MONASH University

MONASH
PHARMACY AND
PHARMACEUTICAL
SCIENCES

Alchemy

Changing of the Guard

Meet our new Dean

Going Global: The faculty's increasingly international face

John and Nariel Ware endow new scholarship

Alumni news

ISSUE 34 • SUMMER 2019/20

MONASH University

Fast Facts

2017 CLARIVATE ANALYTICS HIGHLY CITED RESEARCHERS (2004–2014)

No.1 worldwide in Pharmacology and Toxicology

QS WORLD UNIVERSITY RANKINGS BY SUBJECT, PHARMACY AND PHARMACOLOGY

No.1 in Australia and Asia-Pacific 2018
No.1 worldwide for academic reputation 2018
No.2 worldwide 2018
Top 10 worldwide (average 2011–2018)

Excellence in Research for Australia 2015

Top rating of 5 in all sectors (well above world standard)

PharmAlliance

with University of North Carolina at Chapel Hill, US
and University College London, UK

National Alliance for Pharmacy Education

with University of Queensland, University of Sydney
University of South Australia

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Contents

Alchemy is produced by the Development Office, Faculty of Pharmacy and Pharmaceutical Sciences, Monash University.

Managing Editor: John Palmer

Writers: Rahul Ratwatte, Cyndi Ferguson, Divya Krishnan

Design: BPO Intelligence

Photography: Paul Philipson and Greg Ford

Contact us:
John Palmer
Marketing Manager
john.palmer@monash.edu

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Views expressed in *Alchemy* are those of the authors and persons quoted and are not necessarily those of the Monash Faculty of Pharmacy and Pharmaceutical Sciences, Monash University.

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MONASH University

Fast Facts

ANNUAL QS WORLD UNIVERSITY RANKINGS BY SUBJECT, PHARMACY AND PHARMACOLOGY

Top 3 Worldwide (2017, 2018, 2019)

No. 1 Pharmacy School Worldwide (2016, 2017, 2018, 2019)

No. 1 for Academic Reputation Worldwide (2016, 2017, 2018, 2019)

CLARIVATE ANALYTICS / THOMPSON REUTERS HIGHLY CITED RESEARCHERS

Top 2 Worldwide for Pharmacology and toxicology (2016, 2017, 2018)

EXCELLENCE IN RESEARCH FOR AUSTRALIA 2015, 2018

Top Rating of 5 In all of our fields of research

49 ACADEMIC STAFF, 42 PROFESSIONAL STAFF, 215 RESEARCH-ONLY STAFF, 240 PHD STUDENTS

Australia's only integrated Bachelor and Master of Pharmacy program: Making healthcare better

Revitalised Bachelor of Pharmaceutical Science program: Advancing biotech/pharma industries

Experiential Development and Graduate Education unit (EDGE): Advancing lifelong learning

Australia's premier Pharmaceutical Sciences PhD program: Training tomorrow's research leaders

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News *in* brief

Rebecca Ritchie *new head* of DDB

Leading cardiovascular disease researcher Professor Rebecca Ritchie has been appointed the new Theme Leader of the Drug Discovery Biology Theme at MIPS.

Professor Ritchie is an NHMRC Senior Research Fellow and was previously Head of the Heart Failure Laboratory at the Baker Heart and Diabetes Institute.

She replaces former Theme Leader, Professor Arthur Christopoulos, who stepped down from the position to assume his new role as Dean of the Faculty of Pharmacy and Pharmaceutical Sciences in August of this year.

A graduate of the Dept of Medicine (Cardiology) at the University of Adelaide under the supervision of Professor John Horowitz, Professor Ritchie's PhD focussed on predictors of myocardial function *in vivo* in patients with coronary heart disease, including development of the first quantitative model of the force-interval relationship in human myocardium.

Her postdoctoral training (with Prof James Marsh in the Program of Molecular and Cellular Cardiology at Wayne State University, 1995–1997, USA) and the Florey Institute (with Prof Greg Dusting, 1997-2002) led to her recruitment to the Baker Heart and Diabetes Institute (from late 2002).

Paul White new *deputy dean*

Longtime Associate Dean of Education Paul White has been named the new Deputy Dean.

Professor White joined the Faculty in 1998 as an Assistant Lecturer and has contributed to the Faculty's education and research missions over the past 21 years. He has worked with other Faculty leaders to transform teaching and learning, and this has been acknowledged via receipt of national teaching awards from the Australian Government Office for Learning and Teaching and the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists, in addition to the Vice Chancellor's Award for Teaching Excellence in 2014.

His education research has informed the Faculty's approaches to learning and has been highly cited. In addition to his contributions to education scholarship, Professor White has co-led a research group with Dr Lauren May that continues to shed new light on GPCR signalling in cardiovascular disease, identifying compounds that produce cardioprotection with substantially reduced adverse effects.

His work in this space has been published in top tier journals, including PNAS and Pharmacology and Therapeutics, as well as attracting substantial funding support from the NHMRC. Professor White has supervised 15 PhD students to completion.

He will maintain his portfolio as Associate Dean, Education.

Above left: *Professor Rebecca Ritchie*
Above right: *Professor Paul White*

Monash University *world rankings*

The Monash Institute of Pharmaceutical Sciences has again received excellent results in the latest Excellence in Research for Australia (ERA) rankings.

The ERA process assesses the quality of research conducted at all Australian higher education institutions. The rankings provide an international benchmark by which to measure discipline expertise, and research quality and environment.

The Faculty has received the highest score of 5 in all its major disciplines: Medicinal and Biomolecular Chemistry, Nanotechnology, and Pharmacology and Pharmaceutical Sciences. The score of 5 denotes a research output that is well above world standard.

The latest rankings mean that MIPS has maintained the ranking it attained in 2015, having received 5 out of 5 in all four digit code disciplines, confirming its position as a world leader in its key research fields.

Monash University ranked #1 Pharmacy program, top 3 in the world, for Pharmacy and Pharmacology

The most recent QS World University Rankings by Subject have ranked Monash University in the top three in the world in Pharmacy and Pharmacology, making it the number one ranked Pharmacy program. In the academic reputation category, Monash University again received a perfect score of 100.

The QS Rankings assess the world's best universities across five broad fields and 48 subject areas. Using quantitative and qualitative analysis, the rankings take into account academic reputation, employer reputation, staff productivity and citation impact.

Pharmacy *students collaborate* to improve patient safety

Australian dialysis patients are now at lower risk of medication errors thanks to the efforts of a group of Monash pharmacy students.

The students were completing an assignment set by practitioner-educator Steven Walker from Austin Health when they noticed that the Australian Medicines Handbook ("AMH") entry for the common ACE inhibitor perindopril contained advice that conflicted with a general principle they had learned earlier in the unit.

The AMH entry advised that patients who had been prescribed perindopril should take the medication on the same day as they undergo dialysis. This advice conflicts with the general principle that medications that lower blood pressure should not be administered prior to dialysis.

The students raised the matter with Mr Walker, who referred their concerns to the Nephrology group of the Society of Hospital Pharmacists of Australia. The Nephrology group and the University then jointly brought the error to the AMH's attention.

The latest edition of the AMH, published in July 2019, has been updated to remove this recommendation.

"This is a great example of the pharmacy community coming together to improve patient safety," said Mr Walker. *"It reflects really well on the AMH, who revised the information promptly once it was bought to their attention."*

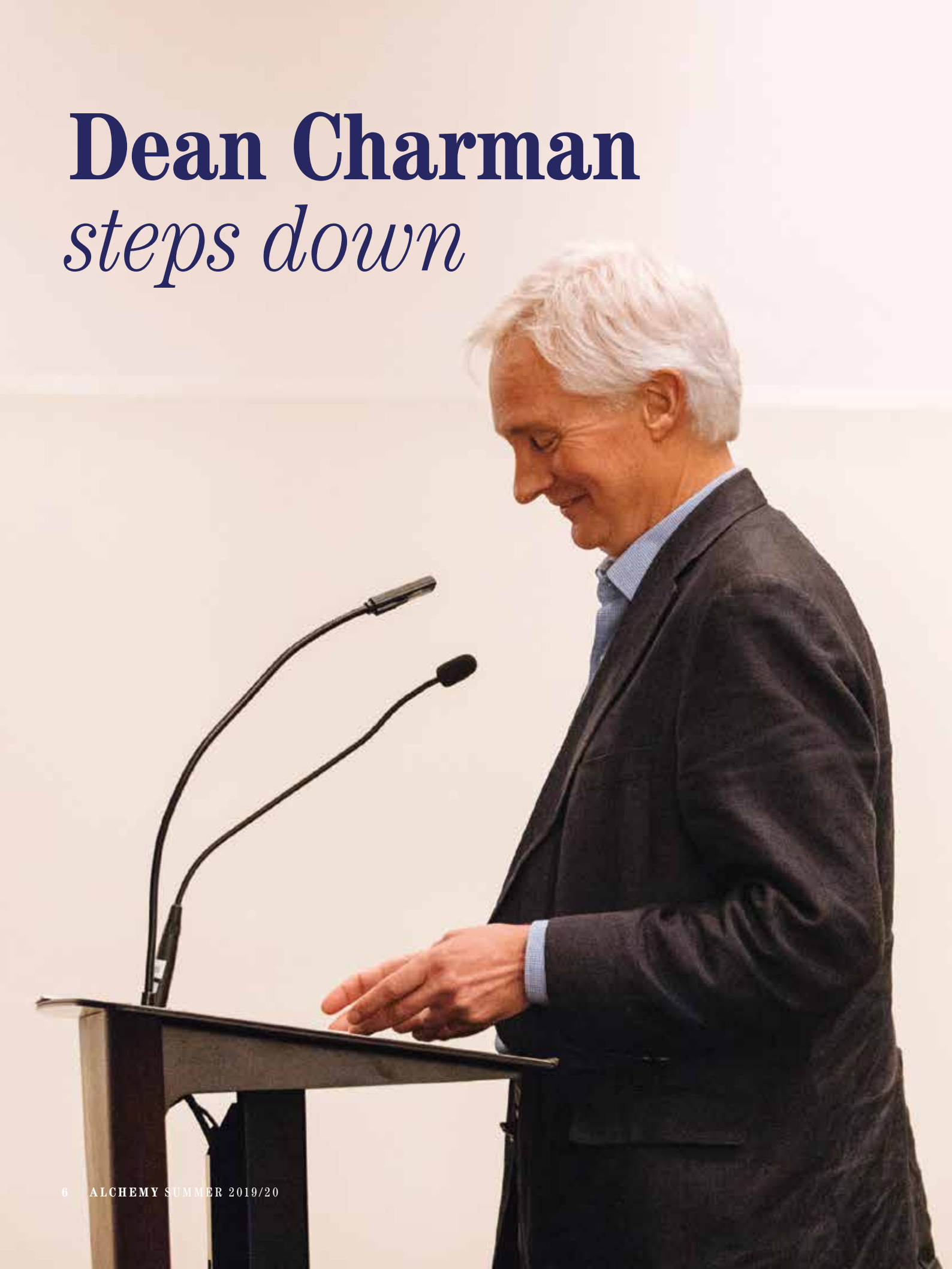
"I'm also extremely proud of our students. Once they had identified this confusing statement, they assumed they had a duty to remediate it, which reflects a strong sense of professional identity. Less than two years into their degree, they already understand that the role of the pharmacist is not simply to endorse the script in front of them, but to promote patient safety more holistically," he said.

