton & Angus P. R. Johnston
Nature Nanotechnology 2025, 20, 1273-1284; https://www.nature.com/articles/s41565-025-01954-9

The precise and efficient delivery of mRNA remains a central challenge in advancing mRNA therapeutics. Lipid nanoparticles (LNPs) are effective carriers for mRNA, yet their tendency to be taken up non selectively can lead to off target distribution and limited delivery to desired cells.

The research team led by A/Prof Angus Johnston has developed a straightforward strategy to capture antibodies on LNPs in an optimal orientation without requiring antibody modification or elaborate purification steps. This approach relies on an oriented anti Fc nanobody embedded on the LNP surface, enabling antibodies to attach in a configuration that maximizes functional targeting.

As a result, protein expression has been observed at levels exceeding those of non-targeted LNPs by more than 1,000-fold and outperforming conventional antibody functionalization techniques by more than eight-fold. The targeted LNPs exhibit highly selective in vivo delivery to T cells, with minimal uptake by other immune cell types.

This platform provides a rapid and adaptable route for creating targeted mRNA delivery systems and offers substantial potential for broadening the therapeutic applications of mRNA technologies in the future.

See the next page for relevant diagrams

OPTIMIZING ANGIOPEP-2 DENSITY ON POLYMERIC NANOPARTICLES FOR ENHANCED BLOOD–BRAIN BARRIER PENETRATION AND GLIOBLASTOMA TARGETING: INSIGHTS FROM IN VITRO AND IN VIVO EXPERIMENTS

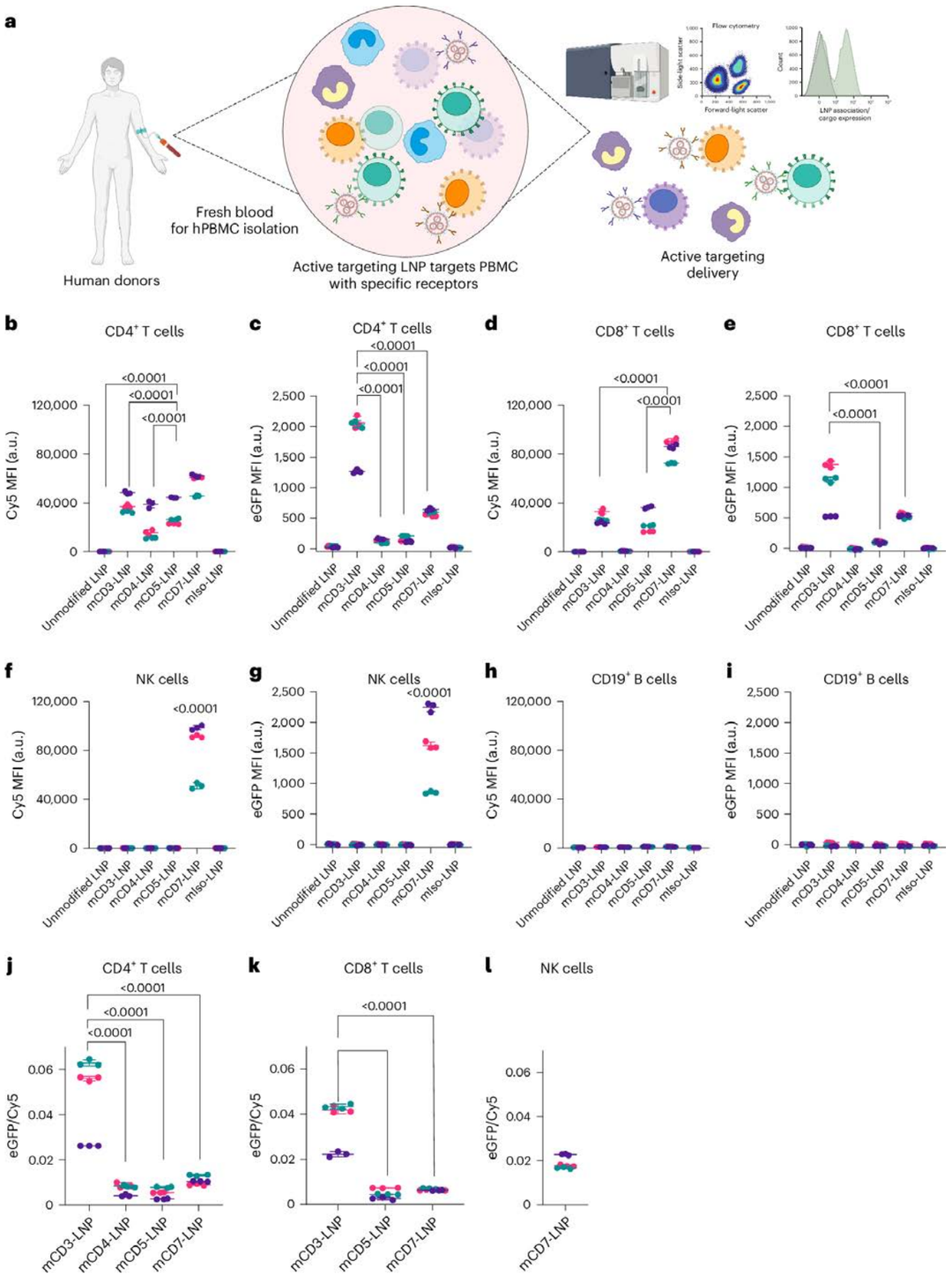
Weisen Zhang, Ahmed Refaat, Haoqin Li, Douer Zhu, Ziqiu Tong, Joseph Anthony Nicolazzo, Bo Peng, Hua Bai, Lars Esser, Nicolas Hans Voelcker
Advanced Functional Materials 2025, 35, 2425165; https://advanced.onlinelibrary.wiley.com/doi/full/10.1002/adfm.202425165

The blood–brain barrier (BBB) remains a major obstacle to effective treatment of brain diseases. The team of Prof Voelcker developed polymeric nanoparticles with tuneable Angiopep-2 (Ang-2) surface densities to evaluate how ligand density influences BBB penetration across multiple in vitro and in vivo models.

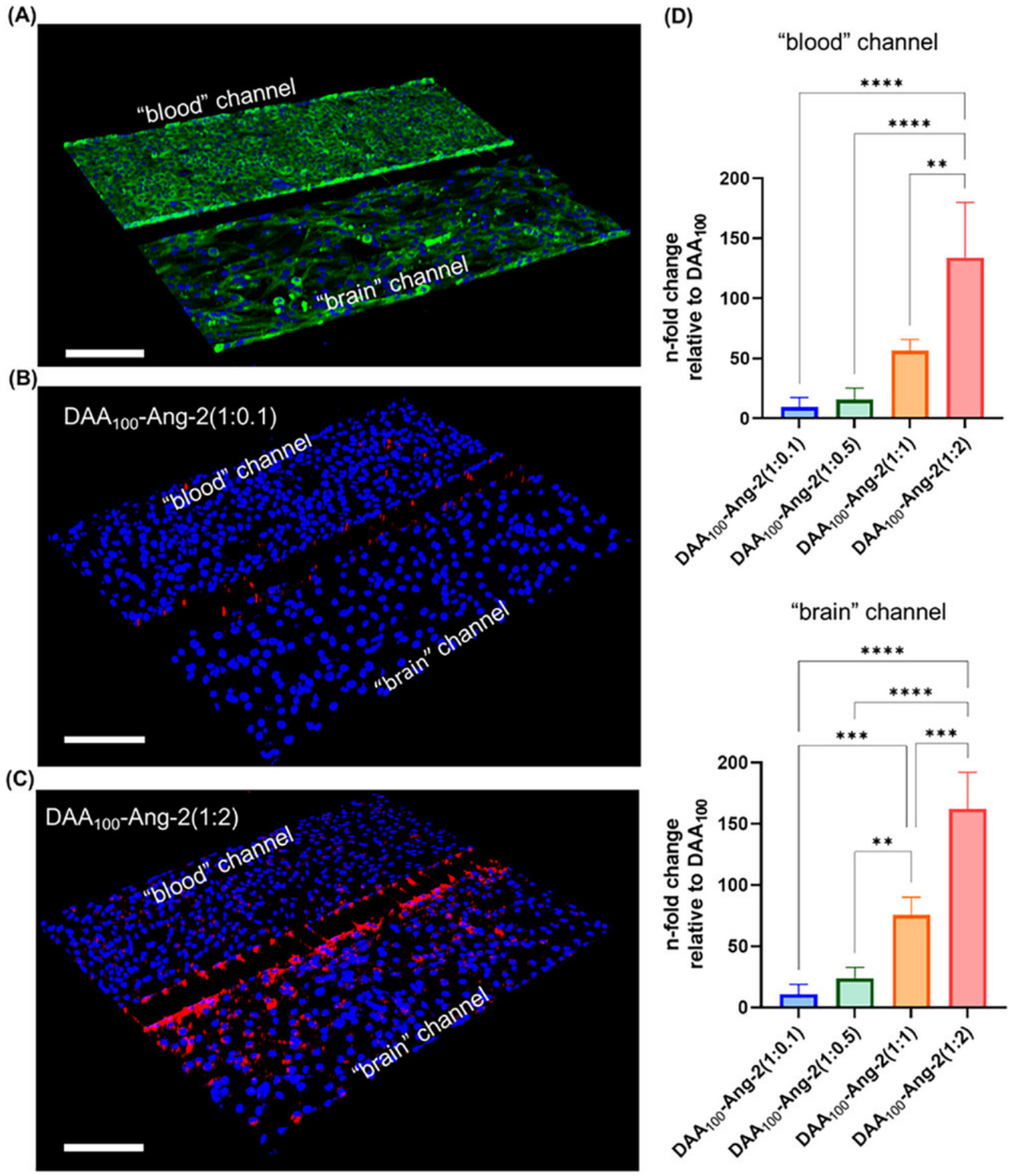
Their dynamic BBB–glioblastoma (GBM) on a chip model revealed improved BBB penetration at higher Ang-2 densities, which correlated with the in vivo findings. Incorporation of doxorubicin into the optimized nanoparticles enabled controlled, pH responsive release and potentiated anticancer efficacy in both 2D GBM cultures and their 3D BBB GBM on a chip.

Overall, the study demonstrates that optimising Ang 2 density is crucial for enhancing brain targeted nanoparticle delivery and that dynamic models such as the BBB-GBM-on-a-chip model used in this study are highly suitable for the preclinical assessment of brain-targeting nanoparticles.

See the next page for relevant diagrams



From: *A Versatile Antibody Capture System Drives Specific In Vivo Delivery of mRNA-loaded Lipid Nanoparticles*



From: *Optimizing Angiopep-2 Density on Polymeric Nanoparticles for Enhanced Blood–Brain Barrier Penetration and Glioblastoma Targeting: Insights From In Vitro and In Vivo Experiments*

CENTRE FOR MEDICINE USE AND SAFETY

Theme Leader: **Professor Simon Bell**
Deputy Theme Leader: **Dr Emily Reeve**

The Centre for Medicine Use and Safety (CMUS) is focused on innovative research to promote safe and effective medicine use. CMUS runs major national and international collaborative and multidisciplinary projects. These projects address Australia's National Health Priority Area of Quality Use of Medicines and Medicine Safety.

CMUS has research strengths in pharmacoepidemiology, health economics, pharmacometrics, clinical practice guideline development and health services research. Key program areas include ageing and aged care, deprescribing, cardiovascular disease, diabetes, dementia and respiratory disease.

Grants & research contracts awarded
7

Staff
32

Total research income
$3,978,963

Publications
116

Graduate research students
26

PhD completions
6

CMUS co-leads the Neurological and Mental Health Global Epidemiology Network (NeuroGEN) and Optimising Geriatric Pharmacotherapy through Pharmacoepidemiology Network (OPPEN). CMUS staff are recognised national and international leaders in deprescribing research, including through the Australian Deprescribing Network. CMUS staff address the evidence-practice gap through investigating novel strategies to translate evidence into practice. This includes developing new NHMRC-approved Australian clinical practice guidelines, developing new model of care and innovative roles for pharmacists.

CMUS is committed to building research capacity. CMUS is home to around 30 Australian and international PhD candidates and an expanding team of post-doctoral researchers focused on ensuring that patients achieve optimal health and medication outcomes.

MAJOR RESEARCH & ACHIEVEMENTS OF 2025

REDEFINING HOW THE VALUE OF HEALTH IS MEASURED

The Health Economics and Policy Evaluation Research Group, under Professor Zanfina Ademi at Monash University has generated strong policy and media impact through research redefining how the value of health is measured by incorporating productivity alongside healthcare costs. Across more than 40 publications spanning multiple diseases, this work has highlighted the broader societal burden of illness. Findings received national coverage including ABC News and other local media, while research on the productivity burden of breast cancer among Australian women gained focused attention through ABC Radio and other local media.

DEVELOPING CLINICAL PRACTICE GUIDELINES

Australian Clinical Practice Guidelines and Principles of Care for People with Dementia

CMUS and other Monash University researchers were commissioned by the Australian Government Department of Health and Aged Care to update Australia's 2016 Clinical Practice Guidelines and Principles of Care for People with Dementia. To date the development of the new Australian Dementia Guidelines has involved consulting with over 50 different organisations across Australia. The new Dementia Guidelines will include clinical questions related to risk reduction, diagnosis and therapies and post-diagnostic care.

Australian Clinical Practice Guideline on MDMA-Assisted Psychotherapy for Post-traumatic stress disorder

Supported by philanthropic funding, CMUS is working with the Neuromedicines Discovery Centre to develop the world's first clinical practice guideline for MDMA-assisted psychotherapy for post-traumatic stress disorder (PTSD). This follows the landmark decision of the Australian Therapeutic Goods Administration to reschedule MDMA for the treatment of PTSD from a prohibited to a controlled drug, thus permitting authorised prescribing outside of clinical trials.

Deprescribing recommendations in clinical practice guidelines

CMUS identified that less than one-third of clinical practice guidelines include recommendations about deprescribing. Guidelines that contained deprescribing recommendations rarely outlined specific steps on how to do it. CMUS is leading an international initiative exploring barriers and enablers to integrating deprescribing recommendations into clinical practice guidelines. This has involved engaging with end-users about their preferred content, language and format of deprescribing recommendations.

INTERNATIONAL ENGAGEMENT AND RECOGNITION

CMUS staff continue to engage actively on the international stage, through invited contributions that recognise their expertise as well as proactive initiatives designed to extend the reach and impact of their research.

Professor Ademi was an invited speaker at the University of Oxford, presenting NHMRC-funded research using UK Biobank data to demonstrate how Mendelian randomisation can strengthen causal evidence for cardiovascular prevention policy.

Dr Reeve delivered the keynote address at the 2025 US Deprescribing Research Network Annual Conference, presenting on the integration of deprescribing into clinical practice guidelines. Building on this work, and together with Dr Shin Liau, she established the Deprescribing in Guidelines International Consortium (DiGiC), which now includes more than 45 experts from 18 countries. Dr Reeve is also providing strategic advice for the organisation of the US Deprescribing in Guidelines Symposium scheduled for January 2026.

Professor Carl Kirkpatrick was recognised as a Fellow of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT), in recognition of more than a decade of leadership roles, including President and Secretary.

Professor Simon Bell and Drs Grace Wangge and Yulisna Mutia Sari from Monash University Indonesia coordinated a multidisciplinary consultation on priorities for optimising medication management in Indonesian aged care homes. The consultation was conducted in partnership with representatives of organisations including the Indonesian Government Ministry of Health and Association of Southeast Asian Nations (ASEAN).

Associate Professor Jenni Ilomäki was an invited speaker at the 15th Asian Conference on Pharmacoepidemiology in Hong Kong in November as part of a regional symposium on the data environment in Asia.

CONSUMER ENGAGEMENT

Now in its second year, the CMUS Consumer Panel has become an integral part of embedding the consumer voice in CMUS research. Through seven meetings involving presentations from 16 staff and students, the panel has provided valuable input across project design, grant development, recruitment, and research translation. The panel has contributed to the refinement of key governance documents, including the terms of reference, meeting agenda structure, and translation strategies, and has reviewed both funded projects and new proposals, with one proposal already successfully funded. CMUS extends its sincere thanks to the Consumer Panel members for their time, insight, and ongoing commitment to ensuring our research remains grounded in the real experiences and priorities of the community.

