



The
Westmead
Institute

FOR MEDICAL RESEARCH

ISSUE 4 SPRING 2021

DISCOVERY

Message from the Executive Director

At WIMR, we are proud to be pioneering precision medicine approaches to disease prevention, and treatment. We continue to invest in the critical infrastructure, technology and, most importantly, the people who will transform the future of health.

Precision medicine uses detailed information about the specific characteristics of an individual's disease, along with their unique genetic profile, to develop a treatment plan for the best health outcomes. It is an approach powered by access to immense quantities of information that, as a young doctor and researcher, I could never have imagined.

The field of machine learning, which aims to detect statistical patterns and rules hidden among vast amounts of data, has witnessed significant progress over the last decade. It is having a major impact on all aspects society and it is integral

to advancing precision medicine in patient care.

When you think of precision medicine, you probably think of genomics, which in itself generates huge amounts of data. However, genomics is only one part of the puzzle. Data generated through biological imaging, like MRI and CT scans; electronic health records; claims information from health insurers; and information from lifestyle apps on our phones and watches, all contribute to the vast amounts of health data generated on a daily basis. Researches around the world then need to integrate this with environmental data, data from ethnically diverse populations as well as the social determinants of health.

As the ability to store immense amounts of data grows, and the cost of generating and analysing this data shrinks, machine learning is becoming increasingly integral in the delivery of precision medicine.

The challenge remains to integrate a deep understanding of the biology of disease with the mathematics and computational skills required to manipulate large data sets.

While data will never replace the care and insight of a physician, data analytics will provide

doctors with the tools to better inform clinical decision making and individual treatment plans for each patient.

To realise the full potential of the precision medicine revolution, WIMR is harnessing the power of data, focusing on:

Attracting data scientists with skills in:

- Bioinformatics
- Artificial intelligence and machine learning.

State-of-the-art technologies like:

- Genomics
- Electronic Data Capture
- Data Analytics
- Data Warehousing
- Biobanking
- High performance computing.

Rather than providing treatment plans that were designed for the "average" patient, doctors will have access to much more data and information which will provide the best treatment options for each individual patient, so that they have the best treatment the first time.

As Barack Obama said at the launch of the Precision Medicine Initiative; precision medicine is about "delivering the right treatments, at the right time, every time to the right person."

That is what we are developing at WIMR.

**Wishing you good health,
Professor Philip O'Connell**



Cover image: 3D interpretation of the neuron cell network.

Double the love and double the impact!

Wednesday 29 September is a global day to focus on heart health and cardiovascular disease. WIMR is rising to the challenge with an online drive to raise funds in support of its pioneering cardiac research. This work could save the lives of hundreds of people a year and improve quality of life for thousands more.

The National Stem Cell Foundation of Australia (NSCFA) has generously pledged to immediately match every dollar raised throughout September, essentially doubling every donation made.

Like us, NSCFA believes that WIMR's pioneering heart research has the potential to radically improve health outcomes and quality of life for all those suffering the debilitating impacts of heart failure after heart attack.

Heart disease is the leading cause of death for Australians. Every year more than 57,000 Australians suffer a heart attack and many develop heart failure.



It is estimated that in 2017, 51 Australians died every day from heart disease – that's one death every 28 minutes. As our population ages, the problem is increasing.

Associate Professor James Chong, Co-Director of WIMR's Centre for Heart Research, is pioneering a radical new treatment that uses stem cells to grow new heart muscle to repair damaged and failing hearts. Specially cultivated stem cells are used to create a 'patch' which is grafted onto the heart to replace an area of damage. This extremely promising line of investigation is already well advanced and will pave the way for clinical trials.

Associate Professor Chong says,

"We are currently pretty good at using drugs to slow the progression of heart disease. We are good at treating heart attacks when they happen. Yet, we can't replace dead heart muscle. That's where stem cells come in. They could replace the dead heart muscle with beating, living heart muscle.

"The potential is enormous. This could revolutionise the treatment of heart disease. For the first time we could start to talk about a 'cure' for heart disease, one that could eliminate the need for heart transplants within the next decade."