The Monash Director of Pharmacy Education, Professor Tina Brock, confirmed that this sense of professional duty is something the course deliberately inculcates.

"From day one, we emphasise to our students that they are pharmacists in training," she said. *"Our course focuses heavily on skills development including having dedicated skills coaches who help students hone their abilities in areas like oral and written communication. We also partner closely with our practitioner community to provide almost 100 days of placement across the degree. This ensures students see first-hand how pharmacists influence the care model – as individuals and in teams."*

Above: *Stephen Walker*

Dean Charman *steps down*



In characteristically self-effacing fashion, he didn't want a fuss.

But on a Friday afternoon at the end of May, Professor Bill Charman attended a small farewell celebration to mark the end of nearly 13 years as the Dean of the Monash Faculty of Pharmacy and Pharmaceutical Sciences.

In a series of brief speeches, staff including Associate Professor Joe Nicolazzo and incoming Dean Professor Arthur Christopoulos paid tribute to Professor Charman's attributes as a leader and mentor.

During a short but at times emotional address, Professor Charman reflected upon the unique culture of the faculty, and attributed its successes to date to a combination of talent and generosity of spirit.

Professor Charman – who has long been cited as one of the world's top 1% of researchers in Pharmacology and Toxicology in the annual Highly-Cited Researchers tables – will not be lost to the Faculty. He will be returning to his research career.

This page from top: *Professor Charman and his successor as Dean, Professor Arthur Christopoulos; Longtime collaborators Faculty General Manager Marian Costelloe and Professor Charman; Dean Charman's predecessors watch over the crowd. His portrait will be joining theirs by the end of 2019.*

Research *with* impact

Expert *testimony* into Aged Care

MIPS researcher provides expert testimony to Royal Commission into Aged Care Quality and Safety

The Centre for Medicine Use and Safety's Dr Janet Sluggett offered expert testimony at the Royal Commission into Aged Care Quality and Safety in Darwin.

The Commission has explored how healthcare professionals and aged care providers are caring for older Australians. A key area under scrutiny is medication management, and the appropriateness of medication regimens in residential aged care homes.

Dr Sluggett provided two hours of testimony at the Commission regarding medication management at these facilities. Her testimony referenced the research being undertaken at CMUS, focusing on medication management and the use of high risk medications. By partnering with aged care providers, CMUS aims to offer solutions in this area.

As an NHMRC Early Career Fellow at CMUS, Dr Sluggett is leading the development of innovative models of care for this demographic.

Dr Sluggett has received numerous awards for her research, most recently the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT) Certara New Investigator Award in 2018.

Above: Dr Janet Sluggett

MIPS *research* licensed

Technology based on Monash research licensed by PureTech Health to Boehringer Ingelheim

Technology developed at MIPS and recently licensed to PureTech Health (PRTC) will be researched in collaboration with Boehringer Ingelheim to develop novel immuno-oncology product candidates.

The collaboration will employ the proprietary lymphatic targeting platform that PRTC licensed from Monash University, and is now developing through its internal R&D division.

The approach harnesses the gut's lipid transport mechanisms to enable oral administration and transport of drug candidates directly through the gut-draining lymphatic vasculature, also bypassing first pass metabolism in the liver. By targeting the lymphatic system directly, the technology has the potential to achieve more effective and precise immunomodulation of local tissues, while sparing the patient adverse effects of extensive systemic exposure.

Under the terms of the agreement, PRTC will receive up to $26 million, including upfront payments, research support, and preclinical milestones, and is eligible to receive more than $200 million in development and sales milestones, in addition to royalties on product sales, whilst MIPS will receive a specified revenue stream.

"This collaboration signals the exciting potential of another proprietary platform from our internal R&D to enable novel immunotherapy approaches," said Daphne Zohar, co-founder and CEO of PRTC. *"We're pleased to continue our collaboration with MIPS as we advance this technology platform from the laboratory to the clinic."*

Optimising *medication* use

PharmAlliance project evolves into new international data science network to optimise dementia medication use

The Centre for Medicine Use and Safety (CMUS) has participated in and led discussions at a new international collaboration of data scientists called the Neurodegenerative Diseases Global Epidemiology Network (NeuroGEN).

NeuroGEN harnesses the power of big data to generate new, high quality evidence related to the benefits and risks of medication use in people with dementia and other neurodegenerative diseases.

Meeting at University College London in August 2019, the NeuroGEN collaboration now includes representatives from the disciplines of pharmacy, neurology, geriatrics, cardiology, health economics, social sciences, biostatistics and epidemiology. NeuroGEN participants originate from all across the world.

"Bringing together data and researchers from across the world creates new possibilities to share expertise and make a global impact," said CMUS Research Fellow Dr Jenni Ilomaki, who was appointed the inaugural Convenor of NeuroGEN.

NeuroGEN evolved out of the International Pharmaceutical Informatics Initiative (IPI2): Big Data Research Platform, which was originally funded through a PharmAlliance scheme. The Platform has received subsequent funding through the Victorian Medical Research Acceleration Fund and Dementia Australia Research Foundation – Yulgilbar Innovation Grant.

PharmAlliance is a partnership between three of the world's most highly-regarded pharmacy schools – Monash University, University College London and the University of North Carolina at Chapel Hill.

Opportunities in *drug development*

New fellowships help pharmacists make the leap from practice to drug development

In collaboration with global leader in model-informed drug development Certara, the Faculty has announced the recipients of the inaugural Certara-Monash University Industry Drug Development Fellowships: Dr. Katrina Hui, Dr. Yu-Wei Lin, and Dr. Zheng Liu.

The fellowship program is designed by Monash University and Certara to help prepare the next generation of industry-experienced drug development scientists through training in clinical pharmacology, pharmacometrics and regulatory science, providing a combination of academic coursework, hands-on industry training, international industry/academic placements, and research.

"Model-informed drug discovery and development (MID3) strategy underpins all stages of contemporary drug discovery and development programs. MID3 provides a quantitative framework to improve decision making and reduce risk, and is used by global regulators to evaluate new drug submissions," said Leigh B. Farrell, PhD, FAICD, Senior Vice President, Commercial, at Certara.

"We are delighted to welcome our first fellows to the Certara-Monash University Industry Drug Development Fellowship Program. We have spent more than a year developing the curriculum for this new leadership program, ensuring that it contains the right mix of technical training, research, and real-world experience," said Director of the Monash Institute of Pharmaceutical Sciences, Professor Chris Porter.

Research launched *to tackle* fibrosis

Inosi Therapeutics (Inosi), a company based on Monash University research, has launched with an investment from IP Group and BioCurate. Formed to enhance the partnership of academia and industry partners, Inosi aims to align new therapy development programs with unmet patient and market needs around fibrosis.

Inosi's technology is based on collaborative research from members of Monash Biomedicine Discovery Institute and MIPS' Associate Professor Philip Thompson, with Monash Innovation leading the deal.

Fibrosis is closely associated with tissue injury and scarring that occurs with chronic diseases and is responsible for a large proportion of healthcare costs and mortality in developed countries.

'Superbug' drug *discovery*

US biopharmaceutical company licenses Monash University 'superbug' drug discovery

Monash University has granted an exclusive licence of its portfolio of proprietary synthetic polymyxin antibiotics to Qpex Biopharma, a US-based company developing new antibiotics to combat the growing threat of global antimicrobial resistance.

