

## THE SECOND COMING OF CARDIOVASCULAR DISEASE

IS IT TIME TO FACE THE FACTS?

### CHAIRMAN'S REPORT

Professor Len Kritharides, the new  
Chairman of the HRI Board of Governors

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### THE SECOND COMING

Professor Shaun Jackson on the  
future of cardiovascular disease

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2017 scientific achievements

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FACE THE FACTS

**FOR THE FIRST TIME IN HISTORY,  
THERE ARE MORE OBESE  
PEOPLE THAN UNDERWEIGHT  
PEOPLE IN THE WORLD**

NCD Risk Factor Collaboration. (2016). Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *Lancet*, 387(10026), 1377-1396.

A photograph showing the backs of two men sitting on a wooden ledge. The man on the left is wearing a solid red t-shirt and dark blue pants. The man on the right is wearing a red plaid shirt and light-colored pants. The background is a blurred outdoor setting with a concrete floor.

FACE THE FACTS

**AUSTRALIA NOW HAS  
THE 5<sup>TH</sup> HIGHEST OBESITY  
RATE IN THE WORLD**



FACE THE FACTS

## **THE GATHERING STORM**

**BECAUSE OBESITY AND DIABETES ARE MAJOR PRECURSORS OF CARDIOVASCULAR DISEASE (CVD), WE CAN EXPECT A VIRTUAL TSUNAMI OF CVD IN THE COMING DECADES**

# HRI Annual Review 2017

## HRI 2017

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Professor Len Kritharides

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Director of Cardiovascular Research Report  
Professor Shaun Jackson

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## Applied Materials Group

**Dr Steven Wise**  
Group Leader

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## Cardiac Imaging Group

**Professor Stuart Grieve**  
Group Leader

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## Cardiometabolic Disease Group

**Dr John O'Sullivan**  
Group Leader

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## Cardiovascular Medical Devices Group



**Dr Anna Waterhouse**  
Group Leader

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## Cell Therapeutics Group

**Associate Professor Sanjay Patel**  
Group Leader

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## Clinical Research Group

**Professor David Celermajer**  
Group Leader

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## Heart Rhythm and Stroke Prevention Group

**Professor Ben Freedman**  
Group Leader

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## High Blood Pressure Group

**Professor Paul M Pilowsky**  
Group Leader

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## Thrombosis Group

**Professor Shaun Jackson**  
Group Leader

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## Vascular Complications Group

**Dr Mary Kavurma**  
Group Leader

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## Vascular Immunology Group

**Professor Annemarie Hennessey**  
Group Leader

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## Fundraising Report

**Richard Wylie**  
Director, Global Fundraising and Brand

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# HRI 2017

The Heart Research Institute (HRI) is an internationally recognised medical research institute that performs cutting-edge cardiovascular research at state-of-the-art facilities in Newtown, Sydney, Australia and the Charles Perkins Centre at The University of Sydney.

**Our Vision**  
The Heart Research Institute's vision is to improve global health through excellence in medical research.

**Our Mission**  
The Heart Research Institute's mission is to understand and remedy the causes and complications of cardiovascular disease.

**Our Ambition**  
The Heart Research Institute's ambition is to be the most influential cardiovascular research institute in Australia.

Above: Image of an Australia-shaped platelet captured on the first super-resolution imaging platform for cardiovascular studies in Australia. Image by Dr Peter Qian Su (IBMD, Faculty of Science, UTS) and Dr Arnold Ju (Thrombosis Group, HRI)

**Locations**

- 7 Eliza Street, Newtown
- Charles Perkins Centre, The University of Sydney

**Chairman**

Professor Len Kritharides

**Director of Cardiovascular Research**

Professor Shaun Jackson

**CEO**

Dr Stephen Hollings

**Deputy Director Research Strategy**

Professor Ben Freedman

**Acting Scientific Director**

Professor Carolyn Geczy

**Clinical Director**

Professor David Celermajer

**11 x Scientific Groups**

- Applied Materials
- Cardiac Imaging
- Cardiometabolic Disease
- Cardiovascular Medical Devices
- Cell Therapeutics
- Clinical Research
- Heart Rhythm and Stroke Prevention
- High Blood Pressure
- Thrombosis
- Vascular Complications
- Vascular Immunology

**Our Partnerships**

- The University of Sydney
- Royal Prince Alfred Hospital
- Charles Perkins Centre
- Sydney Local Health District 'Sydney Research' scientific hub
- 'Sydney Health Partners' Advanced Health Research and Translation Centre

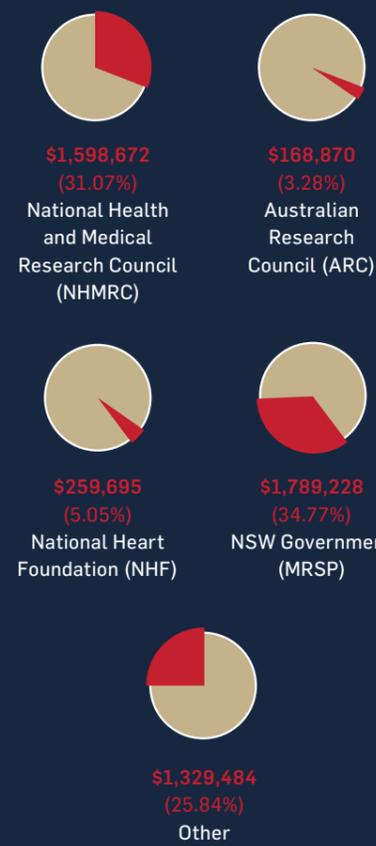
**ABN**

41 003 209 952

**150 COLLABORATIONS ACROSS 21 COUNTRIES**



**2017 GRANT INCOME BY FUNDING BODY**



**2017 CITATIONS**

**1727**

**2017 PERSONNEL**

**180+**

**2017 HRI INCOME**





# Chairman's Report 2017

Professor Len Kritharides

This is my first report as Chairman of the HRI Board of Governors. While it is a new role for me, my association with the HRI goes back 26 years, when I moved to Sydney as a freshly minted cardiologist to undertake a PhD at the HRI. I remember distinctly the excitement of that time as a novice scientist, and feel the same excitement today as I see the work that Professor Shaun Jackson's team of brilliant scientists and clinicians is driving. It is a singular privilege to serve in this role and I hope in this report to encourage you, the supporters of the HRI, to share in the excitement of scientific discovery.