Visit wimr-world-heart-day.raisely.com to make a donation today, and watch it double!

A family plan to help cancer research

When Gemma Wilson walked into the WIMR building for the first time in 2018 as an Honours student, she had no idea of the significant and long-term impact she would ultimately have.

Three years on, and Gemma is now a PhD student at WIMR, working with Dr Dinny Graham in the translational breast cancer genomics group. Gemma's research is focused on ductal carcinoma in situ (DCIS), a non-invasive type of breast cancer where the difficulty in identifying harmless lesions from potentially invasive ones can lead to over treatment.

Gemma says, "I am trying to identify high and low risk patients, with the aim of improving the way we treat DCIS by tailoring treatment to the individual, rather than a one-size-fits-all approach. High risk patients will be treated more extensively, and low risk patients will be spared unnecessary treatment."

A few months ago, Gemma and her mum, Sally were talking about an unthinkable scenario – what would happen if they both died.

While the conversation was confronting, it was necessary, as Gemma and Sally have no other immediate family.

Gemma suggested leaving money to cancer research, and put Sally in contact with WIMR's Gifts in Wills Manager, Hilary May Black. Hilary explained the process to Sally, and invited her to visit WIMR in person.

Sally Wilson explains, "Of course, I was keen to come and see what Gemma does, but when I arrived and started to meet some of the cancer research team, it felt so poignant. I have lost so many family members to cancer, and to see Gemma now working in this area, and to think that our bequest will continue to help long after we have gone – it just seemed like a perfect fit."

Since letting WIMR know her intentions, Sally says she has been overwhelmed by the care and attention she has received from the WIMR Foundation team.

“

That proves to me that they care about their supporters and will use the funds wisely. I'll certainly be encouraging my friends to start looking at leaving gifts to organisations that mean something to them in their Will.

”

For more information about WIMR's Gifts in Wills program call Hilary May Black, our Gifts in Wills Manager, for a confidential chat on 02 8627 3027 or email her at hilary.mayblack@sydney.edu.au



Sally and Gemma Wilson



Metal with meaning

For 55 years, the Parker family has made a huge impact in the metal recycling industry. Now, through their company Sell & Parker, they are making a huge impact on WIMR's life-saving research.

Sell & Parker is an organisation that is all about family. The company is headed by its founder, Ross Parker, and now operated by the next generation of the Parker clan, Ross's children and their partners. The family now also count their 350 staff as family. The care runs deep.

In fact, it was the tragic loss of a staff member that prompted the Parker family's interest in mental health research, and brought them into contact with WIMR's Brain Dynamics Centre.

Simone Ley (nee Parker) explains, "We see the entire Sell & Parker team as part of

our family, and we have had great people who have worked with us for many decades. So, to lose a Sell & Parker family member as a result of a silent struggle with mental health issues was a devastating blow to us all. We knew we wanted to do something to stop other people going through similar experiences, and we knew that medical research was the best place to start."

Sell & Parker is supporting WIMR's Brain Dynamics Centre, whose work is profiled in this issue of Discovery. Recently, Sell & Parker made a significant contribution to the purchase of a new MRI/EEG machine that is vital to WIMR's research. This specific work seeks to improve accurate diagnosis of chronic mental health disorders, including depression, bipolar

disorder, post-traumatic stress disorder and schizophrenia. This equipment will not only dramatically improve patient care, it will also enable researchers to collect and analyse data to directly assist critical research projects.

Co-Director of WIMR's Brain Dynamics Centre, Associate Professor Mayuresh Korgaonkar says, "The support we have received from Sell & Parker has been transformative for our research. This new equipment will result in faster and more effective diagnosis, not only for patients who are analysed here at Westmead, but all those suffering mental health disorders, wherever they may be. We are so grateful for the generous support we have received from Sell & Parker."

Mapping our most complex organ – the brain

Despite centuries of enquiry from the world's greatest minds, is it surprising that we still don't know a lot about the human brain? Perhaps not, when you consider that the human brain contains around one hundred billion neurons, and that information about everything we see, think and do is passing between each of these neurons at speeds of up to 400 kilometres per hour.