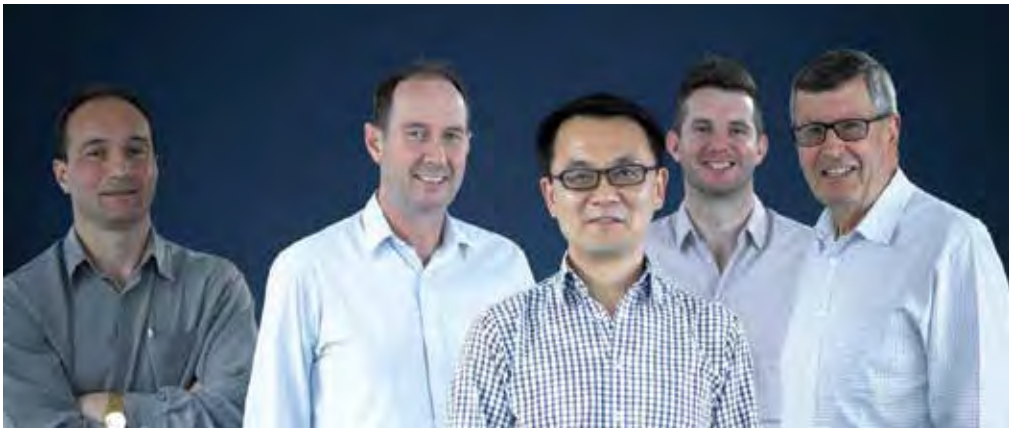
The novel polymyxin antibiotics have been developed by researchers at the Monash Institute of Pharmaceutical Sciences (MIPS) and the Monash Biomedicine Discovery Institute (BDI), led by Professor Jian Li, Associate Professor Tony Velkov, Professor Roger Nation, Dr Kade Roberts and Professor Philip Thompson.

The team has identified a promising lead candidate, which Qpex intends to take into a Phase 1 clinical trial.

The development of this new polymyxin is designed to meet an increasingly urgent healthcare need. By 2050, antimicrobial-resistant infections may kill 10 million people per year, and thus Gram-negative 'superbugs' are at the top of the list to counteract.

Due to their toxicity, no new polymyxins have been approved for use since 1950. Available polymyxin antibiotics are often the only option available to treat pathogens that are resistant to all other antibiotics, yet the adverse effects limit their clinical applications.

"The world desperately needs better polymyxins and our novel synthetic polymyxins show superior efficacy and safety over the existing polymyxin drugs in pre-clinical animal studies. We are thrilled with the partnership with Qpex which will now pursue the clinical development of these promising new polymyxin analogues," said Professor Li, who heads the Monash polymyxin drug development research.



Right: *Professor Jian Li, Associate Professor Tony Velkov, Professor Roger Nation, Dr Kade Roberts and Professor Philip Thompson*

Setting up the future generation: *the power of pharmacy education*

Pharmacy stalwarts and long-time friends of the Faculty John Ware OAM and Nariel Ware made the largest philanthropic gift to pharmacy education in contemporary times.

Mr and Mrs Ware have donated $1 million to support research into pharmacy education in perpetuity through the John and Nariel Ware Fellowship in Pharmacy Education and Leadership. The gift supports the Ware Fellowship program indefinitely, contributing substantially to the body of knowledge around pharmacy education and developing the pharmacy education leaders of the future.

The donation and scholarship were honoured earlier this year with a launch event held at the home of Victorian pharmacy education, Monash University's Cossar Hall. The launch recognised the Ware's contributions with the Faculty commissioning renowned Victorian artist Rosemary Todman-Parrant to paint a portrait of John Ware OAM and Nariel Ware which now hangs proudly in Cossar Hall with the Faculty's past Deans and benefactors.

John Ware OAM graduated from the Victorian College of Pharmacy in 1950. A community pharmacist for 40 years, John has an intimate understanding of why pharmacy education is so critical for the future. In fact, it was John himself who was integral in brokering the amalgamation of the Victorian College of Pharmacy into Monash University in 1992. His wife Nariel spent 14 years with the Victorian branch of the Pharmaceutical Society of Australia before becoming the Executive Secretary of the Western Pacific Pharmaceutical Forum for the International Pharmaceutical Federation (FIP).

The Ware Fellowship represents a significant investment into the future of the Australian pharmacy profession. The program supports a two-year postdoctoral position investigating best-practice curriculum development and teaching practices with a commitment to leadership in pharmacy education. These areas of focus reflect the Ware's lifetime commitment to the pharmacy sector, with much of their professional journeys dedicated to this purpose, with projects across the world in areas including pharmaceutical legislation, distribution and the broader pharmacy community.

In alignment with their global focus, a worldwide search was conducted in selecting the inaugural recipient of the Ware Fellowship, with Doctor Kayley Lyons from the University of North Carolina at Chapel Hill accepting the position earlier this year.

Doctor Lyons is a "double doctor", holding both Doctor of Pharmacy and Doctor of Philosophy degrees. Her thesis at PharmAlliance partner the University of North Carolina at Chapel Hill characterised student and group motivation during collaborative learning experiences. Her background in education and leadership demonstrates her alignment with one of the key facets of the Fellowship, building the capacity of future academic pharmacy leaders.

Doctor Lyons is currently evaluating the Faculty's BPharm (Hons)/MPharm course alongside Director of Pharmacy Education, Professor Tina Brock, and the education team. Doctor Lyons brings a breadth of experience in building models to better investigate collaborative behaviours in teaching, a valuable asset in evaluating the undergraduate degree, and working with key Monash University partners, the National Alliance for Pharmacy Education, PharmAlliance and FIP.

Left: *John Ware OAM and Nariel Ware*
Right: *The Ware Fellowship recipient Doctor Kayley Lyons*

Going *global*

The faculty's increasingly international face.

You can chart the scale of the faculty's ambitions by the various names it has held over the years.

In 1878, when John Kruse began offering courses from his home at 60 Hanover Street in Fitzroy, he called the nascent institution "The Fitzroy School of Chemistry and Pharmacy".

Three years later, when it received the official imprimatur of the Pharmacy Board of Victoria, it was renamed The Melbourne College of Pharmacy, then after WWI it expanded its remit to the whole state, becoming the Victorian College of Pharmacy.

When it amalgamated with Monash University in 1992, it was empowered to lift its gaze. Suddenly it could become a global player.

Monash had long established itself as the nation's most international university. It had embraced large numbers of Columbo Plan Scholars in the 1960s and '70s, then later international fee-paying students.

By the mid-90s it was already on the journey that would see it with campuses in Malaysia and South Africa, research institutes in China and India and a centre in Italy.

The College itself already had form, having shown an appetite for internationalisation with the establishment of the Intersearch program in the 1970s, a joint doctoral program with the University of Kansas.

Fast forward to 2019 and the Faculty of Pharmacy and Pharmaceutical Sciences has seen those seeds of internationalisation flower.

Nearly a third of our undergraduate students are international, from a diverse range of countries including New Zealand, Malaysia, Singapore, China, Vietnam, Indonesia and, recently, Canada.

Our staff is from an equally diverse range of nations including Portugal, Malaysia, the United States, France, Germany, New Zealand and the United Kingdom.

And our major collaboration as a faculty, PharmAlliance, is with two overseas universities: the United Kingdom University College London and the University of North Carolina in the United States.

All of this is only appropriate when you consider the international nature of many of the challenges we've set ourselves, from anti- microbial resistance to neglected diseases to maternal mortality.

That's why this issue we've decided to bring you a selection of short pieces that tell the stories of connections beyond Australia. There are graduates who've parlayed the education they received in Parkville into a career on the international stage. We also have insights from a group of undergraduate students visiting us from a PharmAlliance partner to get a taste of pharmacy downunder, interviews with a couple of the small but growing number of Canadian students attracted by our graduate entry pathway, and an update on the pharmacy program at Monash Malaysia.

Monash University Malaysia's School of Pharmacy *celebrates 10 years*

In May 2019, Monash University Malaysia marked the 10th anniversary of Monash Pharmacy Education in Malaysia.

The Pharmacy School celebrated a decade of the success by hosting a series of workshops and symposia aimed at improving pharmacy education.

The events brought together pharmacy instructors and academic managers from Australia, the United States, Philippines, Vietnam, Hong Kong, Singapore and Malaysia.

In addition to a medication review workshop and a symposium on advances and challenges in pharmacy education, two days was devoted to the first ever MyDispense Asia symposium.

MyDispense was developed by Monash University's Faculty of Pharmacy and Pharmaceutical Science in 2010 and has gone on to have a significant impact on teaching. The software is currently in use in over 70 institutions around the world.

It offers students a safe environment that simulates an actual community pharmacy.

Users have the opportunity to develop professional skills by practising and repeating the virtual dispensing exercises.

As part of the Asia symposium, Monash University Lecturer Vivienne Mak demonstrated how to introduce MyDispense into a curriculum and the group was the first in the region to see the latest release of the software. Chinese University of Hong Kong Lecturer Celeste Ewig and Monash University Malaysia Lecturer Saw Pui San tailored their presentations to the adaptability of MyDispense and how users can customise versions that are relevant to their country's healthcare system and pharmacy practice.

The group dynamic proved to be a huge success with participants saying the teams worked effectively together and the outcomes from the forum included plans to continue adapting the software to support pharmacy practice in Malaysia and the Philippines.

At top: *Professor Carl Kirkpatrick (centre) and outgoing-Dean Professor Bill Charman (far right) participate in a panel discussion*
At left: *Keith Sewell leads the MyDispense workshop*

Our international alumni

Former students with *careers* around the globe

Monash Director of Pharmacy Education Professor Tina Brock is fond of describing pharmacy as "…a degree of opportunity" – an educational pathway that provides a highly transferrable skill set.

It's no surprise then that many of our alumni have pursued careers that have taken them beyond Australia, making an impact on the global stage.

Here, we profile half a dozen former students who have ended up scattered around the world.

James Voo Yau Hon

Head of Drug Information Services Unit, Pharmacy Department, Duchess of Kent Hospital – Sabah, Malaysia.