CLINICAL GUIDELINE REVIEW

CMUS was commissioned by the Department of Health Disability and Ageing to review clinical guidelines and cost estimates for the use of antiseizure medications in Australia, with a focus on lamotrigine and levetiracetam as first-line treatment options. The CMUS review led by Associate Professor Jenni Ilomäki was the basis for subsequent changes to Australia's Pharmaceutical Benefits Scheme enabling broader first-line use of these medicines.

OUTSTANDING EARLY CAREER RESEARCHERS

In 2025, 6 PhD candidates successfully submitted and were awarded their PhD degree. In addition to these successful completions many of our early career researchers were recognised for the impact of their work on practice and policy:

- CMUS PhD students, Annie (May) Ea and Sam Wade attended the 2025 PhD Grand Challenges Interdisciplinary Mobility Workshop (20 - 24 October) in Indonesia
- PhD student Yannee Liu was awarded People's Choice Best Poster at the 2025 Australian Deprescribing Network Annual Meeting.
- Dr Shin Liau organised an international symposium for the 2025 Guideline International Network (GIN) Conference about the role of guideline in supporting reducing low-value care and supporting sustainability.
- Dr Melanie Lloyd won the Health Services & Policy Researcher Paper of the Year from the Health Services Research Association of Australia & New Zealand.

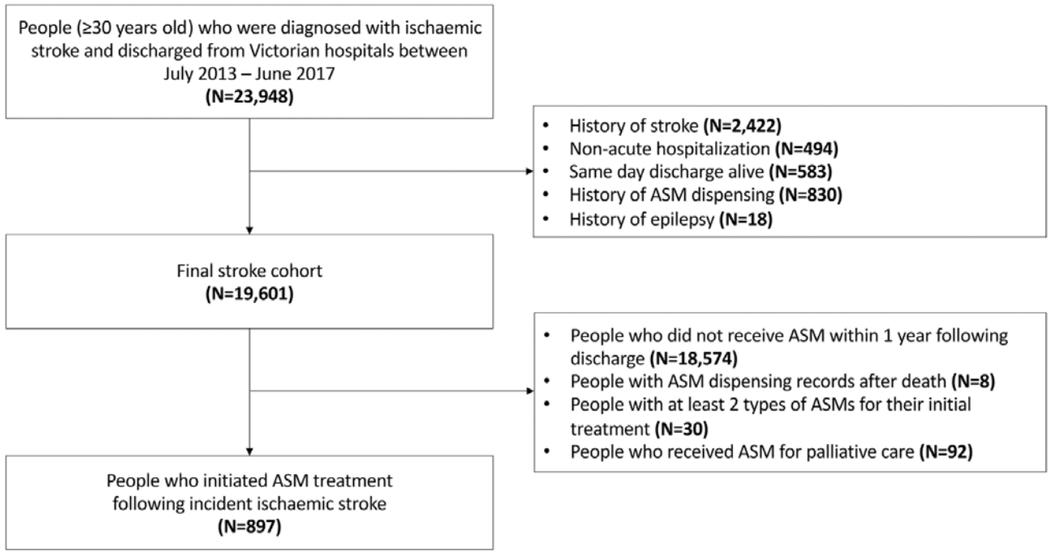
Dr Amanda Cross was awarded the Australian Gerontology Association's (AAG) prestigious 2024-25 Helen Barrie National Prize for her innovative research into medication management for older adults across multiple national and international settings. Dr Cross also organised a symposium for EuGMS Congress on strategies for implementing dementia clinical practice guidelines with perspectives from Italy, Scotland and Australia.

TWO HIGHLIGHT PAPERS

COMPARATIVE RISK OF MAJOR HEALTH EVENTS AMONG INDIVIDUALS PRESCRIBED DIFFERENT ANTISEIZURE MEDICATIONS FOLLOWING ISCHEMIC STROKE

Kim S-H, Marquina C, Foster E, Bell JS, Ilomäki J. *Epilepsia*. 2025; 66: 1907–1918. https://doi.org/10.1111/epi.18336

A new Australian study examined whether different anti-seizure medicines lead to better health outcomes for people who develop seizures after an ischemic stroke. Researchers analysed health records from 897 stroke survivors in Victoria who started anti-seizure medication within a year of their stroke. They compared rates of seizures, repeat strokes, falls or fractures, and death over the following two years. Overall, the study found little difference between the major types of anti-seizure medicines, with similar risks of these serious health events across treatment groups. The findings suggest that commonly prescribed anti-seizure medications provide broadly comparable short-term outcomes for stroke survivors, allowing doctors to consider other factors such as side effects, drug interactions, patient preferences, and individual health needs when choosing treatment.



IDENTIFYING DEMENTIA RISK PROFILES FOR TARGETED INTERVENTIONS: A LATENT CLASS ANALYSIS OF AT-RISK MIDDLE-AGED AUSTRALIANS

Sarwar MR, Cross AJ, Godbee K, Geethadevi GM, Magin P, Tullipan M, … , George J.
Alzheimers Dement. 2025 Nov;21(11):e70888. doi: 10.1002/alz.70888

This Australian study explored dementia risk in just over 400 middle-aged adults who already had at least two known risk factors for developing dementia. Researchers found that participants typically had five modifiable risk factors, with high cholesterol, low levels of mentally stimulating activities, obesity, and high blood pressure being the most common. Using statistical analysis, they identified three distinct risk profiles: people with high cardiometabolic risk, those with behavioural and psychosocial risks (such as poor diet, smoking, depression, or social isolation), and those with generally healthier lifestyles. The findings suggest that dementia prevention may be more effective when tailored to an individual's specific combination of risk factors rather than using a one-size-fits-all approach.

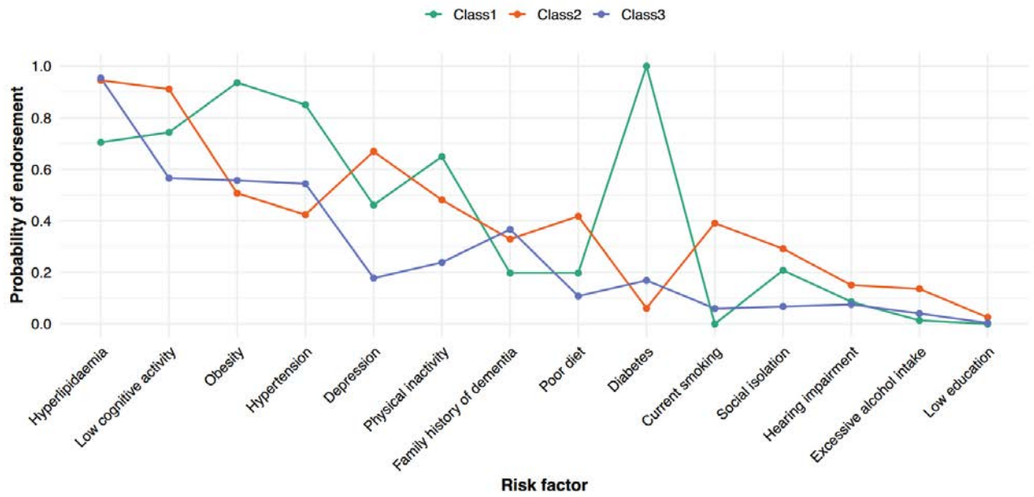


FIGURE 1 Estimated probabilities of risk factors across latent classes.

THERAPEUTIC PROGRAM AREAS

Much of our collaborative work in drug discovery and development, and medicine use is disease agnostic, however, we have a particular focus in three main therapeutic areas:

- Cardiovascular and Metabolic Health,
- Global Health, and
- Neuroscience and Mental Health

In 2020 MIPS established the Therapeutic Program Areas (TPAs) to focus on these topics. By bringing together our collective expertise in these areas we are better able to develop medicines to address priority health needs, and to respond to targeted grant opportunities.

Within the TPAs we have major programs in neuropsychiatric disorders, chronic pain, addiction, metabolic disease, heart failure, fibrosis, antibiotic resistance and malaria.

The TPAs are led by established researchers in the Faculty and run a range of programs to build a community with shared research interests and to support a forum to discuss relevant scientific developments and opportunities. They have both internal and external facing roles, generating a critical mass to address a particular therapeutic need and to connect MIPS with the broader ecosystem. These broader networks include the Australian Global Health Alliance, the Monash Neuroscience Committee, and the Victorian Cardiovascular Research Network.

Since their establishment the TPAs have significantly grown their communities by hosting seminars with MIPS researchers and external guest speakers, as well as organising symposia. They have also supported researchers through grant development and review, in addition to co-funding initiatives. Over the coming years, the TPAs aim to further expand collaboration and engagement with end users, including clinicians, patients, and industry partners.

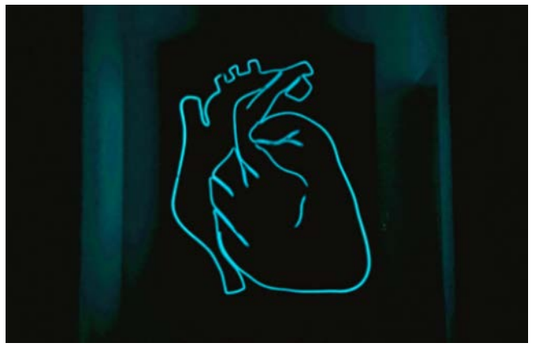
CARDIOVASCULAR AND METABOLIC HEALTH

Co-leads: **Professor Natalie Trevaskis** & **Dr Chengxue Helena Qin**

The expertise from MIPS in the Cardiovascular and Metabolic Health TPA encompasses medicinal chemistry, structural biology, analytical pharmacology, drug disposition, drug delivery, translational models of disease and medicine use and safety.

We focus on understanding how excess nutrient consumption and non-functioning metabolic organs contribute to obesity, diabetes, metabolic associated steatotic liver disease and metabolic- associated cancers, thus enabling the development of improved treatments for metabolic-associated diseases.

We have broad expertise in delineating the underpinning mechanisms of cardiovascular disease and in developing new treatments for heart failure resulting from interruptions in coronary blood supply (such as in heart attack), diabetic cardiomyopathy, and cardiopulmonary disease, lymphatic disease, and ischemic stroke.



MAJOR ACTIVITIES OF 2025

EVENTS

- MIPS Cardiovascular and Metabolic Health Symposium, Oct 2025. Approximately 50 attendees from MIPS, Uni Melb, Victorian Heart Institute, Baker Institute, St Vincent's Institute, Latrobe University, Monash Clayton Centre for Inflammatory disease and Alfred Medical Research Institute.
- MIPS-Victorian Cardiovascular Research Network (VCRN) joint event, Dec 2025.
- MIPS hosted a well attended (~100) MIPS-VCRN event that included clinician, patient and scientist panels, as well as a showcase of early and mid-career cardiovascular researchers from across Victoria

COMMUNITY-BUILDING ACTIVITIES

- Tea & Talks (Angus Johnston, Sam McNeil and Brian Cary from Denise Wooten and Patrick Sexton's lab)
- Sarah Turpin-Nolan has continued to strengthen the relationship between MIPS and CSL.
- Ongoing networking opportunities at ASHRA (*Australian Stroke and Heart Research Accelerator*) and Victorian Heart Institute events, including seminar series and education and training workshops.

MAJOR AWARDS AND OTHER ACHIEVEMENTS IN 2025

- Congratulations to TPA members Dr Amandeep Kaur, Dr Jason Cao, A/Prof David Thal, Prof Arthur Christopoulos and Prof Mark Febbraio on receiving prestigious NHMRC Investigator Grants.
- Congratulations to TPA member Dr Chengxue Helena Qin, on receiving the prestigious ARC Future Fellowship.
- Congratulations to Prof Mark Febbraio and team on receiving an ARC Discovery Grant for 'Inter-organ communication during exercise and aging'.
- Congratulations to Dr Kieran Stockton and team, receiving an AEA Ignite from the Department of Education for the ''Development of innovative small molecules for therapeutic interventions for pulmonary arterial hypertension'.
- Congratulations to Prof Natalie Trevaskis and team on receiving NHMRC Ideas with collaborators.
- Congratulations to Prof Natalie Trevaskis, Prof Darren Creek, Dr Amandeep Kaur, and the team on receiving Lymphatic Imaging funding from the Advanced Research Projects Agency, in collaboration with others.
- Congratulations to Prof Mark Febbraio on receiving the Heart Foundation Vanguard Grant, in collaboration with others.

GLOBAL HEALTH

Co-leads: **Professor Darren Creek** &
Associate Professor (Practice) Pete Lambert

The Global Health TPA works to improve health and achieve equity in health for all people worldwide.

Our major activities focus on infectious diseases and maternal, child and reproductive health, along with capacity-building programs for pharmacy globally.

Our research ranges from the discovery of new drugs, vaccines and diagnostics, to improving medicines and treatment regimens to suit specific populations.

Existing collaborations operate in the Pacific, South and Southeast Asia and sub-Saharan Africa and we look to expand our reach further, aligning our activities with local, national and international frameworks to make a positive impact on global health.

MAJOR ACTIVITIES OF 2025

EVENTS

- Victorian Infection and Immunity Network Young Investigator Symposium (Hosted)
- Malaria in Melbourne Conference 2025
- World Mosquito Day symposium
- Australian Society of Parasitology Meeting
- Australian Global Health Alliance Annual Symposium
- Host delegation from DFAT Indo-Pacific Regulatory Strengthening Programme partner meeting

COMMUNITY BUILDING ACTIVITIES

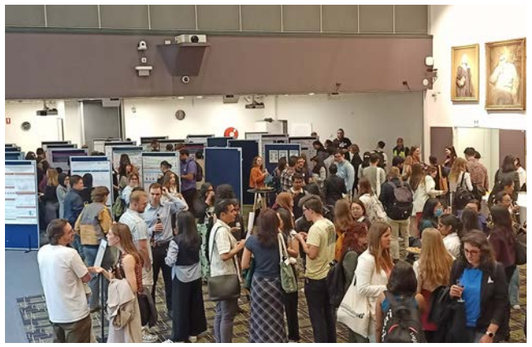
- Dissemination of global health events and funding opportunities to TPA members
- Continued interaction with other global health leaders and initiatives across Melbourne (including Jane Fisher, Sophia Zoungas, Tony Capon, World Mosquito, and RISE). Discussions ongoing to establish a formal global health network within Monash, including key involvement of Monash Malaysia
- Representation at global health events across Melbourne

LOBBYING/NETWORK REPRESENTATION

- Continued membership of the Australian Global Health Alliance (and attendance at multiple events). Includes supporting development of AGHA statement in relation to discontinuation of USAID
- Membership of Victorian Infection and Immunity Network executive (and representation at events)
- Monash Quality of Medicines Initiative continued partnership with DFAT Indo-Pacific Regulatory Strengthening Programme
- Representation on the Maternal Health Supplies Caucus (sub-group of Reproductive Health Supplies Coalition)
- Technical advisors to WHO toolkit to advance the inclusion of pregnant women in trials
- Membership of WHO development group for a target product profile (TPP) for a device/technology that screens for substandard/falsified medical products

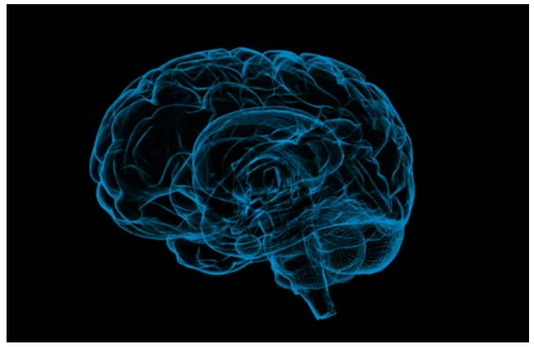
MAJOR AWARDS AND OTHER ACHIEVEMENTS IN 2025

- In collaboration with WEHI, researchers identified a new vaccine target to block malaria transmission. Preclinical evaluation of a next generation mRNA vaccine based on the discovery showed profound antibody response and 99.7% blockage of transmission.
- MIPS researchers developed novel methods to optimise delivery of mRNA to cells, potentially enhancing effectiveness and reducing side-effects.
- Researchers from MIPS Centre for Drug Candidate Optimisation, in collaboration with WEHI, published a study that could lead to a new drug to prevent long COVID symptoms.
- A novel vaccine that boosts immunity against tuberculosis (TB) has been shown to be effective in pioneering pre-clinical trials. A study into the LNP-mRNA vaccine's effectiveness was led by researchers from the Sydney Infectious Diseases Institute at University of Sydney, the Centenary Institute and MIPS at Monash University.
- Monash Quality of Medicines Initiative received second phase funding from the Ripple Foundation (Sydney) to continue and expand activities.
- MIPS drug discovery programs for malaria received funding from NHMRC Ideas and Development Grant schemes, in partnership with researchers at Burnet Institute and Deakin University.
- Emerging from the collaboration between the TGA and Monash Quality of Medicines Initiative, Monash University joined the TGA Academic Outreach Program through an MoU towards providing mutual support and seeking collaboration across research, teaching and TGA operations



NEUROSCIENCE AND MENTAL HEALTH

Co-leads: **Dr Manuela Jörg** & **Dr Amanda Cross**



The Neuroscience and Mental Health TPA (Neuro TPA) aims to break down existing discipline-based research 'silos' to facilitate synergistic multidisciplinary teams to tackle unmet medical needs in psychiatry, neurodegeneration, pain, and other mental health conditions. To improve patients' outcomes, we bring together experts in medicinal chemistry, structural biology, analytical pharmacology, drug disposition, translational models of disease and medicines use and safety. Additionally, we aim to increase the visibility of the excellent research of our members to diverse external stakeholders, including researchers, clinicians and consumers.