It is this hectic and mysterious environment that is the focus of WIMR's Brain Dynamics Centre.

The Brain Dynamics Centre studies biological markers for mental health disorders, to try to understand how our thoughts occur and our emotions are felt, so that treatments and therapies can be tailored to best suit each individual person. The insights gained will ultimately be used to bring about the early identification, best treatment and the prevention of mental illness.

Clinical Director of WIMR's Brain Dynamics Centre, Professor Anthony Harris explains,

“

Around one million Australians will be diagnosed with depression each year, but only half of those will seek treatment. Of those who do seek treatment, there is essentially only a one in three chance that they will receive the right treatment the first time.

”

Removing this barrier to early, effective treatment is the goal of two current research projects.

One study is using EEG (detects electrical activity in the brain) and MRI technology (provides detailed images of the inside of the brain) to identify markers that predict if a specific antidepressant medication will be the most effective choice for an individual. The hope is that this, and previous studies, will lead to a process that can be applied to other antidepressant medications, individualising treatment selection.

The second study, which will begin later this year, focuses on how quickly or slowly an individual metabolises antidepressant medications.

By tailoring the chosen medication to an individual's pharmacogenomic profile (how genes affect a person's response to drugs), the team hopes to personalise treatment choice for optimum results. In a second stage, MRI scans will be added to see if they improve patient outcomes.



Professor Anthony Harris and Associate Professor Mayuresh Korgaonkar

Introducing 'Taia'

WIMR is delighted to announce a partnership with Australia's oldest established jewellery house, Fairfax & Roberts.

The partnership between WIMR and Fairfax & Roberts will see the release of a bespoke white diamond and black spinel bracelet set in rhodium-plated sterling silver, titled 'Taia' and will be available for purchase from October with profits from the sales donated to WIMR.

Katrina Dowling, CEO, WIMR Foundation, says: "WIMR is delighted to partner with Fairfax & Roberts. From the outset, we recognised Fairfax & Roberts as a jeweller of exceptional quality with an impressive heritage, having developed bespoke, artisan jewellery to exacting standards over many years. Over its 25-year history, WIMR has delivered transformative

and personalised medical treatments, again with exacting standards to improve lives. So, our union is a divine strategic fit."

Irene Deutsch, Managing Director, Fairfax & Roberts, says, "We are delighted to partner with WIMR in an effort to raise awareness and directly support its broad research mandate.

"The extent of innovation, agility and ability to pivot to tackle new problems – for example inroads in COVID research – from the team at WIMR is world renowned. We look forward to playing our part in supporting WIMR's prestigious and meaningful work."

The Taia bracelet will retail for \$990 and is available for purchase from 7 October via www.fairfaxandroberts.com.au. Pre-orders can be placed before this date.

"You don't have to be a scientist to help save lives. By purchasing one of the Taia bracelets, you can make a significant contribution to WIMR's life-saving work, with profits from each and every bracelet sold being directed to WIMR's research. This is a wonderful opportunity for anyone and everyone to play a part in supporting and delivering hope, happiness and light through science," Irene Deutsch added.

For more information about the Taia bracelet please contact bespoke@fairfaxandroberts.com.au or speak to a Fairfax & Roberts consultant at +61 2 9232 8510.



WIMR research discoveries

WORLD FIRST: Westmead research accurately assesses individual immune response to COVID-19 virus, variants and vaccines

For the first time, a team of WIMR scientists have demonstrated an approach that can identify the parts of proteins that cause a highly specific immune response to SARS-CoV-2 (the virus that causes COVID-19). One of the lead authors, WIMR's Dr Eunok Lee said that the team now aims to pick the parts that can elicit a highly effective immune response and, in the future, use these to develop an easily accessible 'tool kit' to measure SARS-CoV-2 specific immune response.



"We anticipate that this approach will ultimately be able to accurately predict COVID-19 immune response in 80% to 100% of the global population." This story was featured on ABC News in July.