James' role involves responding to drug information requests from doctors, pharmacists, nurses and patients. As part of the hospital's pharmacovigilance program James reports the incidents of adverse drug reactions and medication errors to Ministry of Health Malaysia each month.

James Voo Yau Hon's dream to study overseas became a reality when the Malaysian government awarded him a highly sought after scholarship to study Pharmacy in Australia in 2007.

"Without a doubt, I made up my mind to choose Monash University over other universities in Australia and have never looked back since."

He remembers being inspired by how passionate pharmacists were in making sure patients understand proper medication use.

One of James's best memories was being appointed President of Parkville International Student Association in third year and Monash University Student Ambassador the year after.

"Without all these rewarding leadership experiences, I would not have such a strong foundation to practice in my current pharmacy field," he says. *"I also met a lot of new friends around the world at the Parkville campus and I still keep in touch with them until now."*

After completing his degree in 2011 James returned to Malaysia to start his pharmacy career. He's worked as a clinical pharmacist across emergency, orthopaedic and medical wards at the Lahad Datu Hospital. He was appointed as the Head of Inpatient and Clinical

Pharmacy Unit before being transferred to Duchess of Kent Hospital in 2016. That year hereceived a Federal Training Award to study his Masters.

When he's not working James is an electric organ enthusiast. He also trained as a Doping Control Officer and is certified by the Anti-Doping Agency of Malaysia. He's been involved in the 2017 SEA Games in Kuala Lumpur and Malaysia Games XIX Perak in 2018.

So what's next? While James still has a lot he wants to achieve in his new position he says a PhD in Clinical Pharmacy would be his next academic goal. And a top priority is mentoring others in the profession.

"I will carry on spreading my passion as a pharmacist to the younger generation of pharmacists."

Special feature

Going *global*

Margaret Louey

Senior Technical Manager, Product Development and Regulatory Affairs, Clinton Health Access Initiative
– Raleigh-Durham, North Carolina, USA

Margaret Louey has been in her current role at Clinton Health Access Initiative (CHAI) for just over a year. CHAI is a non-profit organisation founded by US President Clinton in 2002 with the aim of helping save the lives of millions of people living with HIV/AIDS in the developing world. CHAI has now expanded its goals to include access to critical medicines and diagnostics for HIV/AIDS, TB, malaria and other diseases in low- and middle-income countries (LMICs).

One of Margaret's projects involves a private-public partnership between CHAI, an innovator company and two generic manufacturers for the development of a pediatric HIV drug product.

"The collaborative partnership will accelerate access to affordable and high-quality pediatric antiretroviral products in LMICs by reducing the gap between innovator and generic product approvals," Margaret Louey says.

After completing her Bachelor of Pharmacy degree at Monash University, Margaret worked in community and hospital pharmacies in London. She returned to Melbourne a couple of years later to do her honours and PhD at Monash.

After a move to the University of North Carolina (Chapel Hill) to do a post-doctoral fellowship Margaret began her 15 year career at GlaxoSmithKline (GSK). Margaret says her most significant role was leading the product development team for a low-cost dry powder inhaler product for the treatment of asthma and chronic obstructive pulmonary disease for low and middle-income populations. While working on this project, Margaret visited Jakarta to meet with patients and health-care providers.

"Sitting face to face with patients who were clearly suffering and not receiving adequate care and treatment for their diseases made me realise, firstly, how fortunate I was, and secondly, that I wanted to use my knowledge and experience to help to provide access to high-quality medicines in LMICs," she says.

Margaret's next career move to a non-profit organisation with her pharma background was challenging.

After unsuccessful job applications Margaret eventually secured a position in a corporate volunteering program at GSK. She moved back to Melbourne for a six month placement with Save the Children in 2017 and really learned how the non-profit sector works.

"This role took me outside of my comfort zone; it broadened my view and made me realise that I had transferable skills beyond my technical drug development background."

So what's next? Margaret says she's really happy in her current job at CHAI and her goal is to contribute positively to strengthening global health.

"I feel extremely excited and fortunate to have this role. Not only am I working on a project that will have a huge impact by filling unmet medical needs in LMICs, I am continuing to learn and grow professionally."

Our international alumni

Yee Ming Lee

Assistant Professor, Department of Clinical Pharmacy, University of Colorado Skaggs – Aurora, Colorado, USA.

Yee Ming Lee's clinical practice focuses on the implementation of pharmacogenomic drugs.

"Pharmacogenomics is a subset of Precision Medicine that looks at how an individual's genetic variation affects his/her drug response." Yee Ming says physicians can use this pharmacogenomic information in addition to patient's clinical factors to determine which drug/dose to prescribe and determine which drugs to avoid.

After obtaining her Bachelor of Pharmacy, Honors followed by Master of Pharmaceutical Science from Monash University Victorian College of Pharmacy, Yee Ming returned to Singapore in 2001 to practice as a clinical pharmacist at Alexandra Hospital.

Her next move was to the University of Illinois, Chicago to start a PharmD. After completing a Post-Graduate Year One (PGY1) Pharmacy Practice residency Yee Ming was offered the opportunity to change her career path and become the first pharmacy resident of a Pharmacogenomics Specialty residency at the university. This led to a Fellowship in Clinical Pharmacology and Pharmacogenomics at the University of Chicago.

"I had a keen interest to translate clinically actionable pharmacogenomics research into clinical practice to impact patient care," she says.

Towards the end of the fellowship program Yee Ming realised there weren't a lot of jobs on offer in this emerging field. It was at that time, the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences offered Yee Ming an academic position that combined both research and teaching.

"I am very grateful for this unexpected entrance into academia," she says. *"It allowed me to pursue not only my clinical interest to practice translational medicine but the new pharmacy world of academia."*

Yee Ming says both her formal pharmacy education at Monash University and hospital work have equipped her with the breadth of clinical knowledge and experience to make this career change into pharmacogenomics.

Yee Ming says she has many fond memories of time at the Pharmacy College, even if they do make her sound old.

"Those were the days where the lecturers used transparencies and wrote on the multiple panels of chalkboards. PowerPoint did not exist then and computers were being introduced. This may sound ancient."

As for the future, Yee Ming is excited about the possibilities of pharmacogenomics and wants to inspire other students and pharmacists to embrace it in their clinical practice.

Special feature

Going *global*

Natalie Tolli

Vice President, Regulatory Policy and Intelligence, AbbVie's – Libertyville, Illinois, USA

Natalie began her career with the global research and development-based biopharmaceutical company headquartered in North Chicago, Illinois in 2000.

"Most of my tenure with the company has been in the Regulatory Affairs function, which is the group responsible for managing submissions and approvals to health authorities around the world for all of AbbVie's products."

Since 2018 she has also led the company's Area and Affiliate regulatory team for the Eastern Europe/Middle East/Africa, Latin America and Japan/Asia Pacific regions.

Policy and intelligence team members, located in the US, the UK, Singapore and Dubai work with subject matter experts within AbbVie, and with peer pharmaceutical companies with the aim of improving the regulatory environment.

After finishing her studies at Monash University and registering as a pharmacist in 1990, Natalie worked as a hospital pharmacist at the Royal Melbourne Hospital and at the Peter MacCallum Cancer Institute. In 1997, she took up an opportunity to study in the United States and complete a Fellowship in Pharmacy Practice.

Natalie Tolli's two years in academia in the US gave her an opportunity to complete a Masters degree in Preventive Medicine and Environmental Health which included a research project on the utilization of G-CSF in patients with non-Hodgkins Lymphoma and breast cancer.

Natalie says the knowledge she gained through her university studies on drug development and research skills really set her up for her current global role.

"But the most valuable skill that my pharmacy education has taught me has been to approach problem-solving with a solution-oriented mindset," she says.

Natalie fondly remembers many of her fellow students and professors and looks forward to seeing them at a future reunion.

"I am also very proud of the heritage of the Pharmacy College and the notable therapies that were discovered there, including Relenza."

So what's next? Natalie Tolli says she's enjoying her current role and the challenges it brings but her passion is helping the next generation of regulatory affairs professionals. Natalie is a mentor to several of AbbVie's younger up-and-coming team members.

"I am passionate about using my past experience to help others develop and grow."

Special feature

Going *global*

Basu Charkrabarty

Research Associate, University of Bristol – Bristol, United Kingdom

Now undertaking research to better understand bladder disease at the School of Physiology, Pharmacology, and Neuroscience, at the University of Bristol, Basu is triple Monash graduate, with a BPharmSci, a PharmSci(Hons) and a PhD all from at Monash Parkville.

Basu completed his PhD in the Drug Discovery Biology theme, where he learnt to undertake basic science research with a constant clinical perspective, collaborating with a multi-disciplined team.

Basu is working on a collaborative project in association with the University of Pittsburgh, United States. His focus is on understanding peripheral and central control of bladder function, and the changes that occur with bladder dysfunction. He is also investigating the effects of clinical drugs and novel compounds using various experimental methods and models of bladder disease.

During his PhD, Basu presented at conferences, worked as a teaching associate, and was actively engaged in extracurricular activities, all of which enhanced his professional development.

Lauren Boak

Business Manager, Product Development Neuroscience, Roche – Basel, Switzerland

After graduating from Monash in 2007, and publishing three manuscripts in highly regarded international journals, Lauren joined F. Hoffmann-La Roche, Switzerland as a Clinical Science Specialist. Other than six months back in Melbourne for CSL, in the Clinical Safety department, she has worked for Roche in both Switzerland and the United Kingdom ever since.