MAJOR ACTIVITIES OF 2025

Multiple events were organized by, or supported by, the Neuro TPA to increase the visibility of the research performed by our members, provide networking opportunities and support new collaborations.

This included:

- Monash University Neuroscience Symposium held on 12th June 2025.
  - > Keynote presentation by Cameron Nowell (DDB)
  - > EMCR short talk by Jack McDonald (DDB)
- Dementia Australia: Virtual Reality Dementia Experience.
  - > A group of 15 MIPS researchers/HDR students attended a 3-hour workshop held by Dementia Australia on Wednesday 4th June. Using a virtual reality simulation, the workshop puts participants in the shoes of someone with dementia and helps to build understanding of the consumer experience.
- Networking walks
  - > MIPS neuroscience researchers met monthly for networking walks at lunchtime around Princes Park.
- Neuro TPA team participated in Run Melbourne on 13th July 2025.
  - > A team of MIPS Neuroscience researchers including family and friends participated in Run Melbourne raising awareness and money for Beyond Blue and Dementia Australia.
- Students of Brain Research (SOBR) Networking Dinner
  - > Neuro TPA sponsored SOBR Networking Dinner and one PhD student, Shengfei (Alex) Wang, to attend the networking dinner in August 2025.
- DFAT visit to Monash Neuroscience
  - > MIPS researchers participated in the Department of Foreign Affairs and Trade (DFAT) visit to Monash Neuroscience in October 2025. Professor Chris Langmead participated in a panel discussion for the delegation of 84 permanent consulates from around the globe.
- End-of-the-Year Networking Event – MIPS Neuro TPA members gathered for a networking event in December 2025. The event included short talks from several TPA members and Publication Award winner announcements.
- Neuro TPA members also continued to engage in the wider Monash Neuroscience Network, including positions on the Monash Neuroscience Executive Committee (Dr Amanda Cross) and the Monash Neuroscience EMCR sub-committee (Dr Liam Koehn).

TPA AWARD AND GRANT RECIPIENTS

The Neuro TPA awards and funding opportunities recognize the excellent research of our members and support new collaborative and multidisciplinary research projects.

The 2025 recipients included:

- MIPS TPA Discovery Accelerator Co-funding Program supports proof-of-concept, de-risking or capacity development studies. This program provides a mechanism to leverage co-funding opportunities and underpin the establishment of larger research programs.
  - > The 2025 Recipients were Dr Amandeep Kaur, Dr Manuela Jörg, Dr Al Keen & A/Prof. Michelle Halls who received the funding for their project entitled "dTAG and PROTAC strategies for targeted degradation of Tau".
- Neuro TPA-Monash Neuroscience Seed Grant Scheme was launched to foster collaborations between researchers at MIPS and the wider Monash neuroscience committee.
  - > The inaugural recipients were Dr Sabir Shekh (MIPS) and Dr Matthew Drill (Translational Medicine) who received funding for their project entitled "Developing novel P2X7R inhibitors for the treatment of glioblastoma".
- The Neuroscience Team Publication Award is recognizing excellent neuroscience research led by a team at MIPS.
  - > Alene Yong, Suzie Bratuskins, Musa Samir Sultani, Brooke Blakeley, Christopher Davey, Simon Bell; Safety and efficacy of methylenedioxymethamphetamine (MDMA)-assisted psychotherapy in post-traumatic stress disorder: An overview of systematic reviews and meta-analyses, https://pubmed.ncbi.nlm.nih.gov/39979849/
- The Neuroscience Individual Publication Award is recognizing excellent neuroscience research led by an individual at MIPS
  - > Jack McDonald, G Protein: ß-Arrestin Bias Confers Differential Regulation of $G\alpha_q$ Signaling by GPR17 Antagonists, https://doi.org/10.1021/acschemneuro.5c00521

Dementia Australia enabling EDIE virtual reality experience

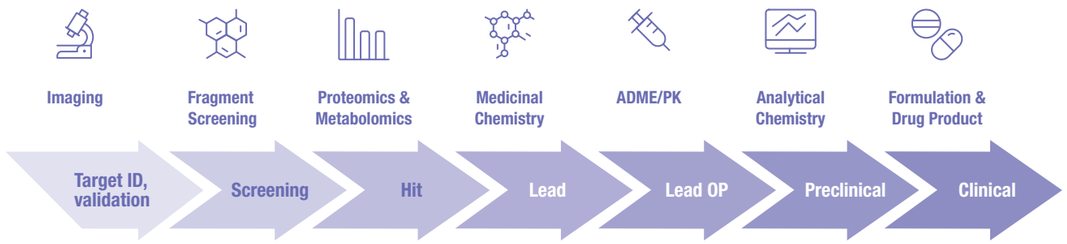
Neuro TPA members attending the Monash University Neuroscience Symposium

Publication award winners: Dr Alene Yong and Jack McDonald

Top and bottom right: Neuro TPA team participating in Run Melbourne

DRUG DISCOVERY RESEARCH PLATFORMS

Our Research Platforms provide the technology, equipment and expertise that underpins our research. They support internal and external drug discovery programs across all stages of drug discovery from hit identification to candidate selection.



The Platforms vary in how they engage with users - through arrangements that include collaboration, partnerships and fee-for-service.

The **Centre for Drug Candidate Optimisation (CDCO)** is a unique group within MIPS being both a Research Theme and a Research Platform. The CDCO supports academic and commercial drug discovery teams to provide expertise and infrastructure in physicochemical property evaluation, drug metabolism and pharmacokinetics for improved compound design, selection and progression. For information about the activities of the CDCO in 2025 see their Theme entry on page 40.

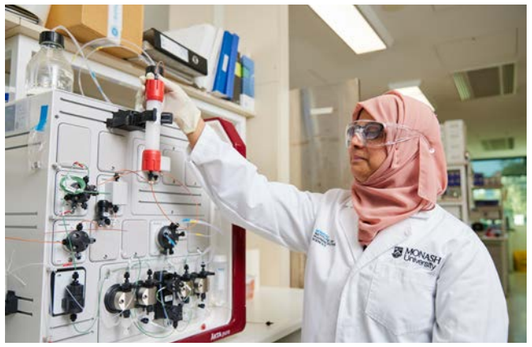
MONASH FRAGMENT PLATFORM

DIRECTOR: PROFESSOR MARTIN SCANLON

The Monash Fragment Platform (MFP) is a biophysical screening and characterisation facility that supports small molecule drugs discovery as well as basic science research. MFP employs NMR, SPR, ITC, X-ray crystallography and other techniques to characterise molecular interactions across a wide affinity range and between diverse molecules such as small-molecules, peptides, proteins, RNA/DNAs, and antibodies. The platform identifies novel binders to therapeutic targets through DNA-encoded library (DEL) screening and fragment-based screening (FBS). MFP's hit identification workflows are underpinned by high-quality libraries designed to maximise chemical space coverage and facilitate efficient hit identification, validation and optimisation. In addition, MFP provides assay development, routine screening, and sample characterisation services, supporting translational and discovery research across academic and commercial scientific communities.

MAJOR ACHIEVEMENTS OF 2025

In 2025 MFP progressed 10 screening campaigns and continue to support multiple projects in development including 2 Monash University spin out companies. MFP supported two successful Therapeutic Innovation Australia voucher applications, which provided support for services including custom fragment screening, assay development, and biophysical interaction analysis, demonstrating our commitment to advancing drug discovery through comprehensive support and collaboration.



Highlights from 2025 include securing funding for major upgrades to state-of-the-art SPR and ITC equipment enabling automation and ~10-fold improvement in throughput, scheduled to be operational by mid-2026. Collaboration with academic groups within MIPS resulted in 9 publications co-authored by MFP staff, representing our long-term commitment to projects and support of basic and applied research.

We are also collaborating with a consortium of institutes and he Australian Nuclear Science and Technology Organisation to develop and implement a high-throughput crystallographic fragment screening platform at the Australian Synchrotron. Development of high throughput crystal handling, unattended data collection, custom analysis frameworks, and fragment libraries will allow for the first high throughput X-ray crystallography fragment screens to be acquired at the Australian Synchrotron. This pipeline makes fragment screening by crystallography practical and efficient, thereby enabling world class capabilities to be access locally.

DRUG TARGET IDENTIFICATION PLATFORM

ACADEMIC LEADER: PROFESSOR DARREN CREEK

The Drug Target Identification Platform (DTI) is a specialised analytical platform within the Monash Proteomics and Metabolomics Platform (MPMP), providing advanced proteomics, metabolomics, lipidomics and targeted bioanalysis workflows to support drug discovery and biomedical research. The platform enables identification and validation of drug targets, elucidation of mechanisms of action, and discovery of biomarkers across diverse biological systems, including cell-based models, animal studies and clinical samples.

DTI operates under a collaborative, cost-recovery model and provides end-to-end expertise spanning experimental design, sample preparation, mass spectrometry analysis, and data interpretation. The platform is increasingly positioned as a national leader in mass spectrometry-based drug target identification, supported by state-of-the-art Orbitrap instrumentation and specialised analytical workflows.

MAJOR ACHIEVEMENTS OF 2025

In 2025 our platform supported a wide range of academic and industry collaborators across Monash and Australia. Over recent years we have seen a shift towards fewer, larger projects, reflecting a strategic shift toward more complex, higher-value projects, particularly in drug target identification. Proteomics remained the dominant service area, while metabolomics and Short-Chain Fatty Acid (SCFA) analysis remained in demand, highlighting sustained need for small molecule analysis. DTI strengthened its external engagement in 2025, with non-Monash collaborations accounting for 45% of projects (up from 35.5% in 2024).

SPP (solvent proteome profiling) and LiP-MS (limited proteolysis mass spectrometry), first implemented in 2024, now constitute the primary proteomics workflows and generate most of the outputs. These highly-sensitive approaches enable discovery of small-molecule drug targets within complex samples such as cell lysates. In addition, LiP-MS provides structural ligand-binding information, allowing mapping of potential drug-binding regions and supporting structural biology applications in drug target identification.

No single technique is effective for all drugs and targets, and while SPP and LiP-MS frequently enable identification of protein targets, alternative approaches are often required to stabilise weaker interactions. Accordingly, in 2025 we continued to expand advanced proteomics workflows, with extensive R&D performed to implement activity-based protein profiling (ABPP) and the peptide-centric local stability assay (PELSA). Together, routine workflows and newly implemented methodologies establish a robust foundation for future analytical capabilities in drug discovery.

Targeted bioanalysis remained an important, high-value service area. SCFA analysis continued to be in strong demand. In addition, newly established phenolic metabolite and bile acid assays now form a comprehensive analytical suite of high relevance to microbiome research, which is lately gaining a lot of interest.

DTI maintains a comprehensive suite of Orbitrap-based mass spectrometry systems supporting both discovery and targeted workflows. In 2025, infrastructure remained stable with no major acquisitions and is well positioned for 2026.

Overall, 2025 was a year of consolidation and strategic specialisation, with DTI increasingly operating as a dedicated drug target identification facility rather than a general analytical service. This shift, together with growing external engagement and sustained research activity, reinforces the platform's role within Monash's translational research infrastructure.

AUSTRALIAN TRANSLATIONAL MEDICINAL CHEMISTRY FACILITY

DIRECTOR: PROFESSOR PAUL STUPPLE

The ATMCF is a purpose-designed, outward-facing, collaborative facility that provides high-level medicinal chemistry know-how, both practical and theoretical, for translation of small molecules into therapeutic candidates. Supported by Therapeutic Innovation Australia (TIA) via the National Collaborative Research Infrastructure Strategy (NCRIS), ATMCF provides medicinal chemistry insight, expertise and a translational bridge between early-stage biology and translational lead optimisation and pre-clinical development.

MAJOR ACHIEVEMENTS OF 2025

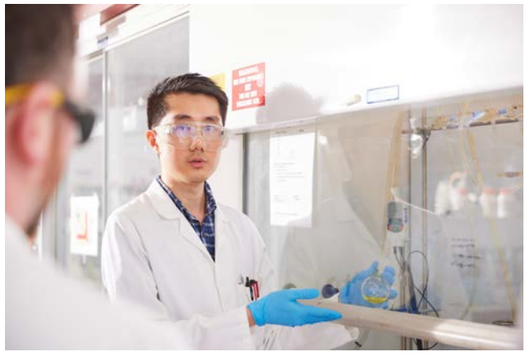
ATMCF and collaborating external partners were successful in a number of grants and funding opportunities in 2025. NHMRC Development and Ideas Grants, as well as funding from MedChem Australia and BioCurate commenced in 2025. The success of these applications is supported by the reputations of the ATMCF and MIPS in addition to the translational experience of the team in leading these proposals. All of these projects build on previous programs of work and talk to the strength of the relationships the facility staff form with our collaborators.

ATMCF's commercial impact continued to strengthen, with the facility providing medicinal chemistry for two active CUREatorfunded spinouts (Monash owned), both originating from ATMCFenabled programs. Translational industry engagement remained strong through ATMCF's ongoing partnerships, culminating in a Phase 0 clinical trial for a radiotracer early in 2025.

A significant strategic achievement in 2025 was the deepened collaboration with an external paediatric research organisation, supported through the appointment of a joint postdoctoral research leader. This partnership enabled the initiation of several new commercially focused drug discovery projects and further positioned the ATMCF as a key national contributor to paediatric translational research.

Technology and infrastructure capability progressed through expanded use of AIenabled drug discovery tools, including the Boltz2 deep learning model and continued deployment of the ICMPro computational platform. ATMCF also maintained and enhanced digital project data management through the CDD Vault.

The facility continued to elevate its national profile through scientific presentations, crossplatform engagement within MIPS, and participation in sectorwide outreach activities such as AusBiotech. Collectively, these achievements demonstrate ATMCF's sustained growth, translational impact, and strategic leadership in medicinal chemistry capability across Australia.



MEDICINES MANUFACTURING INNOVATION CENTRE

DIRECTOR: PROFESSOR MICHELLE MCINTOSH

The Medicines Manufacturing Innovation Centre (MMIC) is a state-of-the-art preclinical research facility that helps the pharmaceutical and allied sectors tackle diverse, complex translational challenges. Through advanced instrumentation available via our open access facility and development-focused research services, we provide expertise in formulation development, advanced analytical chemistry, consultancy, and scaleup manufacturing. These capabilities enable tailored support for our industry and institutional partners to advance new and emerging therapeutics to the clinic.

MAJOR ACHIEVEMENTS OF 2025

MERGING OF MMIC AND HMSTRUST ANALYTICAL LABORATORY

MMIC and HMSTrust Analytical Laboratory were merged in 2025, creating a new MMIC Platform that leverages the strengths of both facilities, consolidates expertise and enhances our advanced capabilities in pharmaceutical development and translation. The MMIC open access facility continues to support over 110 Monash researchers, providing access to advanced instrumentation and supporting over $15 million in research projects annually. New thermal and elemental analysis equipment commissioned in 2025 will ensure the platform remains at the forefront of advanced characterisation for emerging drug substances. Our specialised research services also continue to deliver innovative formulation and analytical solutions for industry and institutional partners. In 2025, MMIC reached a major milestone, having supported more than 100 industry clients and completed over 150 projects since 2017. Sector engagement was further strengthened through participation in the Therapeutic Innovation Australia Pipeline Accelerator Program. Working closely with other MIPS research platforms, the new MMIC Platform aims to complement drug discovery and lead optimisation capabilities, supporting an integrated development pipeline. MIPS-based platforms also hosted a stand at AusBiotech 2025 for the first time, showcasing our combined capabilities to national and international stakeholders.