Australia's first 'revived' kidney transplant

For the first time in Australia, WIMR researchers, along with their clinical colleagues at Westmead Hospital, have performed normothermic machine perfusion (NMP) on donated kidneys. Now, as part of a clinical trial, kidneys treated with NMP have been successfully transplanted into patients. NMP is a procedure that 'revives' kidneys damaged by exposure to cold, or injury sustained during the donation process.

The first two transplants of a kidney treated with NMP have now been conducted at Westmead Hospital, and the results are very promising. Three months post-surgery, the patients are doing very well and have good kidney function, avoiding the need for post-operative dialysis, which occurs in up to 50% of the kidney transplants performed at Westmead. This story was featured on Nine News in February.

WIMR announced to lead the Australian Eye and Ear Health Survey

This survey will examine close to 5,000 Aboriginal and Torres Strait Islander peoples and non-Aboriginal Australians over a period of two years.

Professor Paul Mitchell AO, Director of WIMR's Centre for Vision Research who will lead the study, says, "Having a thorough and accurate understanding of the prevalence of eye disease and hearing loss in Australia is essential.

It allows us to anticipate and plan prevention and treatment approaches that address the issues of vision and hearing loss now, and well into the future."



WIMR in the news

Throughout the COVID-19 pandemic, clear and factual information has sometimes seemed hard to come by. This is why WIMR is proud of its COVID-19 vaccine team, led by Professor Tony Cunningham AO and Professor Sarah Palmer. At this vital time, their media and community work to clear-up misconceptions and provide timely and factual information about COVID-19 vaccines, their development, effectiveness and safety, is to be applauded.

In fact, their media interviews in the months of June and July reached a potential total audience of 262.5 million people.

Plus, hundreds of other business leaders and community members have received their

expert insight through a series of virtual seminars.

Please join us in thanking Professors Cunningham and Palmer for their unwavering commitment and outstanding efforts.



WIMR is committed to sharing the most up-to-date and factual information about COVID-19 vaccines. We have created a range of videos for this purpose. Visit 'The Westmead Institute for Medical Research' Youtube page for a range of factual COVID-19 videos and resources.



On 19 September, WIMR's Brain Dynamics Centre was featured in an episode of SBS's documentary series, Australia Uncovered. Presented by Osher Günsberg, the episode titled 'A Matter of Life and Death' was a personal exploration into a national crisis.

Osher investigated how new science, innovative thinking and technology are helping prevent suicide.

Filming the episode, Osher spent two days at WIMR, talking with Co-Director of WIMR's Brain Dynamics Centre, Associate Professor Mayuresh Korgaonkar, and going through the processes involved in one of the Centre's current research studies.



Westmead's Precision Medicine Conference

WIMR and the Westmead Research Hub were proud to host the Precision Medicine: A Revolution in Patient Care conference in May, pre-COVID-19 lockdown.

This two-day conference seamlessly blended in-person and virtual attendance, and showcased the impressive advances being made by local, national and international scientists in the advancement of precision medicine.

The conference began with a keynote presentation from Dr Luhan Yang, Co-Founder and Chief Scientific Officer at eGenesis. Named in *Fortune*

magazine's "40 Under 40 Influential People in Health, 2020", this was a fascinating start to the conference.

The Honourable Gabrielle Upton (Parliamentary Secretary to the NSW Premier) as well as Professor Hugh Durrant-Whyte (NSW Chief Scientist and Engineer) also joined the conference, discussing the NSW Government's plan to accelerate research and development, and how this relates to Westmead.

Other speakers included Australia's leaders in precision medicine from WIMR, Children's Medical Research Institute, Kids Research, Garvan Institute

of Medical Research, Peter MacCallum Institute and CSIRO.

A fantastic panel discussion wound-up the conference, facilitated by ABC National Medical Reporter Sophie Scott. At this public forum, experts discussed pertinent issues surrounding the implementation of precision medicine across disease areas including cancer, heart disease, immunology and more.