Based in Basel, Switzerland, Lauren worked for five years in the Translational Medicine Group in Neuroscience as lead Clinical Scientist, developing and implementing clinical study protocols for projects in treatment resistant depression, autism, and schizophrenia. She is now in Product Development Neuroscience as a Business Manager, and working in the Roche Partnering organisation to scope external innovation to bring into the company.

Lauren's work gives her opportunities to work on potentially transformative medicines and develop experience across multiple fields. She enjoys working with incredibly talented people with an unfaltering focus on making a real difference for patients with devastating illnesses.

North Carolina calling: *five minutes* with our international partners

It's a spring day in Parkville, most of the students are in t-shirts and shorts, determinedly pretending it's already a sunny January day.

But five students are clustered together holding cups of hot coffee, wearing cardigans, a puffer jacket and even a wool vest.

"This is still cold! I don't know how you guys do it!" comments UNC student Jesse Martin, who's bundled up in a warm cardigan.

The five students are from the University of North Carolina (UNC) at Chapel Hill, a PharmAlliance partner. They have made the trip around the globe to spend a month here. UNC offers a one-month international rotation at one of a number of pharmacy schools around the world, giving students the chance to develop a better understanding of how different healthcare systems work.

"We're all going into different areas of pharmacy. There's so much value in seeing how pharmacy is practiced all over the world," says Patrick Kurunwune.

"The way we practice can really be impacted by our placement experiences and travels. We can bring home what we have been learning at Monash University and in the Alfred Hospital," he adds.

So why Melbourne? The students - Jesse, Patrick, Nic McGuire, Jimmy Xu and Tanner Trantham - had choices from nine different institutions, including locations such as Cairo, Honduras and Tokyo.

"Australia offered clinical opportunities, research expertise and academic skill building, which really incentivised me to put it at the top of my preference list," says Tanner.

"As healthcare systems around the world change and in some countries becomes increasingly expensive, it's important for us, as the pharmacists of the future, to understand how pharmacy and medicine is practiced in a country where there are few to no financial barriers for care," he says

The students have spent two weeks doing ward rotations at the Alfred Hospital as well as community pharmacy rotations. The idea is that they gain an in-depth understanding of different practice models.

"Industries as a whole are global. And if we think about healthcare, we have so many opportunities to perform better and improve our own approach only through exposure to other models," says Nic.

"Talking to pharmacists at the Alfred Hospital, they have such a pure passion for patient care and are so empowered to provide a high level of care. That is really inspirational and something we can take back and embed into our careers," he adds.

The one month is flying by for the five students and when we ask them for their highlights of their rotation, the answers are instantaneous.

"We got to feed kangaroos! That was pretty cool. And the diversity here in Melbourne, in the cuisine, culture and community has been a unique experience," says Jesse.

"Definitely learning about the Tim Tam Slam I think. I'm taking all the Tim Tams back with me!" finishes Patrick.

Left to Right: *Jesse Martin, Nic McGuire, Patrick Karunwune, Patrick Xu and Tanner Trantham*

Graduate entry pharmacy *attracts international attention*

Special feature

Going *global*

The graduate entry pathway into the Monash pharmacy program has been around since 2014. But now that the new BPharm(Hons)/MPharm is open to graduate entry students, it's beginning to attract attention from far afield.

Since developing this dual qualification course Monash has also seen itself climb the international rankings. This has caught the attention of international students and among the 46 Graduate Entry students enrolled in the program in 2019 are seven international students, including three from Canada.

"Melbourne is pretty similar to Vancouver," says Canadian student Eunice Park. *"The coursework kept me busy, I couldn't miss home too much!"*

Eunice says Monash University is well known in Canada and she was attracted to the fast tracked two years of study plus a paid intern year compared to a four-year commitment at a Canadian university.

"I like how this course is structured very differently compared to a traditional science degree. Lectures are interactive lectures," Eunice says. *"There are lots of workshops where we can consolidate our knowledge, I like how we focus on one specific topic per week."*

The course is designed to create pharmacists who are job ready. Students are involved in active learning and skills coaching and are required to do more than just learn the content.

Canadian student Zainab Wanas heard about the program through Oztrekk, a company connecting Canadian students to study in Australia, and chose the course because it was the only one offering graduate entry into third year. Both Zainab and Eunice used Oztrekk as their student representative.

"The application process is quite simple, you just need to have your transcripts and relevant documents and apply online. I think it took me about two weeks to hear back from Monash," says Eunice Park.

While Zainab had obtained a Bachelor of Science Kinesiology in Canada, Eunice has a maths background.

"I studied Mathematics at the University of British Columbia," says Eunice. "I graduated with a Bachelor of Science major in Mathematics. It was a big change and the first few weeks of pharmacy school were quite challenging."

To help the transition into the course students are required to complete a six and a half week summer school unit and then an overload unit when they begin their studies.

Eunice says the program has opened up so many choices for her future career in pharmacy. *"There are just so many different options and career paths I could take with this degree. But, I know I want to start off my career as either a hospital pharmacist or a community pharmacist."*

Zainab is already considering a PhD after graduating. *"My experience has been life changing. I have become much more independent and aware of the environment around me."*

Left: Zainib discusses her PhD aspirations with PhD student Beatrice Chiew
Right: Canadian student Zainab Wanas

Fast facts

- Graduated with a Bachelor of Pharmacy and a PhD in Pharmacology from the Victorian College of Pharmacy, prior to postdoctoral research in the United States and return to Australia as a Research Fellow.
- Joined Monash University in 2006 as an Associate Professor and NHMRC Senior Research Fellow in the Department of Pharmacology.
- Currently holds the positions of Professor of Analytical Pharmacology and NHMRC Senior Principal Research Fellow.
- Most recently Leader of the Drug Discovery Biology Theme in the Monash Institute of Pharmaceutical Sciences, Faculty of Pharmacy and Pharmaceutical Sciences.
- A Clarivate Analytics 'Highly Cited Researcher' in Pharmacology and Toxicology, recognised internationally for his work on novel approaches to drug discovery.
- His innovative research crosses academic and industry boundaries, incorporating computational and mathematical modelling, structural and chemical biology, molecular and cellular pharmacology, medicinal chemistry, and models of behaviour and disease.
- Widely published in leading journals such as Nature, Cell, Nature Chemical Biology, PNAS and Nature Communications.
- Recipient of numerous awards, including the John J. Abel Award from the American Society for Pharmacology and Experimental Therapeutics, the Rand Medal from the Australian Society of Clinical and Experimental Pharmacologists and Toxicologists and the Gaddum Memorial Award from the British Pharmacological Society.
- A Fellow of the Australian Academy of Health and Medical Sciences and the British Pharmacological Society, and a Councilor of the International Union of Basic and Clinical Pharmacology.

The builders are still fitting out his new office when we meet, so Monash University's new Dean of the Faculty of Pharmacy and Pharmaceutical Sciences, Professor Arthur Christopoulos, remains ensconced in the third floor office he's occupied for the last few years, reflecting upon how life has come full circle.

"I've ended up right back where I started from," says Professor Christopoulos, who graduated with a Pharmacy degree from the then-Victorian College of Pharmacy, but won't be drawn as to exactly how long ago.

"When I was a student this building didn't even exist. It was a carpark. In the spot where the Dean's office is, we used to play kick-to-kick at lunchtime."

"Ever since I was in high school I wanted to be a pharmacist. There is a rich history here of primary health care that always drew me to the profession".

But far from being transfixed by the past, Professor Christopoulos is thinking hard about the future of pharmacy.

Although he's still in the fact-finding phase of his Deanship, *"…they wouldn't have given me the job if I didn't have some kind of vision."*

He's quick to acknowledge what he's inherited from his predecessor and mentor Professor Bill Charman.

"Bill led this place for 13 years," he says. *"Under his leadership it's become one of most highly-regarded pharmacy and pharmaceutical science institutions in global higher education. You don't mess with a winning formula. My vision is more about evolution than deconstruction."*

Professor Christopoulos sees that evolution relying strongly on collaboration across Monash University to take advantage of the current opportunities in biomedical research.

"One of the big things for me is cross-faculty integration. Now's the time to really grow the Parkville precinct but in a whole-of-Monash manner, where you bring in IT, engineering, medicine and science, even law, business/economics and arts."

He is also looking to engage former students.

"Our alumni are very clever people. I'll be speaking with them and looking for opportunities to share some of their ideas and also get some of their input as to what they see as the challenges facing us going forward," he adds.

Meet the new Dean: Professor Arthur Christopoulos

"No one has a monopoly on good ideas, so you should just surround yourself with lots of smart people and be humble enough to accept their ideas to address your vision."

Professor Christopoulos believes one of the biggest challenges is in community pharmacy, where approximately 75 per cent of the profession's workforce is currently employed.

"There are quarter of a million hospital admissions each year in Australia because people don't take their medications properly. It costs our economy $1.4 billion dollars per annum," Professor Christopoulos adds.

"We've got to get to the next stage of pharmacy, which is really making sure we embed pharmacists wherever medicines are used."

Professor Christopoulos believes pharmacists need to be with patients every step of the way and that virtual and digital health are the big areas of opportunity to make this happen.

"That's the next revolution we should be focusing on," he says. *"The way I like to think of it is 'hospital in the home; pharmacist on the phone."*

When asked what sort of student he was, Professor Christopoulos hesitates.

"I failed first year pharmacy," he laughs before explaining how competing interests got in the way at the start of his university studies.

"I was a musician and I was trying to choose between a career in music and a career in science and I think in that first year of pharmacy was crunch time because you go to university and you find out everyone's smart, not just you."

While pharmacy won out, the passion for music hasn't faded. Professor Christopoulos illustrates this by opening his office cupboard to show one of his guitars.