ENHANCING OUR TRAINING PROGRAMS

As part of an expanded commitment to student training, the MMIC Platform doubled its student placements in 2025. Through the Master of Pharmaceutical Science program at Monash, MMIC hosted 25 students across the year for 10 week research placements. Students are mentored by MMIC scientists and contribute to projects supporting MIPS research and business development activities, and World Health Organisation (WHO) initiatives, gaining hands on experience with real translational impact. To strengthen our workplace and student training programs, Dr Igor Chekhtman joined MMIC in 2025 as Senior Scientist, Chemistry, Manufacturing and Controls (CMC) and Training. Dr Chekhtman brings extensive industry experience that will enhance our training offerings and further support the translation of innovations emerging from MIPS.

IMAGING, FACS & ANALYSIS CORE

LEADER: CAMERON NOWELL

Imaging, FACS & Analysis Core (IFAC) uses the latest imaging, flow cytometry and analysis platforms for samples ranging from single molecules to whole animals. Our extensive range of ultra-precision microscopes include widefield, high throughput, holographic, hyperspectral, super-resolution, confocal, multiphoton, lifetime imaging and label free. We also provide analytical and sorting flow cytometry capabilities. Advanced image and data analysis is also provided for users with bespoke analysis pipeline development that leverages traditional and new generation (AI/ML) approaches.

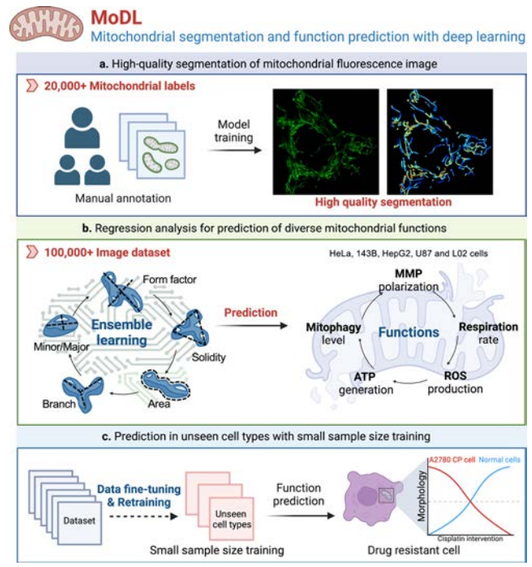
MAJOR ACHIEVEMENTS OF 2025

IFAC has continued to support imaging, FACS and analysis for both MIPS and external (national and international) users through support for project design, instrument training, technique development and custom analysis pipelines. The facility is now recognised within the imaging community as the go to place for trying something a little different or to develop unique pipelines for imaging and analysis. IFAC staff have also run numerous workshops on image analysis locally and across Australia (Sydney Uni, ANU) to a range of students, ECR and senior researchers. Additionally, facility staff were part of the teaching faculty for two Global Bioimaging Workshops – Image data management in Pune, India and Train-the-trainer in Melbourne, Australia.

2025 saw IFAC support 191 users across 32 technology platforms for a total of 13,000 hours over 7,100 individual sessions. Facility staff were authors on 15 publications with MIPS researchers and national and international collaborators.

Images and analyses from the Platform have contributed to significant publications:

- Ding, Y., Li, J., Zhang, J. et al. Mitochondrial segmentation and function prediction in live-cell images with deep learning. *Nat Commun* 16, 743 (2025). https://doi.org/10.1038/s41467-025-55825-x



Dehkhoda F, Ringuet M, Whitfield E. et al Constitutive ghrelin receptor activity enables reversal of dopamine D2 receptor signaling Molecular Cell, 2025; 85, 2246-2260.e10

NATIONAL COLLABORATIONS

MIPS is a national leader in research and translation. We partner with other experts to bring together teams to deliver training and commercialisation outcomes to benefit human health.

The Australian Research Council Industrial Transformation Research Program supports university researchers to partner with industry in priority areas for Australia. Through the program's Industrial Transformation Training Centres (ITTCs) they support higher degree by research students and postdoctoral researchers to gain practical skills and experience through placements with industry. MIPS is proud to host the headquarters of two ITTCs - the Centre for Fragment Based Design, and the Centre for Cryo-electron Microscopy of Membrane Proteins - and is a participant in three other ITTCs - the Centre for Personalised Therapeutics Technologies, the Centre for Next-Generation Technologies in Biomedical Analysis, and the Centre for Cell and Tissue Engineering Technologies.

State and Federal Governments are investing in research and development programs led by MIPS. mRNA Victoria has funded the Victorian mRNA Innovation Hub hosted by MIPS, to develop next-generation mRNA vaccines and therapeutics. MIPS is also contributing to a number of other mRNA vaccine and antiviral therapeutic programs funded by mRNA Victoria. Through the Medical Research Future Fund National Critical Research Infrastructure program we are leading the establishment of MedChem Australia, a partnership with WEHI, the University of Sydney, and Therapeutic Innovation Australia to accelerate early stage drug discovery projects towards clinical trials and new medicines. The National Critical Research Infrastructure program has also funded the Drug Target Identification Platform at MIPS - see page 66 for more information on that platform.

CENTRE FOR FRAGMENT BASED DESIGN

DIRECTOR: PROFESSOR MARTIN SCANLON

The Centre for Fragment-Based Design (CFBD) is an Australian Research Council Industrial Transformation Training Centre. CFBD is a national multi-disciplinary training centre for identifying novel ligands for a range of protein targets, with collaborators from Griffith University and the University of Sydney and research partners including ANSTO, CSIRO, Cytiva, and Vernalis.

ARC CENTRE FOR FRAGMENT-BASED DESIGN

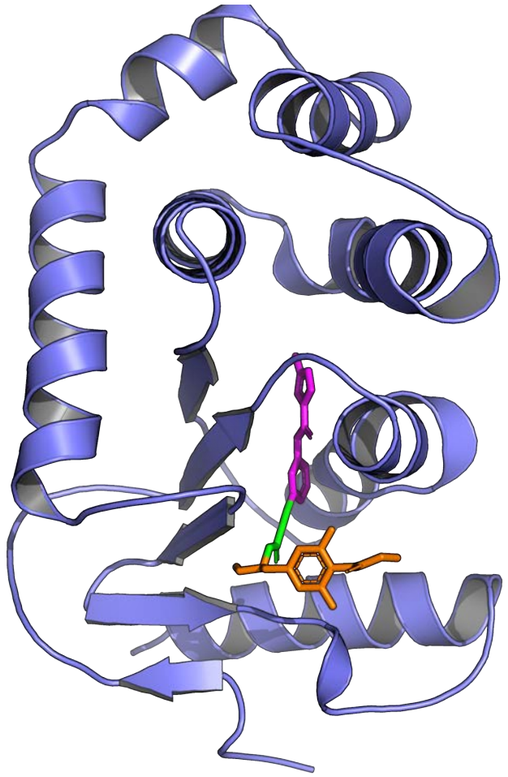
MAJOR ACTIVITIES IN 2025

2025 was the final year of operation for CFBD, concluding five years of interdisciplinary research across three nodes and industry partners. CFBD was a supporting sponsor and contributed to the organisation of FBLD2025, which was held from 21-24 September at Fitzwilliam College, Cambridge, UK.

MAJOR ACHIEVEMENTS OF CFBD MEMBERS IN 2025

In 2025, our PhD student Karoline Sanches was the recipient of the 2024 Mollie Hollman Award. The Mollie Holman Award was established in 1998 and is named after the late pioneering physiologist, Emeritus Professor Mollie Holman AO, in honour of her significant contributions to science and education. This medal is one of the highest academic honours and marks the recipients as researchers of the highest order. Karol received this award in recognition of her outstanding doctoral thesis entitled *Molecular Basis for Inhibition of the Voltage-Gated Potassium Channel Kvl.3 by Peptide Toxins*.

A significant research outcome was achieved by our PhD Student Yildiz Tasdan , who undertook her placement at Vernalis Research in Cambridge. Her research involved developing a method to optimise a classical aspect of fragment-based design. This is a situation where fragment screening has identified two distinct ligand-binding sites on a protein and the goal is to identify a single molecule that occupies both sites simultaneously.
Even in normal circumstances, this is an extremely challenging undertaking – and there are only a few examples of it being invoked successfully in the literature. In Yildiz's case, the problem was made even more difficult because one of the two binding sites was entirely buried within the structure of the protein. This internal binding site was also what is referred to as a 'cryptic pocket'. This means that it only forms transiently in the presence of the ligand and is not observable in the structure before the ligand is bound. Such cryptic pockets have now been observed in several protein structures and have been invoked as providing opportunities to find ligands for protein targets that are otherwise considered 'undruggable'. Yildiz's research involved a bacterial enzyme called DsbA that is essential for certain pathogens to cause disease. Therefore, inhibitors of DsbA have the potential to be developed as novel treatments for bacterial infections.
The two fragment binding sites on DsbA had been identified previously – although neither site on its own was suitable for the development of high affinity ligands that would be necessary to inhibit the activity of DsbA. Yildiz developed a 'direct-to-biology' workflow, wherein compounds were designed and synthesised on a small scale and then tested without extensive purification. This approach enables compound libraries to be synthesised and tested more rapidly. Yildiz was able to access expertise at Vernalis in the use of flow-chemistry to generate libraries of reagents that were required to develop the compounds that were able to simultaneously occupy both sites on the protein. These compounds are the most potent inhibitors of DsbA that have ever been reported. They were able to inhibit DsbA in isolated enzyme assays and in cellular activity assays and represent excellent starting points for the development of an entirely novel class of antibacterial compounds that operate via a completely different mechanism to current antibiotics. Yildiz's work also highlights the power of direct to biology approaches in general and provides a template for exploiting cryptic pockets in other biologically important proteins. Yildiz' work was recently published in the Journal of Medicinal Chemistry1, which is the most prestigious journal in the field



CENTRE FOR CRYO-ELECTRON MICROSCOPY OF MEMBRANE PROTEINS

DIRECTOR: PROFESSOR PATRICK SEXTON

The Australian Research Council funded Centre for Cryo-electron Microscopy of Membrane Proteins, CCeMMP, focuses on training industry-ready, world class graduates in cryo-electron microscopy of membrane proteins. It was established as a collaboration between MIPS, WEHI, The University of Melbourne, and The University of Wollongong alongside 15 educational and industry partners. The Centre now encompasses members from an additional 7 academic institutions.

MAJOR ACTIVITIES IN 2025

Heading into the final operating year of CCeMMP, the Centre saw five Centre students complete a 3-month industry placement with local and international industry partners (Servier, Sanofi, Aculeus Therapeutics, Dimerix and Pfizer). The students gained invaluable and significant experience of how scientific discovery is translated into commercial strategy within the biotechnology sector.

Four students submitted their thesis. Among these Qinghao Ou's degree was recently conferred and he has subsequently moved into a postdoctoral fellowship position conducting cryo-EM at MIPS. The Centre's first completion was Isabella Russell who graduated in 2025. Isabella has taken up a position with their PhD project industry partner, Astra Zeneca (Cambridge, UK), as a Senior Scientist specialising in cryo-EM.

The Centre held its annual EduWeek providing a variety of professional development opportunities including technical training, intelligence analytics and business development. Outside of EduWeek, the Centre fellows continued to deliver numerous workshops focused on technical cryo-EM training in Microcrystal Electron Diffraction, Single Particle Analysis, CryoSParc and other data processing workshops, which were available to Centre members and the broader scientific community.

The Centre also ran its annual 2-day CCeMMP Symposium with around 110 attendees across the Nodes celebrating recent research and developments in the field of cryo-EM of membrane proteins. At the event there were 2 keynotes, 13 oral presentations and 24 posters and opportunities to strengthen networks and collaborations with the cryo-EM community. The Centre supported, and was heavily represented, at the biennial CryOZ, which brings together researchers, imaging specialists and industry partners at the frontier of structural biology and advanced microscopy.

The Centre continues its strong engagement with the scientific community through quarterly newsletters, an annual report and the monthly seminar series with presentations from local and international researchers and industry showcasing their cutting-edge research. The Centre also regularly challenges its community to create artwork of their research and submit to the Centre's annual Bench to Art Competition.

Centre members at Bio21 for the CCeMMP Symposium 2025

Centre student Minakshi Baruah (third from left) at Pfizer (Connecticut, United States) for her 3-month industry placement

Centre student Bhavika Rana (fifth from left) at Sanofi (Paris, France) for her 3-month industry placement.

Laura Humphreys (Monash University) was the winner of the CCeMMP Bench to Art 2025 competition with her "Too Hot to Chandle"

RESEARCH HIGHLIGHT

WEHI's Parkinson's Disease Research Team with Centre member Dr Alisa Glukhova, were the recipients of the Eureka Prize for Scientific Research. The Eureka Prizes are Australia's leading science awards, celebrating excellence in research, innovation, leadership and science engagement.

The team was awarded for their breakthrough research of the key protein that is linked with Parkinson's Disease, PINK1. They determined how PINK1 attaches to mitochondria to start the critical recycling process, this had been a mystery eluding scientists for the last 20 years. Mutations in PINK1 prevent the mitochondria from initiating this recycling process so that toxicity builds in the damaged mitochondria, initiating neuronal death and leading to early-onset Parkinson's Disease.

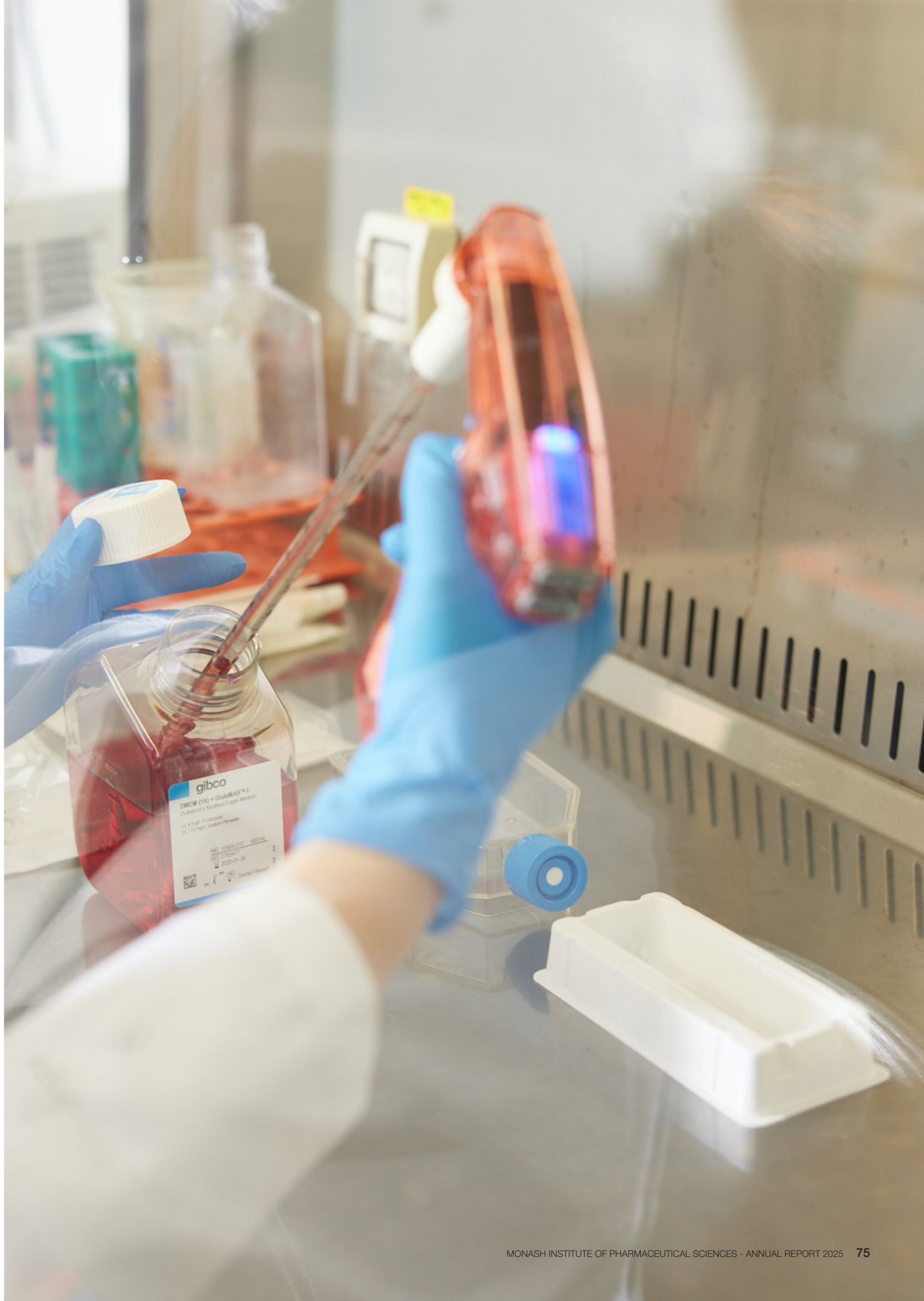
Dr. Alisa Glukhova (on right) with the WEHI PINK1 Parkinson's Disease Research Team