We extend sincere thanks to the conference Innovation Partner, Novartis; the Major Sponsor, NSW Health; as well as all the organisations who sponsored this outstanding conference.

Q&A

Q: Does my donation to WIMR really have an impact?

A: Your support is vital to making WIMR's research a reality. WIMR's researchers are successful in being awarded peer-reviewed government funding, but there is still a significant gap.

Donations help with the costs of many things – from employing the best and brightest staff, to purchasing and maintaining the technology required to carry out world-class medical research, and even the seemingly mundane, but essential items like microscope slides, centrifuge tubes and protective gloves.

In short, every dollar counts.

Your donation helps WIMR to purchase essential items like:



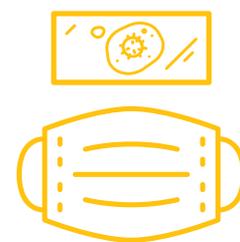
\$10

100 Syringes
100 Surface cleaning towels



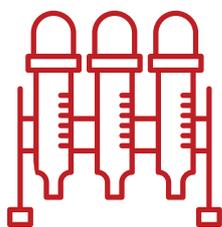
\$20

100 Protective Gloves
500 Microcentrifuge Tubes



\$50

1,000 Microscope Slides
50 Face Masks



\$100

1,000 Pipette Tips
100 Serological Pipettes



\$250

50 Tissue Culture Flasks
500 Centrifuge Tubes



\$500

1 Specialised Culture Media

We save lives. You can too.

WIMR's life-saving research is only possible thanks to philanthropic support. There are many ways to support WIMR's work including major gifts, regular donations, workplace giving and corporate sponsorship, community fundraising and leaving a gift in your Will. We welcome the opportunity to discuss the different options available to you and the various ways you may choose to show your support for medical research conducted at WIMR. Please contact the WIMR Foundation team on 02 8627 3000 or email development@westmeadinstitute.org.au for more information and to chat further. We hope to hear from you and engage you in our work.



Donation form

Donate to medical research and improve the health of current and future generations

You don't have to be a medical researcher to have a positive impact on health outcomes for people in our local community, across Australia and throughout the world. When you choose to support WIMR's vital work, you can be assured that every donation, no matter what size, makes a real difference.

Thank you for your consideration and generous contribution.

Your contact details:

Title: _____

Name: _____

Address: _____

Email Address: _____

Phone: _____

I would like to donate the following amount to help fund vital breakthroughs at WIMR:

\$25 \$50 \$100 \$250 \$500

Another amount: \$ _____

If you would like to make this a regular, monthly donation, please indicate when you would like the donation to be made:

- The 1st of every month
- The 15th of every month

If you would prefer to set up a direct payment from your bank account, our details are:

Account Name: The Westmead Institute for Medical Research Foundation

BSB: 032-278

Account: 76 76 16

Payment Information:

Card Type:

Visa Mastercard Amex Diners

Cardholders Name: _____

Card Number: _____

Card Expiry Date: ____ / ____

CCV/Card Security Number (on back of card): _____

Donations of \$2 or more are tax deductible.

Would you like to receive information from WIMR?

Yes No

If yes, please tick the relevant boxes:

- I'd like to receive a copy of WIMR's quarterly magazine, Discovery
- I'd like to receive information about WIMR's Meet the Researcher seminar series
- I'd like to receive information about giving to WIMR in my Will
- I'd like to receive information about fundraising for WIMR
- I'd like to receive information about supporting WIMR through my workplace

How would you like to hear from WIMR?

- Yes, via email please
- Yes, via both email and mail please
- Yes, via mail please
- No thank you. Please do not send me any regular correspondence.

DISC04

Please complete this form and return it to:

The Westmead Institute for Medical Research Foundation | PO Box 412 | Westmead NSW 2145 Australia | Ph: 02 8627 3000 | Website: www.westmeadinstitute.org.au | ABN 90 141 847 634

There are many ways to support WIMR's work. To find out more, contact the WIMR Foundation team at development@westmeadinstitute.org.au or phone 02 8627 3000.