"In fact, I always have at least one in the office," he enthuses. *"I have another 32 at home."*

The son of Greek migrants, Professor Christopoulos was the first person in his family to finish tertiary studies. He credits his parents with teaching him the value of hard work.

"I studied hard and I found that I loved it. What I was drawn towards in particular was pharmacology; the science of how drugs work."

That interest has led to a prestigious research career and numerous international awards for his study of the G protein-coupled receptors, the largest class of protein targets for medicinal agents.

"The best analogy for what we discovered studying these proteins is that of a 'dimmer switch' that can be modulated by drugs," he says. *"Most current drugs treat their protein targets like 'on-and-off-switches', which is not very physiological, but what we discovered was the 'dimmer switch', which allows us to better tailor a medicine to unique nuances associated with different diseases."*

Now Professor Christopoulos is looking to the future of how this groundbreaking work can be applied.

"So now you combine that with the types of advances that are being made in devices and delivery approaches and you can come up with something totally magical."

With research being so important to Professor Christopoulos, he has decided to keep his laboratory going while serving as Dean.

One thing's certain: the new Dean of Monash Pharmacy and Pharmaceutical Sciences is hungry for the challenges that lie ahead.

"If I've got 10 plus years left, what am I going to do that has the most impact? I started by wanting to come up with better medicines so I'm going to finish by wanting to come up with better medicines. That's basically what made me just go for it."

Introducing the ELPHs

You'd be forgiven for thinking Santa's helpers were involved in a pilot program being run in Professional Practice workshops for first year students.

"I always have to explain what that means because everyone says oh Tina's like Santa and you guys are the elves," laughs third year student Jess Kludass.

ELPHs or Educational and Learning Pharmacy Helpers are the initiative of Director of Pharmacy Education Professor Tina Brock.

"It's definitely a cheeky name," says Professor Brock. *"It was around Christmas when we came up with it."*

This is the program's first year. Third year students attend hands-on workshops and circulate alongside teaching associates to help their junior peers.

"We're basically more of a link between the facilitator and the students to relay any problems that they're having back and provide another level of support for them that they might not usually have," says third-year student Kate Lowe.

As part of their duties, ELPHs take part in team meetings and provide a survey after each session so staff get a unique student perspective on teaching methods.

"It adds another dynamic to the workshop. We want learning spaces to be fun and delightful," says Professor Brock.

Kate Lowe and Jess Kludass submitted a resume and cover letter as part of the application process to be chosen as ELPHs.

"I wanted to be involved because I wanted to be able to make the first years feel more comfortable in their transition from school to university. I remember what first year was like for me," says Jess.

Kate says, *"I think they're a lot more comfortable in telling us what they don't know. I think that's something really important that they don't have that guard up which they may have with the facilitators."*

And it's a valuable experience for the ELPHs themselves.

"It's great to be able to consolidate my learning and be able to relay that back to the students as well. That helps me to understand while teaching it," says Jess.

"I think it's good as a student to have an opportunity to go for positions that give you a taste of what it might be like to look for jobs or internships in a couple of years," Kate adds.

Kate Lowe hadn't considered a career in pharmacy until the end of high school.

"I really liked chemistry and my teacher when I was in year 12 suggested that I apply for pharmacy," says Kate. *"Once I started the course and got to see what pharmacists do I really loved it and was completely sold."*

Now Kate's hoping to get a hospital pharmacy internship and says this mentoring experience might even lead her down the path of teaching.

"I really like when we have working pharmacists come and talk us through a topic and we can see they have the expertise in that area. Maybe one day I'll do that too."

Jess Kludass took a less direct path to pharmacy.

"When I did my biomedical science studies I took a couple of pharmacology units to see how I would go and I really loved them so that's where I got the idea to come into pharmacy."

Jess finished her VCE in 2010 and started an engineering degree before transferring to a Bachelor of Biomedical Science at Monash. After a two-year work and travel break on the completion of her degree Jess started pharmacy.

"I really like the Parkville campus. Because it's small you tend to know everyone in your course and are always with friends you make from the start," she says.

And now the ELPH program is helping to build on those friendships.

"It's just nice to see some of the people you know in different year levels instead of just your little group," says Jess.

With so much positive feedback it's hoped the program will continue and grow.

"I hope we'd have something like that ourselves in our year level. It would be fantastic to have someone to look up to a little bit further along in the course," says Jess.

Kate adds *"I've loved my experience with it and I would definitely recommend it to other people."*

And it's clear Professor Tina Brock is impressed with her ELPHs and what's been achieved so far.

"They're amazing. Every time I leave a meeting with these students I feel inspired."

Top L to R: *Kate Lowe and Jess Kludass*

From hospital *to hardcover*

VCP alumna Susan Hurley

Susan Hurley may have transitioned from pharmacist to medical researcher to novelist but pharmaceutical science is still at the heart of her work.

"People say write what you know or write what you'd like to know," she says.

"I worked in the medical research and pharmaceutical industry for many years and wanted to take readers to that world, but really needed to have a topic that was going to be interesting."

The disastrous first human trial of immunomodulatory drug TGN1412 in London in 2006 caught Susan's attention.

Six healthy men ended up in intensive care with multiple organ failure after a severe immune system reaction.

"What was interesting was that the company itself had warned about this reaction in their documentation for the trial but then hadn't taken what most people regarded as the appropriate level of care as appropriate precautions moving forward. Scientists subsequently were somewhat divided into camps, some arguing that it was foreseeable."

That same drug profile features in Susan Hurley's medical thriller *Eight Lives*. Young Vietnamese-Australian doctor David Tran has made a breakthrough drug discovery but before he can carry out the first human trials he's found dead. The voices of friends, family and business associates tell the story.

"This is something that I really wanted to do and is quite difficult for a novelist to pull off to get readers to engage with a number of different characters but also for them to keep engaged with a story."

Susan says she's always wanted to be an author.

"I've always been a very keen reader and I read widely and I have always dreamt of being on the other side, being a writer."

But science captured Susan Hurley's imagination first. Susan trained as a pharmacist at the then-Victorian College of Pharmacy and became interested in research through her time in hospital pharmacy, where she designed and ran a clinical trial of asthma drug theophylline. Her trial of individualising dosages for patients with acute asthma eventually led to a complete rethink of the drug treatment.

"It showed that the drug was very toxic, too toxic to use. Even the individualising dosage didn't make it an acceptable treatment and it's no longer used today."

That study became the basis of a Masters of Pharmacy degree and Susan Hurley went on to do a PhD in epidemiology and health economics. Susan became an expert in the cost-effectiveness analysis of medicines and public health programs and has worked across universities, pharmaceutical companies and not-for-profit organisations.

The breadth of this research background now plays an important role in Susan's writing work and is set to continue with her second novel.

"That science lends itself," Susan says. "So when people read Eight Lives hopefully they'll learn a little bit about where their medicines come from."

When reflecting on her Monash University student experience Susan Hurley fondly remembers making medicines.

"When I qualified everybody was a compounding pharmacist but one thing that I found frustrating in Pharmacy College was that we weren't allowed to try anything on ourselves. So we'd make lipstick and we couldn't take them home!" Susan laughs before explaining why.

"There was an experiment where the lab technicians made up a solution that the students did try on themselves to observe the pharmacology of a particular drug and the technician who made up the solution made an error and there was an overdose and the students were rushed to hospital. So that practice was stopped."

That idea of self-testing is something Susan came back to when writing her debut novel.

"We try things on people who volunteer and it doesn't always go well.

There have been times in history where a scientist would test it on themselves, that was the honourable thing to do, it's called going first and that comes up in my novel. Maybe that originated from that little experience in Pharmacy College so many years ago."

Coaching the *next generation* to victory

From top: *Professor Tna Brock, Dr Jennifer Short*
Right: *Skills coach Kate Deale with her group*

Professor Tina Brock and Dr Jennifer Short

We've done this to ourselves.

When we started in academia, we had the not-unreasonable expectation that we would teach in much the way we ourselves had been taught – and indeed as higher education had been delivered for hundreds of years.

We would stand at the front of a lecture theatre, or perhaps a lab, and students would lean forward, straining to hear our pearls of wisdom.

We were onto a good thing. But we had to go and change it.

If you've been following recent developments at the faculty – and in higher education more generally - you'll know that we've been increasingly focused on equipping our graduates with finely honed skills to accompany their deep knowledge. This evolution reflects both the best academic research into professional development and our consultation with practice and industry stakeholders. Skills such as problem-solving, communication, teamwork and integrity are transferrable to most existing and emerging career pathways in pharmacy and pharmaceutical sciences.

In the past it was widely assumed that people were born with, or would develop skills of their own accord. That may be true in some cases, but as a faculty we believe that professional skills are too important to be left to chance. Employers should be able to expect that every Monash graduate possesses an advanced skill set, so we have decided to teach these skills explicitly.

And whilst the traditional didactic model might be barely adequate for transmitting knowledge (although we have better ways to do that as well), it's lousy when it comes to building skills. The literature concludes that skills are best developed through a cycle of practice, feedback, reflection, feedback, and coaching. That necessitates an entirely different pedagogical model – one more akin to the models found in classical music or professional sports rather than academia.

Skills before pills

Like athletes, students need a lot of practice. About one-third of our academic week is dedicated to hands-on workshops and laboratories in which students perform tasks that would be expected of practitioners and scientists. Across the courses, students also engage in extensive small group work and experiential placements. But how do they know whether their practice is paying dividends?

First, students receive regular performance feedback. Next, our students reflect on their performance using their feedback as evidence, and consider how they can improve. They submit reflections using the framework developed by Borton, in a well-known model of reflective learning: What? So What? and Now What?