MAJOR ACHIEVEMENTS OF CCEMMP MEMBERS IN 2025

- Dr Alisa Glukhova – The Snow Fellowship recipient ($5 M)
- Dr Alisa Glukhova and PINK1 Parkinson's Disease Research Team – Winner of Eureka Prize for Scientific Research
- Professor David Adams elected to Australian Academy of Science
- Professor Patrick Sexton elected to Fellow of ASPET
- Associate Professor Karen Gregory appointed Associate Dean of Graduate Research, MIPS
- Professors Patrick Sexton and Arthur Christopoulos – Clarivate Highly Cited Researchers 2025
- Professor Chris Langmead, Dr Gregory Stewart and the Neuromedicines Discovery Team – winner of Research Commercialisation Award in the 2025 Financial Reviews Higher Education Awards
- Dr Sarah Piper - JG Russell Award from the Australian Academy of Science
- Dr Wessel Burger – Anders Award, Lorne Proteins
- Dr Winnie Tan – Anders Award, Lorne Proteins
- Dr Brooke Hayes – Anders Award, Lorne Proteins
- Dr Jason Cao – Gordon Hammes Scholar Award
- Daniel Fox – ASBMB Fellowship, Tilley Prize (MPG Symposium)

COLLECTIVELY, THE CENTRE MEMBERS:

- Were awarded over $112 million in competitive funding
- Published 73 articles
- Presented 23 international and 43 national oral presentations
- Presented 51 academic presentations and 81 poster presentations (17 local meetings, 64 at international/ national conferences and symposiums)
- Over 100 industry interactions (projects, meetings, roundtables, presentations)
- 76 solved structures deposited



NEUROMEDICINES DISCOVERY CENTRE

LEADER: PROFESSOR CHRIS LANGMEAD

The Neuromedicines Discovery Centre (NDC) is focussed on the discovery, development, and use of medicines to address the significant unmet need across neuropsychiatric conditions, including schizophrenia, depression, substance-use disorders, eating disorders and PTSD.

MAJOR HIGHLIGHTS FOR 2025

- The continued progress of Phrenix Therapeutics, the NDC's first commercial spinout. With investment from Curie.Bio (USA) and Brandon Capital (Australia), the company identified PHX-001, a small molecule drug for treating schizophrenia and related neuropsychiatric disorders.
- This approach offers the potential to treat multiple symptom domains of schizophrenia with a significant tolerability advantage compared to both atypical antipsychotics and the recently approved KarXT/Cobenfy.
- Preclinical studies (including at MIPS and The Florey) confirmed PHX-001's robust activity in psychosis and cognition models and support its potential as both a once-daily oral medicine and a seamless path to develop a long-acting injectable option.
- The expansion of the NDC's partnership with Servier (France) to include a third collaborative research program in neurological disorders.
- Further progress on the NDC's nascent research program on a novel drug target for remyelination in brain disorders, including a review in Journal of Neurochemistry and a research article in ACS Chemical Neuroscience.
- The NDC, represented by Prof. Chris Langmead and Dr Greg Stewart, was named as the joint winner of the Research Commercialisation Award in the 2025 Australian Financial Review's (AFR) Higher Education Awards for their research program 'Translation and commercialisation of neuromedicines'.
- Continued collaboration with the Centre for Medicines Use and Safety (CMUS) to develop clinical practice guidelines for MDMA-assisted psychotherapy for the treatment of PTSD, including systematic review in the Australian and New Zealand Journal of Psychiatry and report on guidelines' development in the Journal of Affective Disorders.

These milestones, particularly for research translation, have resulted in several changes as research staff move between the University and new commercial ventures. In early 2025 Prof. Chris Langmead stood down as the NDC's Director to lead Phrenix Therapeutics, retaining a part-time professorial role at the University.

Not only do such changes reflect progress made, but they are also possible due to MIPS' vision for better research translation and commercialisation. Furthermore, it presents opportunities for emerging research leaders to assume responsibility for new programs, such as Dr Natalie Diepenhorst taking on a new role as laboratory head and co-lead of the partnership with Servier.

MEDCHEM AUSTRALIA

DIRECTOR: PROFESSOR BRENDON MONAHAN

MedChem Australia, headquartered at MIPS, is a national initiative delivered in partnership with the University of Sydney and WEHI, and supported by the Australian Government Medical Research Future Fund (MRFF) and Therapeutic Innovation Australia (TIA). MedChem Australia addresses a critical bottleneck in drug discovery: access to high-quality medicinal chemistry and DMPK expertise. Through coordinated, subsidised support, MedChem Australia enables Australian biomedical researchers to progress translational drug discovery projects toward therapeutic, commercial, and clinical outcomes.

MAJOR ACTIVITIES IN 2025

- Portfolio expansion through a competitive Round 2 process, with three new projects selected, doubling the number of active programs supported
- A diversified portfolio of six projects spanning cardiovascular disease, oncology, inflammation, Prader–Willi syndrome, antiviral therapies, and pulmonary disease, each addressing significant unmet clinical need
- Strengthening of operational frameworks to support scale, impact, and cross-institutional delivery
- Increased capacity and capability with the recruitment of 6 new medicinal chemists and 3 management staff across the initiative
- Continued delivery of integrated medicinal chemistry and DMPK support, advancing projects through key drug discovery milestones
- Sustained national engagement and demand, with Round 3 launched in late 2025

PORTFOLIO GROWTH, NATIONAL ENGAGEMENT AND CAPABILITY BUILDING

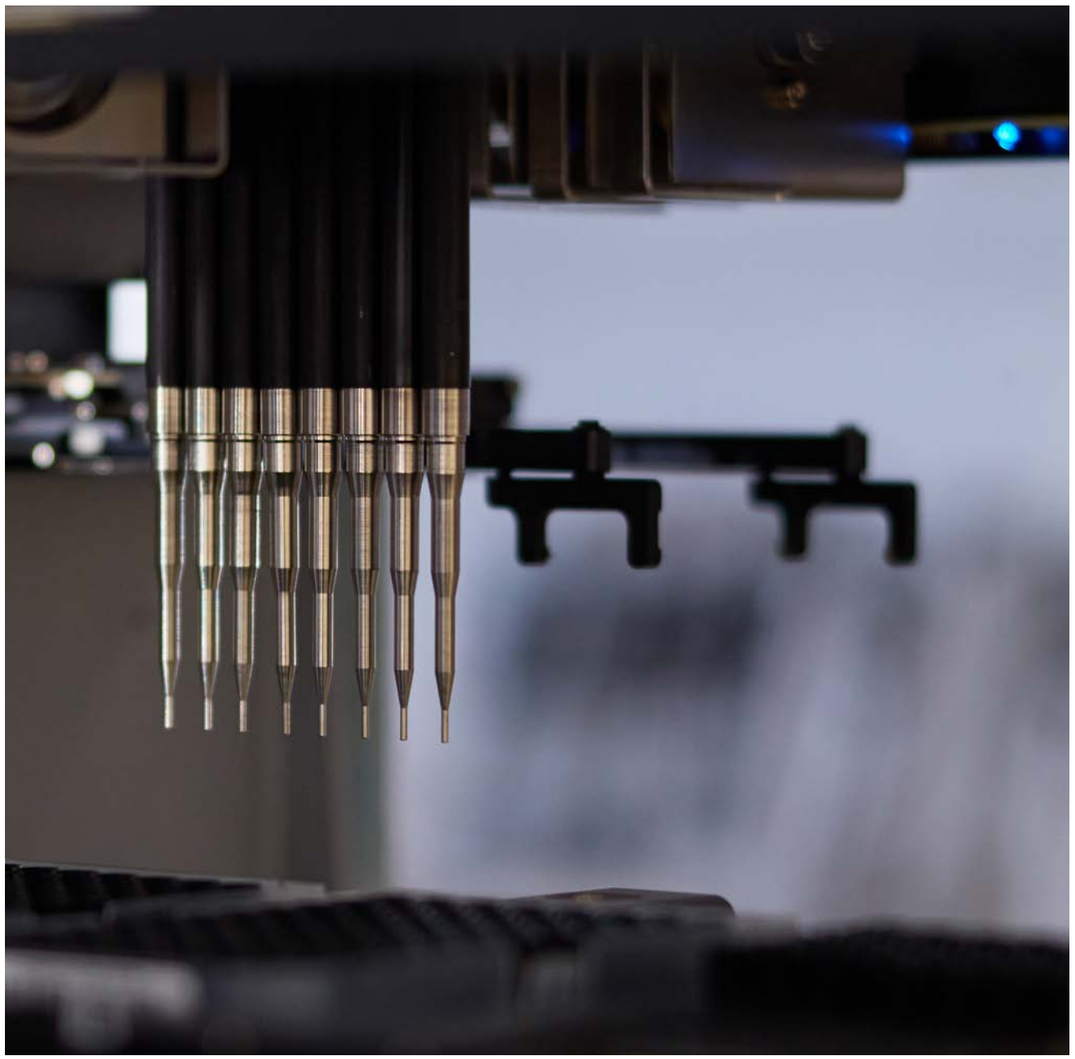
Following independent review by the Selection and Review Committee, three Round 2 portfolio projects were selected for support based on scientific excellence and translational potential:

- Targeting inflammation-driven mechanisms in heart failure (QIMR Berghofer) Prof. James Hudson.
- Small molecule therapeutics for pulmonary arterial hypertension (Monash University) Dr Chengxue Helena Qin and Dr Kieran Stockton
- Next-generation antivirals for acute and long COVID (WEHI) Dr Shane Devine and Dr Lee Booty

A third national call for applications was launched in late 2025, reflecting continued strong demand from the research sector. MedChem Australia maintained active engagement with researchers and institutions nationwide, supporting pipeline development and strengthening connectivity across the drug discovery ecosystem. In 2025, the program was represented at key forums, including the Adelaide Drug Discovery Incubator Translational Research Forum and the AusBiotech International Conference, further enhancing visibility and stakeholder engagement.

In parallel with portfolio delivery, MedChem Australia continued to strengthen the operational infrastructure required to support a growing national program. In 2025, this included enhancements to governance and independent review processes, the implementation of portfolio and milestone management frameworks, and improved coordination across partner nodes to enable scalable delivery and maximise impact. Importantly, nine new staff were recruited across the initiative, including six medicinal chemists and three node managers.

Collectively, these developments position MedChem Australia to support an expanding portfolio and deliver sustained national impact in drug discovery.



MRNA INITIATIVES

The Monash Institute of Pharmaceutical Sciences is committed to building a strong future for mRNA therapeutics. In 2025 we expanded our innovation and capacity to build a diverse range of interconnecting platforms, that support and expedite the development and success of mRNA medicines.

MAJOR ACTIVITIES OF 2025

VICTORIAN MRNA INNOVATION HUB

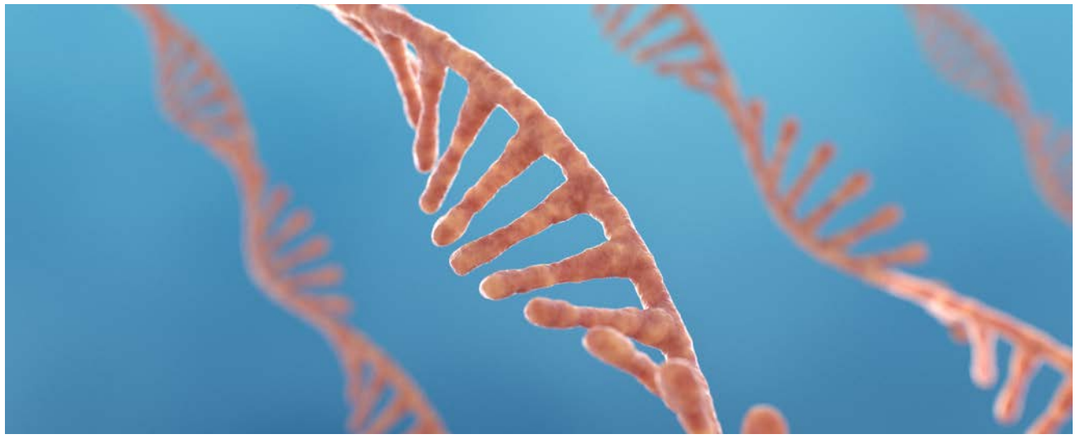
Headquartered at MIPS, the Victorian mRNA Innovation Hub (VMIH) has established itself as a core leader of innovation in therapeutic RNA and delivery technologies. In 2025, VMIH-enabled collaborative research has catalysed the award of more than $47 million in competitive grant funding, supported four industry partnerships, generated six invention disclosures, and fostered 29 VMIH-associated collaborative publications. Founded in 2023 through Victorian State Government investment via mRNA Victoria, the VMIH unites MIPS, the Monash Biomedicine Discovery Institute, the University of Melbourne, and the Doherty Institute in a cross-institutional research network. The Hub continues to drive high-impact collaborative programs addressing critical health priorities, including respiratory and immunosuppressive viral infections, neurological disease, and the development of next-generation mRNA platform technologies. Working collaboratively also with mRNA Core and CORTx, the VMIH enables continuous multidirectional knowledge and resource exchange, strengthening the pipeline from discovery through to potential therapeutic development and accelerating innovation to strengthen the broader mRNA therapeutics pipeline at MIPS.

NATIONAL CENTRE FOR BIOPHARMACEUTICAL OPTIMISATION OF MRNA THERAPEUTICS

The National Centre for Biopharmaceutical Optimisation of mRNA Therapeutics (CORTx) supported by the Medical Research Future Fund (MRFF) and lead by co-directors Assoc Prof Angus Johnston and Professor Natalie Trevaskis, has further expanded its collaborative network with industry and academic leaders to accelerate advances in mRNA delivery technologies. In 2025, CORTx has advanced innovative mRNA therapeutics, with a particular emphasis on improving delivery specificity and cellular uptake. This has been achieved through the continued engineering of nanoparticles incorporating versatile, proprietary targeting agents developed at MIPS. These efforts remain directed toward high-impact disease areas, including cancer, diabetes, and inflammatory bowel disease.

MRNA CORE

mRNA Core at MIPS has evolved into a significant national platform for advancing next-generation mRNA therapeutics. Supported by the Medical Research Future Fund (MRFF), Therapeutics Innovation Australia, and the National Collaborative Research Infrastructure Strategy (NCRIS), the platform serves as a key catalyst for mRNA innovation across Australia and internationally. It provides a comprehensive pipeline of critical resources, including specialised nanoparticle and mRNA design and production, as well as optimisation of mRNA delivery systems toward clinical applications. mRNA Core supported more than 30 collaborative research programs, resulting in fifteen peer-reviewed publications since commencing in 2022, and enabled progress in a broad range of therapeutic areas, including vaccines, cardiovascular disease, and rare genetic disorders.



MONASH-MODERNA QUANTITATIVE PHARMACOLOGY ACCELERATOR

The Monash-Moderna Quantitative Pharmacology Accelerator (MMQPA) continues to excel in quantitative pharmacology and mathematical modelling to optimise mRNA modalities, improving efficacy and safety to guide clinical development. Supported by Moderna and Monash University, the MMQPA has informed therapeutic and vaccine design and decision-making, supporting and shaping key aspects of mRNA modalities and strengthening Australia's national mRNA therapeutics and vaccine development platform. In 2025 the MMQPA has informed development programs at Moderna across different mRNA modalities. MMQPA team members have co-authored a state-of-the-art review on 'Clinical and Quantitative Pharmacology Considerations of mRNA Therapeutics and Vaccine Development' together with the Moderna team which was published in the internationally leading journal Clinical Pharmacology and Therapeutics.

Members of MMQPA have presented collaborative research with CORTx, and served as chairs, at a symposium at the ASCEPT and Hypertension Australia Joint Scientific Meeting 2025. This research was also presented as a Top Poster at the 2025 American Society for Clinical Pharmacology and Therapeutics (ASCPT) Annual Meeting. MMQPA also co-authored a poster with the Moderna team that was presented at the 2025 American Conference on Pharmacometrics (ACoP).

MAJOR FUNDING AWARDS IN 2025

- **2025 NHMRC Ideas Grant:** This grant aims to precisely and specifically target diseased cells with targeted mRNA delivery technology. Johnston A, McLeod V, Pouton C, Cao E, Sloan E. Precise depletion of metastatic cancer using targeted mRNA, $1,984,695. 2026-2030.
- **MRFF Stem Cell Mission:** This is a grant to take a cure for a genetic blood disorder into the clinic by mRNA-enabled 'prime editing' of haematopoietic stem cells and subsequent autologous transplantation. Deans A, Pouton C, Rio P, Hewitt A, Bryan T, Glaser A, Fairfax K, Nelson A, Crismani W, Liu DR, Mariana L. Next-generation experimental cell therapies in patients, using advanced gene editing, A$5,000,000. 2026-2030.
- **Yuxin Yao** - Moderna Platform Incubator Network (mPIN) PhD student sponsorship, 2025. Supervisor: Prof. Natalie Trevaskis.

HIGHLIGHT PAPER

In addition to the following paper, MIPS mRNA researchers undertook the research in the D4 highlight paper, *A versatile antibody capture system drives specific in vivo delivery of mRNA-loaded lipid nanoparticles,* on page 45.

Impact of ionizable lipid type on the pharmacokinetics and biodistribution of mRNA-lipid nanoparticles after intravenous and subcutaneous injection

J. Control Release. 384, 113945 (2025). https://doi.org/10.1016/j.jconrel.2025.113945

Ren Y, Lin L, Abdallah M, Zhu X, Liu H, Fabb SA, Payne TJ, Pouton CW, Johnston APR & Trevaskis NL.

Understanding how mRNA medicines move through the body and where they act is critical to advancing the development of mRNA therapeutics. Successful treatment and prevention of disease depends on delivering mRNA therapeutics to specific organs and tissues, which is largely determined by the formulation of the lipid nanoparticles used to package the mRNA. A key component of these formulations, known as ionisable lipids, plays a central role in nanoparticle targeting, efficiency, and safety. Our researchers found that altering the ionisable lipid formulation changed mRNA stability, circulation time, and delivery to different organs and tissues. This knowledge will add to the optimisation and development of mRNA therapies with improved precise targeting, greater effectiveness and potentially fewer off target effects.'

INTERNAL INITIATIVES TO GROW AND SUPPORT OUR STAFF AND STUDENT COMMUNITY

Both the Faculty and MIPS benefit from an extraordinarily active and engaged staff and student community. This is exemplified by the *Early- and Mid-Career Researchers Committee* (EMCR Committee), *Her Research Matters* (HRM), and the *Multicultural Outreach and Support for Advancement, Inclusion and Community* (MOSAIC). Each group has been established to represent and build a community in their areas, respectively EMCRs, research staff and students who are women, and staff and students of colour.

MIPS applauds the dedicated members of each group and recognises the challenges that they are working to help us address. Through their considerable efforts we have a growing community of young researchers, a pleasing number of whom are women. MOSAIC has recently been established to help improve the cultural and linguistic diversity across the Institute.

EARLY-AND MID-CAREER RESEARCHER COMMITTEE

The early and mid-career researchers' (EMCR) committee represents the community of developing researchers in the Faculty. The Committee promotes and runs specialised training programs and organises events to enable the exchange of scientific ideas and generate new collaborations. Since 2022, the EMCR committee has supported the publication of the EMCR newsletter to showcase EMCR achievements, highlight opportunities, and strengthen engagement across the Faculty.

MAJOR ACTIVITIES OF 2025

2025 was a successful year for the FPPS EMCR committee in supporting and facilitating connections within the MIPS EMCR community, through a series of professional and social events. The first career event of the year was our "Career Progression Workshop" where we invited three speakers to share their diverse career paths and what skills they required to thrive beyond their current research roles. Our second career event was an NHMRC Investigator Grant Writing Workshop delivered by Empirical Careers and co-hosted with Her Research Matters (HRM), which provided practical guidance on research impact, grant competitiveness and career progression. Participants gained insight into how to enhance research impact through grant writing. Lastly for our career workshops, we invited three MIPS research leaders to share how EMCRs can build visibility, differentiate their work from their PIs', and establish themselves as an emerging leader. As always, we hosted our Welcome lunch, our mid-year trivia night (co-hosted with the Parkville Postgraduate Association), and our end of year celebration event, bringing together EMCRs from all parts of faculty to network together.

The EMCR committee further supported the growth of the parents' group by running a monthly social catch up and an end of year lunch. We also worked alongside HR to circulate the "General guide to the enterprise agreement provisions and University processes for birth parent and partner leave" document".

Taking advantage of our proximity to other research institutes within Parkville, our team has contributed to the organising of three inter-institute events which bring together EMCRs from 12 leading research institutes across Melbourne. For the third year in a row, our committee co-organised the Melbourne Emerging Leaders in Biomedical Research (MELBR) Symposium to foster collaboration amongst EMCRs from Victoria (held in September 2025).

Photo from the EMCR career workshop held in May 2025.

Photo from EMCR-PPA Trivia night, June 2025.

HER RESEARCH MATTERS

HRM is a grassroots-driven, outcome-focused collective within the Faculty that promotes, sponsors and fosters an inclusive and equitable leadership environment, empowering all women in research to reach their full potential.

MAJOR ACTIVITIES OF 2025

In 2025, HRM continued to build on this mission with a highly productive and engaging year, marked by growth, collaboration and impact. Supported by a dedicated board, active sub-committees and a growing collective, HRM delivered thirteen events designed to support career development, foster meaningful connections and advocate for equity across the research community. Alongside these activities, HRM coordinated reviews of grant and promotion applications, providing members with valuable support at critical career stages. Collaborations with MOSAIC, the Early-Mid Career Researchers (EMCR) Committee, Dose of Pharma, the Parkville Postgraduate Association (PPA), and the Faculty Associate Dean for Equity, Diversity and Inclusion, Dr Betty Exintaris, were further strengthened through joint initiatives and regular meetings to better align activities and maximise shared impact.

A key highlight of the year was the continued growth of the HRM collective, with membership increasing from approximately 145 members in 2024 to 188 in 2025. This expansion reflects strong engagement across the Faculty and the increasing recognition of HRM as a platform for connection, advocacy and professional development.

Equity, diversity and inclusion remained central to HRM's activities throughout the year. In early 2025, HRM hosted its first International Women's Day event, celebrating the achievements of women in research and featuring presentations from the inaugural HRM Impact Award winners, Professor Natalie Trevaskis and Dr Simona Carbone (2024 recipients). The event highlighted the importance of leadership, advocacy and sponsorship in creating inclusive research environments and was met with strong attendance and positive feedback.

Later in the year, HRM delivered LGBTIQA+ Ally Training, equipping participants with practical tools to foster inclusive and respectful workplaces. In collaboration with PPA and Dose of Pharma, HRM also hosted a Diversity and Inclusion Panel, where speakers shared insights into the challenges and opportunities faced by the LGBTQIA+ community in research. The discussion was subsequently released as a podcast, extending its reach beyond the event.

Professional development remained a cornerstone of HRM's work in 2025. A highlight was the Grant Writing Workshop, which provided practical guidance on preparing competitive funding applications. The Academic Promotion Application Workshop further supported researchers by offering advice on effectively presenting research impact, leadership and service contributions. HRM also introduced new initiatives such as "Her Science, Her Story," an engagement event connecting undergraduate students with women researchers across different career stages and showcasing diverse pathways in science. Throughout the year, informal networking opportunities, including coffee catch-ups and "Walk and Talk" sessions, created welcoming spaces for mentorship, collaboration and peer support, strengthening the HRM community.

In 2025, HRM sponsored Garima Sharma, Gopisankar Mohanannair Geethadevi, Bui San Thai and Melanie Lloyd to attend *Science Meets Parliament* in Canberra. This initiative provided valuable insights into the intersection of science and government, and the role of research in informing policy. Attendees later shared their experiences with the HRM community, encouraging broader engagement in science advocacy and leadership.

HRM also expanded its communications and outreach e fforts in 2025. Its LinkedIn presence grew from 532 to 663 followers, with strong engagement driven by posts celebrating member achievements, promoting events and highlighting key initiatives. Work also progressed on a new HRM promotional video, developed in collaboration with the Faculty Marketing Team to showcase the collective's impact and support future engagement.

The year concluded with the HRM Annual General Meeting, where members reflected on achievements, celebrated successes and set priorities for the future. At the AGM, Rosemary Manning was announced as the 2025 HRM Impact Award recipient, recognising her significant contributions to supporting women in research. As part of this initiative, she will deliver the keynote address at the 2026 Flagship event.

HRM extends its sincere gratitude to its board members, sub-committees, members and allies for their continued dedication and support throughout 2025. With a strong and growing collective, HRM looks ahead to 2026 with a continued commitment to advancing equity, strengthening networks and empowering the next generation of research leaders.

MULTICULTURAL OUTREACH AND SUPPORT FOR ADVANCEMENT, INCLUSION AND COMMUNITY

Multicultural Outreach and Support for Advancement, Inclusion and Community (MOSAIC) is a support network in the Faculty for people of colour, including those of culturally and linguistically diverse backgrounds, with the goal to increase representation of traditionally marginalised communities in decision-making groups and leadership positions.

MAJOR ACTIVITIES OF 2025

MOSAIC continued its strong momentum in 2025, strengthening its role within the Faculty of Pharmacy and Pharmaceutical Sciences in supporting equity, diversity, and inclusion (EDI). Further information about MOSAIC's activities and initiatives is available on the MOSAIC webpage.

A key highlight was the continuation of the MOSAIC Sponsorship Program in partnership with Monash EDI and Winitha Bonney OAM. The program supported 15 sponsor–sponsee pairs across academic, professional, and research staff, focusing on career development and leadership opportunities for individuals from culturally and linguistically diverse (CALD) backgrounds. The pilot concluded in July 2025, with evaluation currently underway.

MOSAIC also contributed to shaping an inclusive Faculty culture by promoting greater diversity in the MIPS seminar series. MOSAIC also hosted a panel discussion on inclusive workplace practices, attended by over 30 participants. These activities provided opportunities for discussion and shared learning. In 2025, MOSAIC worked collaboratively with groups including HRM, PPA, and EMCR Committees, co-organising events and supporting staff promotion applications.

MOSAIC

The network's contributions were recognised through several achievements including MOSAIC receiving the Faculty Equity, Diversity and Inclusion Award. Individual members were also recognised, including Dr Amandeep Kaur, who received the Scientific Research Award at the 2025 Women of Colour in STEM Awards, and Associate Professor Betty Exintaris, who received the Business in Colour Sponsor Category award at the inaugural Business in Colour Awards.

Internally, MOSAIC expanded its capacity with the recruitment of a Casual Marketing and Project Assistant to support communications and coordination. Membership also increased from 40 to 80.

MOSAIC also undertook leadership transitions within the executive team, supporting continuity and opportunities for new members to take on leadership roles. We welcomed our new Co-Chair, Dr Elva Zhao who "looks forward to increasing the visibility of MOSAIC both within the MIPS community and beyond, and collaborating with faculty colleagues and partners to provide practical, actionable guidance that supports culturally inclusive practices across our community."

Importantly, MOSAIC held its first Annual General Meeting (AGM) at the end of 2025. This provided an opportunity to reflect on progress, engage members in shaping future directions, and establish key priority themes to guide MOSAIC's work moving forward.

MOSAIC looks ahead to 2026 with a focus on consolidating its impact through targeted priorities in culture and representation, inclusive teaching and mentoring, and fostering belonging and community.

COMMERCIALISATION & TRANSLATION

MIPS is leading the way in transforming its research discoveries into real-world impact, improving health outcomes, and driving economic growth. With the largest concentration of pharmaceutical researchers in the country and a strong legacy of excellence in pharmaceutical science, MIPS has established itself as a leader in translational drug discovery and development. Our focus on therapeutic innovation positions us at the forefront of research translation, addressing critical human health challenges.

COMMERCIALISATION

Invention Disclosures
23

Patents
3

Licences including options and assignments
4

Complementing MIPS' expertise in pharmaceutical science is a strong foundation in commercialisation and business development, enabling the advancement of research towards meaningful commercial opportunities. A key aspect of research translation at MIPS is the identification, development, and commercialisation of novel intellectual property and research outcomes. A dedicated team of business development and commercialisation professionals provides researchers with support in contract management, strategic planning, partnership development, and commercial strategy, ensuring a clear pathway from discovery to impact. Researchers also benefit from mentorship, coaching, and expert guidance throughout their commercialisation journey. and commercialisation.

MIPS fosters a collaborative, multi-disciplinary culture that embraces entrepreneurship, as demonstrated by its successful spinout companies, licensing deals, and long-standing industry partnerships. The combination of world-class pharmaceutical research expertise, drug development capabilities, and commercialisation experience enables MIPS to drive the development and translation of innovative therapies. The highlights of these activities in 2025 are outlined in the following pages.

CRC-P WITH ADRACARD

The CRC-P project *Life-saver in your wallet: AdraCard delivers portable emergency healthcare* brings together AdraCard and a consortium of industry and academic partners to develop a firstinclass, creditcard–sized nasal drugdelivery platform. Supported by a successful $3 million CRC-P grant (round 16), the collaboration aims to transform emergency response by offering a simple, needlefree alternative to autoinjectors, overcoming barriers that currently limit uptake of devices such as the EpiPen.

MIPS along with the Medicines Manufacturing Innovation Centre (MMIC, also part of MIPS), provides critical formulation, manufacturability and translational expertise. MMIC's capabilities in nasal delivery, powder and liquid formulation, and device–drug integration underpin the development of a robust, scalable product suitable for mass manufacture. This contribution ensures the platform is optimised for stability, rapid absorption and realworld usability.

By project completion, the consortium will deliver a validated prototype ready for inhuman trials and commercial partnering. With its adaptable design and lowcarbon manufacturing profile, AdraCard has the potential for global adoption across emergency medicine and broader clinical settings, strengthening Australia's MedTech innovation pipeline and sovereign manufacturing capability.

AdraCard

Cooperative Research Australia

AESON CHANG – GILEAD AND OTHER GRANTS

Dr Aeson Chang in the Drug Discovery Biology Theme is internationally recognised for his pioneering work on neural signalling in metastatic triplenegative breast cancer (TNBC), culminating in his selection as a Gilead Sciences Research Scholar in Solid Tumors for his project *Cancerneural Interaction: Identifying Novel Strategies to Prevent Triple Negative Breast Cancer Recurrence.* This award supports highpotential investigators whose research accelerates translation toward improved patient outcomes.

Aeson's program has generated 15 peerreviewed publications, including first and seniorauthor papers in *Science Translational Medicine, Journal of the National Cancer Institute*, and *Nature Cancer Reviews.* His findings have been showcased at leading international and national meetings such as Keystone Symposia and the Australasian Neuroscience Society Meeting, underscoring his growing influence in cancer neuroscience.

Over the past three years, Aeson has secured approximately $3 million in competitive funding, including two NHMRC Ideas Grants and the prestigious Gilead Research Scholars Program Grant. His research advances a mechanistic understanding of tumour–nerve interactions and identifies new therapeutic strategies to prevent recurrence in highmortality TNBC. Equally, his commitment to integrity, mentorship, collaboration and an inclusive laboratory culture strengthens Monash's translational research ecosystem and positions the University at the forefront of emerging cancerneuroscience innovation.

AUSTRALIAN ECONOMIC ACCELERATOR AWARDS

Monash researchers secured three competitive awards through the Australian Economic Accelerator (AEA) Ignite program, a national scheme designed to fasttrack the commercial readiness of breakthrough university innovations by providing targeted funding, entrepreneurial capability building, and industryaligned translational support.

In AEA Ignite Round 1, Prof Bernard Flynn received $494,993 to advance CIN244, a firstinclass antifibrotic therapy developed by Cincera Therapeutics. The project strengthens the preclinical data package needed for future clinical translation, defining CIN244's mechanism in halting fibrosis, identifying biomarkers of response, and assessing safety parameters. This work positions the asset for partnership, regulatory engagement, and progression toward firstinhuman studies, addressing a major unmet need across fibrotic diseases.

In AEA Ignite Round 2, Dr Azadeh Nilghaz, Professor Nico Voelcker and collaborators were awarded $288,844 to develop a portable microneedlebased sensor enabling instant, labgrade assessment of meat and seafood freshness. Integrated with a mobile app for realtime readouts, the technology aims to reduce waste, improve food safety, and enhance consumer confidence. The project will deliver a scalable prototype validated in industry settings, establishing a new benchmark for smart foodquality monitoring and strengthening Australia's position in advanced sensing technologies.