In the "What?" section, students summarise their experience and identify the opportunities for improvement.

In the "So What?" section, students explain the importance of their experience and contextualise their skill proficiencies within the broader framework of their learning.

Finally, in the "Now What?" section, students outline their strategy for skill development, ideally composing a plan that is SMART (Specific, Measurable, Attainable, Relevant and Timely).

Put me in, coach!

Practice and reflection are important, but who is there to help our students to refine the reflective skills they will need to exhibit, in order to continue improving once their degree is finished? A coach!

At regular intervals throughout the year, students meet in small groups with an academic (early years - pharmacy and pharmaceutical sciences) or a practitioner (later years – pharmacy) "skills coach."

The skills coach reviews the students' reflections and evidence and then provides

tailored feedback, so as to facilitate a set of agreed actions. From their close perspective of the student journey, coaches identify common themes that they use to spark discussion, enabling the group to learn not only from the coach but from each other. It's common for really deep dialogue to emerge from these sessions as the students tend to feel comfortable with a coach who knows them well.

Because we're coaxing students to reflect on their own behaviours and thought processes, and come to realisations about themselves, coaching requires a little bit of the demeanour and skill set of a psychologist. This is a new approach for our staff so we meet regularly to plan for and debrief about coaching sessions.

In it to win it

If this all sounds resource intensive, that's because it is. The faculty has made a considered decision to invest heavily in skills coaching. We believe it's the only way to equip our students with the skills they will need to be successful in the rapidly shifting employment market.

But the program also has other benefits.

In some ways coaching hearkens back to the way things were done before the massification of higher education that followed WWII. Coaching provides an antidote to the anonymity of large classes, guaranteeing that each student has at least one teacher who knows them well each year – someone who can vouch for them to a future employer, or ensure they're not falling through the cracks.

The advantages for prospective employers are many.

Over time students build an online portfolio of their learning, an evidence base that provides transparency for employers. It's one thing for an interviewee to assert that they are great at, say, teamwork. It's quite another for an applicant to be able to prove it. Students can now articulate their mastery of a skill through their portfolio just as objectively as they can demonstrate their knowledge of a particular area of, say, cell biology through their academic transcript.

The program also encourages students to adopt a professional mindset much earlier than they otherwise may have. As the surgeon Atul Gawande recently put it, a professional is someone who is capable of managing their own improvement. With skills coaching, students very quickly realise that they are responsible for their own learning.

Kicking goals

From Ron Barassi to David Parkin, our neighbourhood is no stranger to superstar coaches.

It's early days for us yet, but the signs are promising. More than 750 students are engaged in skills coaching, and more than 14 000 reflections have been submitted to date.

And in October, the team leading the skills coaching program, Kirstie Galbraith, Andreia Bruno, Vivienne Mak, Jen Short and Thao Vu, won one of the Faculty's most prestigious prizes, the Teaching Excellence Award.

In doing so they represented the cast of many academics and practitioners who have made the program a success. We'd like to finish by acknowledging that team here:

Simon Bell, Ian Larson, Betty Exintaris, Johnson George, Darren Creek, Natalie Trevaskis, Paul White, John Haynes, Sab Ventura, Joe Nicolazzo, David Manallack, Andreia Bruno, Connie Landesdorfer, Bernie Flynn, Greg Rublee, Thao Vu, Carl Kirkpatrick, Dan Malone, Carmen Abeyaratne, Jess Webster, Denise vandenBosch, Anne Leversha, Annie Chen, Cath Forester, Kayley Lyon, Megan Waldhuber, Suzanne Caliph, Vivienne Mak, Sara Chuang, Lorenna Reynolds, Stephen Wood, YanYan Yeap, Jacquie Stasinopoulos, Samanta Lalic, Mark Teofilo, Kirstie Galbraith, Michelle Vienet, Laura Dean, Elizabeth Morabito, Brindha Kshirsagar, Eugene Ong, Ben Emery, Gina Arora, Angelina Lim, Bianca Levkovich, Steven Walker, Sonia Koning, Nadia Mouchaileh, Nick Wilson, Simon Furletti, Diana Sandulache, Joanna Pizzi, Chloe Bell, Marisa Hodgkinson, Dorothy Shum, Kate Deale, Alex Edwards, Michelle McIntosh, Elizabeth Yuriev, Laurence Orlando, Ben Capuano, Stefan Huth, Angus Johnston, Erica Sloan, Roland Chung, David Chalmers and Nel Karunaratne.

Professor Simon Bell *and the future* of CMUS

Earlier in 2019, the Australian Government announced medicine safety as a national health priority. As peak bodies in the health industry reorient their priorities to address managing medication safety, institutions and research facilities are shaping their focus and curriculum to meet growing health burdens.

The Monash University Centre for Medicine Use and Safety (CMUS) is working to meet this demand, with CMUS delivering several projects to provide the patented expertise to tackle pressing concerns including polypharmacy, managing medication errors and the mismanagement of medication regimes in vulnerable populations such as elderly Australians.

The changes are timely. In 2018, data revealed that close to one million Australians over the age of 70 take five or more medications every day. Over half of the elderly Australian population may be taking at least one medication deemed as unnecessary.

Effective medication management forms one of the pillars of patient wellbeing and recovery. Patient safety is in fact one of the World Health Organisation's (WHO) global health priority areas, with WHO estimating that medication mismanagement could cost 42 billion dollars annually.

The rise of polypharmacy has been met with a suite of dedicated research from CMUS researchers, with Dr Janet Sluggett testifying this year at the Royal Commission into Aged Care Quality and Safety on the dangers of poor regulation of medication regimes in residential aged care facilities.

CMUS itself operates with a vigour in delivering innovative research to optimise health outcomes for individuals and communities throughout Australia and around the world. Established in 2008, CMUS has been providing expertise in integrating the roles of pharmacists in practical settings including hospitals, communities and the home.

The Centre's research has also led to a greater understanding around how general practitioners and pharmacists can work collaboratively to improve the quality of care for each patient.

Optimising health outcomes and managing patient safety can only be maintained through continuous research to identify disparities in medication safety, especially in vulnerable populations. These areas include polypharmacy, pharmacoepidemiology and pharmacy education, all overseen by CMUS's new Director, Professor Simon Bell.

Professor Bell, an NHMRC Dementia Leadership Fellow and an Adjunct Professor at both the University of Eastern Finland and University of South Australia, has a research record in elderly medication use, dementia, deprescribing and more. Having been at CMUS for over five years and already seeing 10 PhD theses to completion, Professor Bell was the perfect candidate to pick up the mantle of Director from his predecessor, Professor Carl Kirkpatrick, in January this year.

Professor Bell admits that he had big shoes to fill.

"Carl really embodied the heart and soul of CMUS. His role in pioneering aspects of the Vertically Integrated Master's degree, contributions to each of the Faculty's outreach programs and structuring a whole new partnership with MTP Connect and Certara to establish the new Certara-Monash Fellowship program in Drug Development Science certainly assisted in setting the stage for me to come into this role," says Professor Bell.

"Carl has also provided the perspective in adopting a new approach to meet these new health priorities and understanding how we can use our position as leading experts to provide the necessary frameworks for patient safety."

"As the roles of pharmacists change in Australia, it feels like a pertinent time to consider how we can harness our expertise to understand what more we can be doing not to just assist in a reactive space but to proactively prevent medication harm," says Professor Bell.

"I see CMUS as having two key strengths; pharmacoepidemiology and pharmacometrics. Consolidating these into outcomes to tackle medication literacy, polypharmacy and enhancing our collaborative relationships with stakeholders across hospitals, pharmacies and governing bodies can go a long way in addressing patient safety as a global health priority."

This tenacity is certainly on display, with an impressive suite of projects having been announced in less than one year. Led by Professor Bell, CMUS was the recipient of a novel innovation grant of $500,000 from The Dementia Australia Research Foundation and the Yulgilbar Alzheimer's Research Program (YARP). The project uses the evaluation of big data to understand how medication management can be better used in treating dementia.

This year also saw Dr Johnson George of CMUS receiving a $2million grant for the new HAPPI MIND program, a national collaborative project across general practices to reduce dementia risk. Research Fellow Dr Jenni Ilomäki was also appointed Convener of new international collaboration Neurodegenerative Diseases Global Epidemiology Network (NeuroGEN), designed to manage medication risk for neurodegenerative diseases.

"CMUS is well positioned in a research space, we are now leading in the quest to meet Australia's next big health priority: medication safety," says Professor Bell.

"Clinical research and big data are some of the best tools we have in examining evidence and converting that into tangible outcomes."

"We're not just trying to develop strategies, we're trying to maximise every bit of data we have to generate new information continuously."

Top: Professor Simon Bell

Coming together to *commemorate*

In Alchemy 32, we told the story of the effect that WWI had on the College, with a special focus on the stories of five students. In April we held a special ceremony to honour those students

A week after ANZAC Day 2019, the Parkville campus was transformed in remembrance of World War One.

More than 200 alumni and students of the Melbourne (later Victorian) College of Pharmacy served in the First World War. Nineteen died on service, including four students.

On Tuesday 30 April, Monash University honoured the lives of those four fallen students by conferring upon them in death the contemporary equivalents of the degrees they were prevented from attaining in life: a Bachelor of Pharmacy with Honours.

A fifth student who returned from the war deeply traumatized and ultimately ended his own life was also honoured.

Representatives of the five soldiers' family accepted the awards on their behalf witnessed by Monash students, The Honourable Ted Baillieu Chair of the Victorian Anzac Centenary Committee, the family of Sir John Monash, members of the Australian Defence Force, Major General Professor Jeffrey Rosenfeld AC OBE, senior members of Monash University including the Chancellor, and many guests and delegates.