Also in AEA Ignite Round 2, Dr Kieran Stockton and Dr Chengxue Helena Qin and their team were awarded $499,515 to develop a first-in-class oral therapy that targets the root cause of pulmonary arterial hypertension (PAH), a severe and often fatal disease. Using a precision approach called biased agonism, the drug will offer the potential to activate protective inflammation-resolving pathways while avoiding harmful signals. This innovation could halt disease progression, transform PAH into a manageable condition, and deliver a breakthrough treatment that improves survival and quality of life.

Australian Government | AUSTRALIA'S ECONOMIC ACCELERATOR

MEDCHEM AUSTRALIA FUNDING

MedChem Australia Round 2 Portfolio Project funding was awarded to Dr Chengxue Helena Qin, Dr Kieran Stockton and collaborators for the development of novel small molecules for pulmonary arterial hypertension (PAH), recognising the program's translational potential and pathway toward therapeutic development. The team will leverage specialist medicinal chemistry and translational drug discovery expertise to optimise therapeutic candidates for PAH. Through access to specialised medicinal chemistry and drug development expertise, the funding will support optimisation of lead compounds and accelerate progression toward future clinical translation, investment readiness and commercial opportunities.

BRIDGE PROGRAM PITCH COMPETITION

Dr Joanne Baltos was recognised through success in the national Bridge Program pitch competition, a leading pharmaceutical commercialisation initiative designed to strengthen translation and entrepreneurial capability across Australia's medical technology and biotechnology sectors. The achievement highlights the growing emphasis on research impact and commercial readiness within the Faculty, recognising the ability to communicate the translational and real-world potential of innovative research to industry audiences. Participation in the program further strengthened networks and capability development supporting future pathways to translation and commercialisation.

CUREATOR FUNDING FOR XCYSTENCE BIO

Monash University biotech spin-out, xCystence Bio, led by the Biomedicine Discovery Institute & MIPS, has been awarded top-up funding through Brandon BioCatalyst's CUREator incubator to drive the development of urgently needed therapeutics for Polycystic Kidney Disease (PKD). Top-up funding rounds recognise innovations that received initial seed funding from CUREator and have gone on to demonstrate substantial progress. The top-up brings CUREator's total grant funding awarded to xCystence Bio to AU$750,000.

PKD is a family of genetic diseases in which multiple large cysts form in the kidneys. It's a progressive condition which typically worsens over a patient's lifetime and is one of the leading causes of renal failure requiring dialysis or transplant. xCystence Bio was originally identified by CUREator as an early-stage biomedical innovation with long-term potential due to the group's identification of a cell signalling pathway which is active in PKD and which, when blocked in PKD disease models, prevents the formation of new cysts and the growth of existing ones.

The top-up funding moves the program to the next crucial stage of providing proof of concept in treating the disease.

BRANDON BIOCATALYST

2025 BIOTECH INNOVATORS PROGRAM

Dr Luke Adams was selected to participate in the 2025 Biotech Innovators Program, a competitive professional development initiative designed to strengthen research translation and commercialisation capability among Victorian scientists, clinicians, researchers and technology transfer professionals. Delivered by Brandon Capital and supported by international industry experts, the program provided intensive training across therapeutic development, translational pathways, clinical development, company formation and investment strategy. Through interactive workshops and engagement with biotechnology leaders, participants developed business plans for emerging research opportunities while expanding industry networks and commercial skills. Participation in the program reflects a commitment to building translational capability and strengthening pathways from research discovery to real-world impact and future commercial development.

ARPA-H AWARDS

TARGETING THE CNS-DRAINING LYMPHATICS TO ADVANCE ISCHEMIC STROKE OUTCOMES IN WOMEN

An international research team including Monash Institute of Pharmaceutical Sciences researcher Professor Natalie Trevaskis secured AU$4,594,582 support through the Advanced Research Projects Agency for Health (ARPA-H) to targeting the CNS-draining lymphatics to advance ischemic stroke outcomes in women. Led at Monash by Professor Trevaskis, the project explores innovative approaches to improving stroke outcomes by targeting the brain's lymphatic drainage pathways, with a particular focus on sex-specific differences that may contribute to poorer outcomes in women. The award supports the translation of emerging discoveries in neuro-lymphatic biology into novel therapeutic strategies and highlights the growing international recognition of MIPS expertise at the interface of lymphatic drug delivery, neuroscience and translational medicine.

NON-INVASIVE FUNCTIONAL IMAGING OF THE DIGESTIVE LYMPHATIC SYSTEM

Monash Institute of Pharmaceutical Sciences researchers Professor Natalie Trevaskis, Dr Amandeep Kaur, and Professor Darren Creek, joined a major international collaboration funded by AU$10,511,340 through ARPA-H's Lymphatic Imaging, Genomics, and pHenotyping Technologies (LIGHT) program for Non-invasive Functional Imaging of the Digestive Lymphatic System. The multidisciplinary project, led by the University of Pennsylvania with Monash Institute of Pharmaceutical Sciences participation, aims to develop next-generation imaging technologies capable of visualising and characterising the digestive lymphatic system using non-invasive approaches. By advancing tools for earlier diagnosis and improved understanding of lymphatic-related disease, the program strengthens pathways from fundamental discovery to clinical application and demonstrates the value of international partnerships in accelerating translational impact.

ARPA-H

SNOW VISION ACCELERATOR

The Snow Vision Accelerator (SVA) is a major initiative led by Sydney University and funded by Snow Medical Research Foundation to transform treatment of glaucoma, specifically neurodegeneration of the optic nerve. The program is initially supported with $25m philanthropic commitment from the Snow Medical Research Foundation. Monash Institute of Pharmaceutical Sciences has joined as a founding collaborator to provide the primary research translation capability for any small organic molecule targets to emerge from the program. Feasibility work has been initiated on the first target, an allosteric inhibitor of SARM1. SARM1 acts as a metabolic sensor. When stressed by elevated intraocular pressure (glaucoma) or trauma, the axon loses the protective enzyme NMNAT2, triggering SARM1 to break down cellular NAD+ and cause rapid axonal death resulting in irreversible vision loss. The SARM1 project is a collaboration between medicinal chemists at Monash Institute of Pharmaceutical Sciences (Prof. Martin Scanlon and Dr Indu Chandrashekaran) and research biologists at Sydney University (Dr Andrea Loreto and Prof Jonathan Crowston).

MONASH BOSTON HUB

Monash University established the Boston Hub in the United States in October 2025. The Hub connects biotech, pharmaceutical and industry partners to foster collaborations that help translate drug discovery and health innovations into real-world impact.

The Hub was established to build on Monash's research and translational ecosystem, which has seen more than 160 licence deals, 33 spinout companies, and $1.27 billion raised in investment in the past five years.

The Monash Boston Hub is in the Cambridge Innovation Centre and includes a team of development professionals headed by Boston native Nathan Elia, Monash's Director of Enterprise for North America and Europe.

TRANSLATION

We have a strong focus on bridging the gap between our research strengths and its practical application, ensuring that research findings and discoveries are used effectively to improve human health. This involves communicating research evidence to stakeholders, such as healthcare providers, policymakers, and consumers, to influence their decision-making and promote the adoption of evidence-based practices through clinical practice guidelines.

2025 has seen MIPS researchers build on our solid track record of research translation through government-commissioned reports, national guidelines, industry collaboration, and the innovative use of technology beyond the original purpose.

CMUS MODELLING INFORMS PBS CHANGES RELATING TO THE TREATMENT OF EPILEPSY

The Australian Government Pharmaceutical Benefits Scheme (PBS) commissioned the Centre for Medicine Use and Safety (CMUS) to undertake a review into the use of anti-epileptic medicines levetiracetam and lamotrigine as first-line treatments for epilepsy. The review examined clinical guidelines, medicine utilisation data, and projected PBS costs. It found that most Australian and international guidelines already recommend one or both medicines as first-line options for adults with focal or generalised seizures. The Pharmaceutical Benefits Advisory Committee (PBAC) accepted the review's findings and supported removing current restrictions that require patients to first fail other anti-epileptic drugs before accessing subsidised treatment. The proposed changes are expected to increase PBS costs while reducing reliance on older medicines.

MDMA CLINICAL PRACTICE GUIDELINES

The Centre for Medicine Use and Safety recently led a national consortium of multidisciplinary experts in developing the world's first Clinical Practice Guideline on the Use of MDMA-AP for PTSD. The guideline has since been accessed by 2000 users from more than 40 countries to date, indicating global interest in evidence-based guidance for the use of novel psychedelic therapies. The Guideline has been approved by the National Health and Medical Research Council and endorsed by the Royal Australian and New Zealand College of Psychiatrists, Pharmaceutical Society of Australia, and Australian Psychological Society. The Guideline provides the basis for new funding pathways for patients through the Department of Veterans' Affairs and private insurance bodies.

PFIZER ADVANCES MIPS-INVENTION TO PHASE 3 CLINICAL TRIALS

A promising breast cancer treatment discovered by researchers at MIPS and the Cancer Therapeutics Cooperative Research Centre (CTx) has taken a major step forward, with Pfizer launching a Phase 3 clinical trial for patients with advanced breast cancer. The experimental drug, known as PF-07248144, targets two proteins, KAT6A and KAT6B, which help cancer cells grow and spread. Early trial results were encouraging, with more than a third of patients responding to the treatment when it was combined with hormone therapy. Reaching Phase 3 trials is a rare achievement for an Australian-discovered therapy and brings the treatment closer to potential approval and patient use. The collaborative project highlights Australia's growing role in developing innovative cancer treatments.

MONASH QUALITY OF MEDICINES INITIATIVE

The Monash Quality of Medicines Initiative (QoMI) is a philanthropically funded research program focused on improving medicines quality in low- and middle-income countries. In partnership with the Therapeutic Goods Administration's (TGA) Indo-Pacific Regulatory Strengthening Program, a Department of Foreign Affairs and Trade-funded initiative, QoMI is supporting efforts to strengthen medicines regulation and oversight across the region.

In 2025, QoMI established a PhD program to investigate the underlying sources of medicines quality issues in the Pacific, as identified through post-marketing surveillance and reports of poor clinical outcomes. This work is helping to build a stronger evidence base for targeted regulatory and public health responses.

A key issue of global concern is the contamination of cough syrups with (di)ethylene glycol, which has caused hundreds of child deaths in low- and middle-income countries in recent years. Contaminated products have been identified in India, Indonesia, the Marshall Islands and the Federated States of Micronesia.

In collaboration with the TGA, QoMI is working to improve the detection of these contaminants by optimising test methods for use in low-resource settings, where such products are most commonly encountered. The team is also seeking novel, simple and low-cost testing approaches suitable for use at points of product entry and in clinical settings.

Looking ahead, QoMI aims to expand its partnerships across the Pacific, including through collaboration with the WHO Western Pacific Regional Office and country partners, to become a trusted contributor to efforts to address substandard and falsified medicines in the region.

Australian Government | INDO-PACIFIC CENTRE FOR HEALTH SECURITY

QOMI DIRECTOR'S EFFORTS RECOGNISED

QoMI founder and Director, Associate Professor Pete Lambert, was recognised in the Faculty's Research Excellence Awards in 2025. Pete received the Engagement and Impact Award for his efforts establishing QoMI as part of a long career focussed on global health. The award recognises exceptional impact through transdisciplinary challenge-led research. Pete has achieved this through collaborative work, enduring partnerships, deep engagement, and evidence informed decision-making.

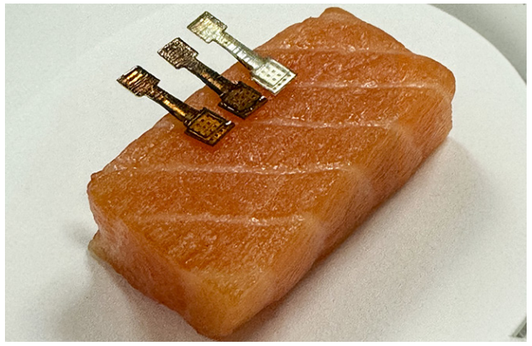
Congratulations Pete.

MICRONEEDLE-BASED BIOSENSOR FOR REAL-TIME MONITORING OF FISH FRESHNESS

MIPS scientists, in collaboration with Deakin University researchers, have developed microneedle-based biosensors to monitor fish freshness in real time. The electrochemical 'microneedle array' (MNA) based biosensor monitors hypoxanthine (HX) levels in fish tissue. HX levels in fish are used as an indicator of freshness, with levels rising as spoilage occurs.

The approach used by researchers from the Drug Delivery, Disposition and Dynamics Theme is unique because, unlike traditional methods or previously developed biosensors, it does not require labor-intensive protocols including sophisticated instrumentation and extensive sample preparation such as homogenisation, filtration and centrifugation.

Instead, the MNA-based biosensor utilises a microneedle array that can be pressed on the meat surface, eliminating the need for extensive and complex sample pre-treatments and enabling direct analysis of semi-solid samples, like fish tissue.



MIPS ORGANISATIONAL STRUCTURE AND EXPERTISE

All MIPS research staff and students are affiliated with one of the Research Themes. The MIPS Leadership group consists of the Theme Leaders, the Faculty Associate Deans of Research and Graduate Research, the Director of Engagement & Enterprise, the Chief Operating Officer, and the Managers of Research and Graduate Research, and Business Development.

MIPS Director
Chris Porter

Drug Discovery Biology, incorporating the Neuromedicnes Discovery Centre
Theme Leader: Rebecca Ritchie
Deputy: Michelle Halls

Analytical & Structural Neuropharmacology
Arthur Christopoulos, Celine Valant, David Thal

Cancer & Neural-Immune Regulation
Erica Sloan, Aeson Chang

Cardiac GPCR Biology
Lauren May

Cardio-Metabolic Physiology
Miles De Blasio

Cardiovascular Pharmacology
Chengxue Helena Qin

Cellular & Molecular Metabolism
Mark Febbraio

Endocrine & Neuropharmacology
Karen Gregory

GPCR EcoPharmacology
Anh Nguyen

Heart Failure Pharmacology
Rebecca Ritchie, Miles de Blasio

Integrated Neurogenic Mechanisms
Simona Carbone, Daniel Poole, Nicholas Veldhuis

Male Reproductive Pharmacology
Sab Ventura

Metabolic GPCR Biology
Patrick Sexton, Denise Wootten

Molecular & Translational Drug Discovery
Chris Langmead, Greg Stewart, Natalie Diepenhorst

Neurometabolism
John Scott

Spatial Organisation of Signalling
Michelle Halls

Stem Cell Biology
John Haynes

Structural DynOmics
Tracy Josephs

Medicinal Chemistry
Theme Leader: Martin Scanlon
Deputy: Dan Priebbenow

Synthetic medicinal chemistry
Ben Capuano, David Chalmers, Bernie Flynn, Manuela Jörg, Amandeep Kaur, Dan Priebbenow, Peter Scammells, Chris Smedley & Phil Thompson

Chemical biology
Ben Capuano, David Chalmers, Bernie Flynn, Manuela Jörg, Amandeep Kaur, Ray Norton, Dan Priebbenow, Peter Scammells, Martin Scanlon, Chris Smedley & Phil Thompson

Advanced organic synthesis & catalysis
Bernie Flynn, Dan Priebbenow, Peter Scammells & Chris Smedley

Peptide science
David Chalmers, Ray Norton, Phil Thompson & Martin Scanlon

Fragment based drug discovery
Martin Scanlon, Ben Capuano, David Chalmers, Ray Norton, Peter Scammells & Phil Thompson

Computational chemistry & molecular modelling
Giuseppe Barca, David Chalmers, Bernie Flynn, Ray Norton, Dan Priebbenow, Martin Scanlon & David Winkler (Adjunct)

Centre for Drug Candidate Optimisation
Theme Leader: Joseph Nicolazzo
Deputy: David Shackleford

Physicochemical profiling
Michael Campbell

In vitro ADME
David Shackleford

In vivo pharmacokinetics
David Shackleford

Bioanalysis
Michael Campbell

Human PK and dose predictions
Sue Charman

Drug discovery for tropical infectious diseases
Sue Charman

Drug Delivery, Disposition and Dynamics
Theme Leader: Michelle McIntosh
Deputy: Kristian Kempe

Biopharmaceutics
Natalie Trevaskis, Ben Boyd, Chris Porter, Michelle McIntosh, Colin Pouton

Antimicrobial resistance
Cornelia Landersdorfer

Structured materials in drug delivery
Ben Boyd

Respiratory drug delivery
Michelle McIntosh, Pete Lambert

Blood-brain barrier in neurodegeneration
Joe Nicolazzo

mRNA delivery
Colin Pouton, Angus Johnston, Natalie Trevaskis, Jie Tang, Michelle McIntosh

Nanomaterials for biology
Angus Johnston, Jie Tang

Macromolecular therapeutics
John Quinn, Kristian Kempe, Michael Whittaker

Anti-infectives and pharmacometrics
Cornelia Landersdorfer

Lymphatic medicine
Natalie Trevaskis, Chris Porter, Enyuan Cao

Nanomaterials, biosensors and drug delivery
Nico Voelcker

Malaria metabolomics and proteomics
Darren Creek

Global health
Darren Creek, Michelle McIntosh, Ben Boyd, Pete Lambert

Centre for Medicine and Safety
Theme Leader: Simon Bell
Deputy: Emily Reeve

Aged care services
Simon Bell, Amanda Cross

Clinical Guidelines
Simon Bell

Deprescribing
Emily Reeve, Justin Turner

Health economics and policy evaluation
Zanfina Ademi

Health services research
Johnson George

Pharmacoepidemiology
Jenni Ilomäki, Richeek Pradhan

Pharmacometrics
Carl Kirkpatrick

Pharmacotherapy
Michael Dooleyr

Associate Dean Research
Peter Scammells

Associate Dean Graduate Research
Joseph Nicolazzo

Enterprise & Engagement
Director: Russell Tait

Operations & Resources
COO: Rosemary Manning

Research & Graduate Research Office
Manager: Gaby Bright

Business Development Office
Manager: Julian Vultaggio

OUR GRADUATE RESEARCH STUDENTS

Graduate research students – those studying for a PhD or Masters by research – make up almost 50% of MIPS researchers. They contribute enormously to our research efforts whilst undertaking training with our world-leading researchers. Our students in the graduating cohort have embarked on varied careers across the globe – undertaking postdoctoral research fellowships at universities including Harvard, Hong Kong, Nottingham, and Oxford, working in scientific and clinical roles in industry including CSL, ThermoFisher and myDNA Life, and some haven't gone quite so far afield and are working here in Melbourne at various sites including the Murdoch Children's Research Institute, WEHI and MIPS.

Congratulations to all 49 of the graduates of 2025

DOCTOR OF PHILOSOPHY

JANUARY

Dr Shao Qian Tan
Drug repurposing using real-world data: a pharmacoepidemiologic approach
Associate Professor Jenni Ilomäki, Dr Jedidiah Morton
Centre for Medicine Use and Safety

Dr Jiyuan Che
Novel GPR52 Agonists for the Treatment of Schizophrenia
Associate Professor Ben Capuano, Professor Christopher Langmead, Dr Michelle Camerino
Medicinal Chemistry

FEBRUARY

Dr Zijun Lu
New Approaches to Treat Organ Failure via Inhibition of Pancreatic Enzymes in the Gut and Gut Lymph
Associate Professor Natalie Trevaskis, Dr Sanjeevini Babu Reddiar, Professor Christopher Porter, Professor Benjamin Boyd
Drug Delivery, Disposition and Dynamics

Dr David Nash
Targeting the sympathetic nervous system to reduce the progression of breast cancer
Professor Mark Febbraio, Dr Lauren Terry
Drug Discovery Biology

MARCH

Dr Ellie Ponsonby-Thomas
Investigating human milk as a lipid-based formulation for the delivery of poorly water-soluble drugs in paediatric populations
Professor Benjamin Boyd, Dr Malinda Salim, Professor Donna Geddes (University of Western Australia)
Drug Delivery, Disposition and Dynamics

Dr Dina Abushanab
Epidemiological And Economic Modelling Of The Management Of Diabetes And Cardiovascular Disease In Australia And Qatar
Professor Zanfina Ademi Delaney, Associate Professor Daoud Al-Badriyeh (Qatar University), Professor Danny Liew (The University of Adelaide)
Centre For Medicine Use & Safety

Dr Leonie Picton
Medication use and health outcomes in people living with dementia and chronic comorbidities
Associate Professor Jenni Ilomäki, Associate Professor Johnson George
Centre For Medicine Use & Safety

Dr Louise Lord
Medication burden in people living with cystic fibrosis: a focus on mental health and opportunities for change
Associate Professor Jenni Ilomäki, Dr Justin Turner, Dr Emily Reeve, Associate Professor Tom Kotsimbos, Associate Professor Sue Kirsa (Monash Health)
Centre For Medicine Use & Safety

APRIL

Dr Ali Esfandiary
Biomarker Discovery in Parkinson's Disease; A Focus on the Diagnostic Value of the Sphingolipid Pathway in Early-stage Diagnosis
Dr David Rudd, Professor Nicolas Voelcker, Professor David Finkelstein (Florey Institute of Neuroscience and Mental Health)
Drug Delivery, Disposition and Dynamics

Dr Xiangyan Yi
Novel Signalling at Immunomodulatory GPCRs: Development of Small Molecules as Probes and Drug Candidates
Professor Rebecca Ritchie, Dr Chengxue Helena Qin, Dr Amandeep Kaur, Dr Annaliese Dillon
Drug Discovery Biology

Dr Asuka Takanashi
Designing mRNA formulations for vaccine development
Professor Colin Pouton, Dr Harry Al-Wassiti
Drug Delivery, Disposition and Dynamics

Dr Rie Nakao
Understanding IRAP inhibition using diverse substrates, inhibitors and mutagenesis
Professor Philip Thompson, Associate Professor David Chalmers
Medicinal Chemistry

Dr Tsz Fung Pun
Applying and Improving Off-rate Screening by SPR in the Development of FABP4-selective Chemical Probes
Professor Martin Scanlon, Dr Anitha Kopinathan, Dr Luke Adams
Medicinal Chemistry

MAY

Dr Cameron Fairweather
Exploring the Structure and Dynamics of Amylin Receptors
Dr Tracy Josephs, Dr Cindy Zhang, Professor Patrick Sexton
Drug Discovery Biology

JUNE

Dr William Parsons
Controlled assembly of macro- and supramolecular cyclic peptide nanotubes
Associate Professor David Chalmers, Professor Philip Thompson
Medicinal Chemistry

Dr Chantel Mastos
Developing an optogenetic system to study the spatial compartmentalisation of GPCR signalling
Associate Professor Michelle Halls, Professor Erica Sloan, Associate Professor Lauren May
Drug Discovery Biology

JULY

Dr Stella Jung-Hyun Kim
Patterns of antiseizure medication use and related health outcomes in people with ischaemic stroke: Pharmacoepidemiological analysis of real-world data
Associate Professor Jenni Ilomäki, Dr Clara Hernandez
Centre For Medicine Use & Safety

Dr Peije Pepijn Russell
Theranostic Porous Silicon Nanoparticles for the Diagnosis and Treatment of Thrombosis
Professor Nicolas Voelcker, Dr Lars Esser, Professor Christoph Hagemeyer, Associate Professor Karen Alt
Drug Delivery, Disposition and Dynamics

Dr Thu Anh Hoang
Evaluating the lymphatic transport of therapeutics from the brain in health and neuroinflammation
Professor Natalie Trevaskis, Professor Joseph Nicolazzo
Drug Delivery, Disposition and Dynamics

AUGUST

Dr Isabella Russell
Taking advantage of constitutive activity for structural determination of ligand free GPCRs
Professor Patrick Sexton, Professor Denise Wootten, Dr Cindy Zhang, Dr Matthew Belousoff
Drug Discovery Biology

Dr John Jackson
The impact of Government policy and the regulatory environment on pharmacists' practice in community pharmacy in Australia
Professor Carl Kirkpatrick, Professor Michael Mintrom, Associate Prof Shane Scahill (University of Auckland)
Centre For Medicine Use & Safety

Dr Travis Lay
Towards peptide oral bioavailability - Design and synthesis of active, membrane permeable and stable peptides
Associate Professor David Chalmers, Professor Philip Thompson
Medicinal Chemistry

Dr Cheng Peng
Fine-tuning Formylpeptide Receptor 2 Activation: Signalling Bias and Ligand Binding Mode
Dr Chengxue Helena Qin, Professor Rebecca Ritchie, Dr Elva Zhao, Dr Liz Vecchio
Drug Discovery Biology

Dr Zahra Abousalman Rezvani
Polymer Grafted Porous Silicon Particles for Cancer Therapy
Professor Nicolas Voelcker, Dr Pouya Dehghankelishadi, Dr Lars Esser
Drug Delivery, Disposition and Dynamics

SEPTEMBER

Dr Lara Molle
Understanding the Cellular Internalisation of Antibody Therapeutics using Novel Sensors
Associate Professor Angus Johnston, Dr Daniel Yuen
Drug Delivery, Disposition and Dynamics

Dr Bryce Barber
An investigation into 3D printed polymer-lipid hybrid systems for personalised drug delivery
Professor Benjamin Boyd, Emeritus Professor George Simon, Mr Philippe Caisse (Gattefossé)
Drug Delivery, Disposition and Dynamics

Dr Annabel Manoleras
The role of the sympathetic nervous system in chemotherapy efficacy in metastatic triple-negative breast cancer
Professor Erica Sloan, Dr Aeson Chang, Associate Professor Delphine Merino (Olivia Newton John Cancer Research Institute)
Drug Discovery Biology

Dr Narges Sadat Mahdavian
Defining Cellular Changes in the Colon in Hirschsprung Disease
Associate Professor Daniel Poole, Dr Simona Carbone, Dr Pradeep Rajasekhar, Associate Professor Sebastian King (Royal Children's Hospital)
Drug Discovery Biology

Dr Nicole Warne
Semi-Crystalline Poly(cyclic imino ether) Nanorods for Drug Delivery Applications
Associate Professor Kristian Kempe, Dr Orlagh Feeney
Drug Delivery, Disposition and Dynamics

Dr Owindeep Singh Deo
The Design, Synthesis and Evaluation of Novel (delta)-Opioid Receptor Allosteric Ligands
Professor Peter Scammells, Associate Professor David Thal, Dr Manuela Jörg, Associate Professor Ben Capuano
Medicinal Chemistry

OCTOBER

Dr Nabila Akhtar
Nucleic acid vaccines: improving the efficiency and delivery mechanism
Professor Colin Pouton, Associate Professor Angus Johnston
Drug Delivery, Disposition and Dynamics

Dr Scott Peng
Functional importance of crosstalk between G protein-coupled receptors and the Transient Receptor Potential Vanilloid 4 (TRPV4) ion channel in endothelial cells
Associate Professor Nicholas Veldhuis, Associate Professor Daniel Poole
Drug Delivery, Disposition and Dynamics

Dr Xiaomeng Xu
Beyond the Gene: Understanding the Ras Master Regulator Neurofibromin (NF1)
Associate Professor Michelle Halls, Dr Alastair Keen
Drug Discovery Biology

Dr Cameron Smyth
Phage Display and Next-Generation Sequencing-Enabled Selection of Synthetic Nanobodies for Targeted Nanoparticle Delivery
Associate Professor Angus Johnston, Dr Daniel Yuen
Drug Delivery, Disposition and Dynamics

Dr Ya Su
The Development of Xanomeline-based Bitopic Ligands Targeting M4 Muscarinic Acetylcholine Receptor as a Potential Treatment for Neurological Disorders
Professor Peter Scammells, Associate Professor Ben Capuano, Associate Professor Celine Valant
Medicinal Chemistry

Dr Boqun Liu
The Development of Novel Muscarinic Acetylcholine Receptors Ligands as Potential Antipsychotic Agents
Professor Peter Scammells, Associate Professor Ben Capuano, Associate Professor Celine Valant
Medicinal Chemistry

Dr Joel Syphers
Rational Design and Synthesis of Selective Macrocyclic WEE1 Inhibitors with Strong Efficacy against Patient-Derived Colorectal Cancer Organoids
Dr Daniel Priebbenow, Dr Kieran Stockton
Medicinal Chemistry

Dr Muhammad Bilal Hassan Mahboob
Cationic lipidated oligomers (CLOs) as multifunctional antimicrobial agents: structural innovation and mechanistic insights via metabolomics
Dr Michael Whittaker, Associate Professor Cornelia Landersdorfer, Associate Professor John Quinn, Dr Jessica Tait
Drug Delivery, Disposition and Dynamics

NOVEMBER

Dr Ting Fu
Formylpeptide receptor regulation in cardiopulmonary disease
Dr Chengxue Helena Qin, Dr Elva Zhao, Professor Rebecca Ritchie, Associate Professor Barbara Harper
Drug Discovery Biology

Dr Herodion Adiwignyo Hartono
Watching the Elusive: Elucidation of Transient Events in Molecular Dynamics Simulations
Associate Professor David Chalmers, Dr Daniel Scott (The Florey)
Medicinal Chemistry

Dr Alex Parker
Mitochondrial-Targeted Therapies Limit Structural and Functional Changes in Diabetic Cardiomyopathy
Professor Rebecca Ritchie, Dr Miles De Blasio, Dr Max Shiang Y Lim (St Vincent's Institute), Dr Jarmon Lees (St Vincent's Institute)
Drug Discovery Biology

Dr Abisola Ave-Maria Siedoks
Identification, Structure and Function of Peptides with Therapeutic Potential
Professor Raymond Norton, Professor Martin Scanlon
Medicinal Chemistry

Dr Weishuai Ma
Prediction of Membrane Permeation by Parallel Cascade Selection Molecular Dynamics
Associate Professor David Chalmers, Professor Geoff Webb
Medicinal Chemistry

DECEMBER

Dr Scott Wong
The Development of Novel Biased Allosteric Ligands of the Metabotropic Glutamate Receptor Subtype 5
Associate Professor Ben Capuano, Associate Professor Karen Gregory, Professor Peter Scammells
Medicinal Chemistry

Dr Terrance Lam
Spatial Encoding of β_2-adrenoceptor Signalling in Triple-Negative Breast Cancer
Assoc Professor Michelle Halls, Professor Erica Sloan, Dr Aeson Chang
Drug Discovery Biology

Dr Zhe Chen
Precision Delivery of mRNA Therapeutics via Optimally Oriented Antibody-Targeted Lipid Nanoparticles
Associate Professor Angus Johnston, Dr Daniel Yuen
Drug Delivery, Disposition and Dynamics

Dr Qinghao Ou
Structural insights into GLP-1R and GIPR co-agonism
Professor Denise Wootten, Professor Patrick Sexton, Dr Fabian Bumbak, Dr Matthew Belousoff
Drug Discovery Biology

Dr Katayoun Nazemi
New redox-active materials for manipulating cell signaling processes
Associate Professor John Quinn, Dr Michael Whittaker, Dr Francesca Ercole, Associate Professor John Quinn
Drug Delivery, Disposition and Dynamics

MASTER OF PHILOSOPHY

Dr Bhavesh Patel
Compatibility of injectable oxytocin and tranexamic acid: Exploring the possibilities for co-administration
Professor Michelle McIntosh, Dr David Rudd
Drug Delivery, Disposition and Dynamics

FINANCIAL SNAPSHOT

	2024	2025
Revenue	$'000s	$'000s
Australian Government (includes MRFF and infrastructure)	37,003	46,139
Victorian Government	212	8
Other Australian Competitive grants	3,133	3,141
Australian contracted research	10,190	12,668
Donations - research, scholarships and other	668	705
HDR Student fees	4,305	5,000
International grants and contracted research	8,159	5,105
Total	**63,670**	**72,765**
	2024	2025
Expenditure	$'000s	$'000s
Direct research costs - salary, consumables and collaborations	50,462	55,987
Directorate management and business development	3,919	4,184
University overheads (legal, IT, finance, etc)	12,061	11,781
Space and infrastructure	11,718	13,897
Student scholarship costs	8,358	8,481
Total	**86,519**	**94,329**

Revenue

- Australian Government (includes MRFF and infrastructure)
- Victorian Government
- Other Australian Competitive grants
- Australian contracted research
- Donations - research, scholarships and other
- HDR Student fees
- International grants and contracted research

Expenditure

- Direct research costs - salary, consumables and collaborations
- Directorate mgmt. and business development
- University overheads (legal, mgmt. IT, Finance, etc)
- Student scholarship costs
- Space and infrastructure

MONASH University

MONASH INSTITUTE OF PHARMACEUTICAL SCIENCES

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