The ceremony marked the culmination of a year-long campaign of remembrance led by outgoing Dean Professor Bill Charman.

"The event was a wonderful way to commemorate the loss and recognise the sacrifice of the students and alumni of the faculty who fought in WWI," Professor Charman said.

"As an institution responsible for educating the next generation of pharmacists, it is important that our students and the broader community have an appreciation of the lineage into which they are stepping and of the men and women who shaped the profession" he said.

Several of the fallen soldiers served under the command of the University's namesake, Sir John Monash, who visited the College in 1927 to open the academic year and award prizes. The Monash family was represented by Sir John's great-grandson, Michael Bennett.

Top row from left: *Cossar Hall was full to capacity; The exterior of the Sissons Building was draped in panels of hand-knitted poppies kindly provided by the 5000 Poppies Project; Sir John Monash's great-grandson, Michael Bennett, explores the connections between Sir John, the Melbourne Pharmacy profession and modern approaches to STEM education; Ms Marna Couve De Murville accepts the testamur on behalf of the family of Alan Couve.*

Second row: *Frank Cahir's son Pat accepts a Certificate of Recognition and Appreciation; Major General Sir Geoffrey Rosenfeld AC OBE with a WWI-era ambulance of the same model fundraised for and donated by the Melbourne College of Pharmacy. (Vehicle provided by Ambulance Victoria Museum); Ms Rachael Joyce of the Sir Zelman Cowen School of Music, leads the National Anthem; Against the backdrop of Cossar Hall's historic Sissons Mural, former Premier of Victoria the Honorable Ted Baillieu, reflects upon the broader historical context, speaking in his capacity as Chair of the Victorian ANZAC Centenary Committee; Mr Peter Jewkes accepts the testamur on behalf of the family of Wallace Gordon Jewkes;*

Third row: *Ms Sally Pritchett accepts the testamur on behalf of the family of Eric Bisset; Professor Charman reads the honorary degree citations; The Last Post; The President and Vice-Chancellor of Monash University, Professor Margaret Gardner AO, addresses the assembly.*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Top row from left: *The Chancellor, Mr Simon McKeon AO, addresses the assembly; Artist Christine Johnson and writer Michael Shmith with Ms Johnson's work Five Soldiers. The series consists of five prints, one commemorating each of the five soldiers honoured at the event. A copy of the relevant print was gifted to each family by the faculty, and the full set hangs on permanent display in Building 404.*

Second row: *The ceremonial planting of a Eucalyptus Kruseana, a gift from Michael Bennett to the Faculty as a token of the enduring friendship between the University, the Monash family, and the pharmacy profession, Pat Cahir poses in front of an illuminated display that tells his father's story*

Third row: *Melbourne band The Orbweavers perform their composition The Distant Call of Home*

Track to laboratory:

Professor Mark Febbraio *goes for gold*

Elite athlete, leading metabolic disease researcher, NHMRC senior principal research fellow and avid sports fan, Professor Mark Febbraio joined the Drug Discovery Biology Theme at MIPS in 2019 following a stint as Head of the Cellular and Molecular Metabolism Laboratory at the Garvan Institute for Medical Research.

From his resume bristling with publications and awards, it could be assumed that Professor Febbraio has spent a lifetime in research. But the photos littered across his office tell a different story.

An accomplished athlete, Professor Febbraio spent several years competing in triathlons across the world. Fascinated by human performance and endurance from his own experience, Professor Febbraio completed his PhD at Victoria University on how environmental temperature extremes can impact muscle metabolism during exercise.

His PhD paved the way to his research career. At the turn of the millennium, Professor Febbraio and his team made a breakthrough discovery in understanding how the human body responds to exercise and its implications for metabolic diseases.

The team discovered that skeletal muscles secrete a protein known as interleukin-6. Professor Febbraio and his colleagues coined the term "myokines" for proteins secreted from muscles. Myokines present a great hope for metabolic disease sufferers including diabetes and obesity.

Following the milestone myokines discovery, Professor Febbraio's career has led to positions at prestigious research institutions across Europe and Australia while also becoming an NHMRC Fellow and receiving the Australian Diabetes Society Kellion Award, Sandford Skinner Oration and the A K McIntyre Prize.

Professor Febbraio's passion is tackling obesity-related illnesses. Metabolic diseases are presenting as a growing pandemic in global communities. Research demonstrates that over 60% of cancers are linked to obesity.

His most recent discovery builds on 13 years of research, having developed a compound called IC7Fc, which has shown great success in preventing weight gain and improving glucose metabolism. The findings are a world first in showing that a single drug could be used to treat diseases such as type 2 diabetes.

Now having returned to Melbourne, Professor Febbraio has a vision on how drug discovery biology can be further explored to better understand human physiology.

"MIPS has an excellent reputation as a world leader in GPCR research, medicinal chemistry and pharmacology. I'm hoping to harness that knowledge and take it to the next level," said Professor Febbraio.

"I'm especially interested in the integration of medicinal chemistry and pharmacology to develop a stronger knowledge of translational biology."

"We could really use the exceptional pharmacology expertise here at MIPS to bridge the gap between structural biology and pharmacology into tangible pathophysiology outcomes."

"I'm hoping that we can show that exercise really is medicine. We've seen the shift in mentality, with more people being conscious of their sedentary lifestyle. It's possible that in time, this changes for good."

PHDs to *improve practice*

PhD students who are drawing on their experience as pharmacists

As a profession that requires a tightly prescribed pathway to attain accreditation, it's arguable that we tend to regard education beyond that point purely through the lens of professional advancement.

Whilst it's true that undertaking a PhD can substantially expand your opportunities, at the Monash Centre for Medicine Use and Safety (CMUS) we see an increasing number of candidates who are using their PhD research in combination with their day job to change practice for the better.

At CMUS, there are several candidates working to integrate their academic capabilities and current careers to work towards tackling pressing health concerns. One community pharmacist who's under co-supervision is doing his PhD on whether diabetes treatment regimens are consistent with clinical guidelines.

Another candidate is an emergency department pharmacist who witnessed first-hand the impact of the opioid epidemic and so enrolled to do a PhD on analyses of PBS opioid data. She also did an exchange at the Karolinska Institute where, researching the impact of opioid prescribing on sick leave in Sweden.

The candidate, Samanta Lalic has examined over five years of PBS data to determine that 1.9 million Australians begin taking prescription opioids every year. Her research findings were published in the British Journal of Pharmacology just last year.

A third community pharmacist, Amanda Cross is in the final stages of completing her PhD on inappropriate medicine use in people with dementia. Her research has seen her take positions on Victorian Medicine Roundtables to offer clinical expertise on how to better manage medicine use. Amanda's PhD has also seen her be awarded the national Three Minute Thesis finalist prize for her ability to effectively translate technical research for the public.

The value of a PhD during an existing career journey is no better demonstrated than in our current PhD candidates. Each of these projects have seen significant real world impact through their perspectives working as practicing pharmacists.

Few people are better positioned to identify ways in which medication use and safety systems could be improved than practicing pharmacists. A PhD offers a way to make those changes happen.

From top: *Amanda Cross, Samantha Lilac*

The *story* of the Acrux *sculpture*

Located in the forecourt of the Monash University Faculty of Pharmacy and Pharmaceutical Sciences in Parkville is a sculpture by well-known and respected sculptor Lenton Parr.

Named 'Acrux', after the brightest and lowest of the five stars that make up the Southern Cross, the sculpture is dedicated to the memory of Ernest Wharton Braithwaite.

Braithwaite was a dedicated pharmacist who took pride in his profession and its many responsibilities. After graduating high school, he was apprenticed to his older brother Harry at his pharmacy in Camberwell Junction.

Following graduation from the then-College of Pharmacy, Braithwaite managed a pharmacy in Hawthorn, eventually purchasing it. Working with Harry and other collaborators, Braithwaite purchased and operated six pharmacies in Melbourne.

World War II saw Braithwaite join the Australian Army and was posted to Tobruk in the Middle East as a Senior Pharmacist. During this time, his skill saw him promoted in the field and awarded a *'Mentioned in Dispatches'*.

On returning to Australia he was first posted to Darwin and then as Senior Pharmacist of the Army, to Victoria Barracks (Army Headquarters) in St Kilda Road with the rank of Lieutenant-Colonel.

At the end of the war and on his release from the Army, Braithwaite returned to his pharmacy in Glenferrie Hill where, for 30 years, he continued to serve the local community.

In 1946, Braithwaite left the Council of the Pharmaceutical Society of Victoria to join the Board of Pharmaceutical Defence Limited (PDL). He was then elected Chairman of the Board, a role he held for a record 21 years, and over this time frequently lectured at the Pharmacy College.

Braithwaite was not only a leader in his professional life but also an active participant and leader covering a wide range of interests outside the profession: a keen lawn bowler, winning club and state titles and acting as President; an active founding member of the local Rotary Club, again serving as President. Master of the Wesley College Masonic Lodge; and, in later years a loyal follower and sponsor of the Hawthorn Football Club. He was also an active member of the Lauriston Girls School Parents Association and a sponsor to the Point Leo Surf Life Saving Club.

Braithwaite passed away peacefully in 1981 and 'Acrux' is a fitting tribute to a good and useful life, and an example to all those passing by to – aim for the stars.

Top: *Ernest Wharton Braithwaite*
Left: *"Acrux" sculpture*

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Faculty of Pharmacy
and Pharmaceutical Sciences

Monash University

381 Royal Parade
Parkville VIC 3052

Phone: 03 9903 9635
Email: pharmacy.info@monash.edu

CRICOS Provider Number: 00008C