The commonest cause of heart attacks and strokes is the narrowing of arteries by atherosclerosis (the build up of cholesterol and inflammatory cells) and the cessation of blood flow by thrombosis (formation of a blood clot). The combination of the two processes is often referred to as "athero-thrombosis". The HRI has as one of its core missions the study of the mechanisms by which heart attacks and strokes occur. By studying the processes that cause

these events we can develop preventative strategies and develop new treatments.

Biomedical research and improved clinical care have decreased the age-adjusted rate of heart attacks by over 80% compared with the 1960s – a remarkable Australian success story. However, there is no room for complacency, as heart disease and stroke remain the number one cause of death and disability in our community – in men and women. This is because our population is getting older and we are increasingly suffering from comorbidities associated with heart disease such as diabetes, obesity and high blood pressure.

Premature death and disability are still, today, devastating consequences of heart disease and stroke. Everyone reading this annual report will know of a loved one or friend who has suffered at an unexpectedly young age. It is also the costliest disease in terms of hospital admissions and health care delivery. Investing in scientific research for the prevention and treatment of cardiovascular disease is therefore vital for our health, and vital for the economic

viability of our health care sector.

Supporting biomedical research is, to many of us, an article of faith. We want to believe in its value – we know that it is potentially important, but our faith is often challenged. We can be confused by mixed messages relating to nutrition, lifestyle, and the value of preventative therapies such as cholesterol-lowering or blood pressure-lowering medications. In addition, scientific standards and experimental reproducibility are increasingly being challenged in the wider press. In such a climate, it is essential that the work of the HRI is of the highest scientific standard and of the highest scientific impact. It is also essential that the governance of the HRI is robust, financially prudent, and meets the highest standards of corporate governance. On both counts, I am proud to say that the science and governance of the HRI are world class. Credit for this goes to the scientific leadership of the HRI, led by Professor Jackson, the management team of the HRI led by Dr Stephen Hollings, and the enormous contributions of the Board of Governors and our International Trustees.

Professors Carolyn Geczy and Ben Freedman have made invaluable contributions to the scientific governance of the HRI in the last year, and provided continuity in the face of some changes in our scientific groups since our last report. Associate Professor Martin Ng from our Translational and Bioengineering Group has moved on from his role as Visiting Group Leader. Assoc Prof Ng continues to contribute to the prevention and treatment of heart disease in his role as a leading cardiologist at the Royal Prince Alfred Hospital (RPAH). Dr Christina Bursill from our Immunobiology Group left HRI to take up an exciting opportunity in South Australia at SAHMRI and is now a Visiting Scientist of the HRI. Associate Professor Clare Hawkins from our Inflammation Group and Dr David Pattison of the Free Radical Group left HRI to join our former Director, Professor Mike Davies at the University of Copenhagen. Drs Hawkins and Pattison are now both HRI Visiting Scientists.

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In such a climate, it is essential that the work of the HRI is of the highest scientific standard and of the highest scientific impact.  
”

We have been delighted to welcome two outstanding new recruits to the HRI. Dr Freda Passam has already established her new Haematology Research Group at the HRI, and will hold a clinical appointment at RPAH, and, in the near future, we will be welcoming Dr Ashish Misra, a scientist from Yale University in the USA.

Many of our scientists have received awards this year – Dr Freda Passam gained a Ramaciotti Health Investment Grant and Associate Professor Sanjay Patel a Ramaciotti Foundation Grant together with a NSW Health Fellowship, Dr Roxanne Darbousset an International Society Thrombosis and Haemostasis Young Investigator Award and a NSW Cardiovascular Symposium Rising Star Award, Dr Laura Norton a NHMRC Peter Doherty Early Career Fellowship, Dr Lining (Arnold) Ju an International Society on Thrombosis and Haemostasis Young Investigator Award and a National Heart Foundation of Australia Paul Korner Innovation Award, Dr John O'Sullivan a Sydney Medical School Catalyst Award and Chapman Fellowship, Dr Nicole Lowres a NSW Health Early Career Postdoctoral Fellowship, Mrs Jessica Maclean the Charles Perkins Centre Student Researcher Award, and Associate Professor Simone Schoenwaelder the Sydney Local Health District Mentor of the Year Award. Dr Steve Wise gained a Qantas Side by Side Program Grant and Kirby Foundation Grant, while Dr Siân Cartland gained the HRI Early Career Researcher Award. It was also particularly pleasing to see our senior scientists recognised with Professor Annemarie Hennessy gaining Teacher of the Year at Campbelltown Hospital and Professor Ben Freedman being awarded the Arrhythmia Alliance Award for Outstanding Individual who has contributed to arrhythmia services in 2016 and the Atrial Fibrillation Association 2017 Healthcare Pioneers Award for AF-SCREEN International Collaboration.

Among the unsung heroes of the HRI are our administrative and

“It is a singular privilege to serve in this role and I hope in this report to encourage you, the supporters of the HRI, to share in the excitement of scientific discovery.”

Professor  
Len Kritharides

operational teams who are essential for the good governance of the HRI and provide the infrastructure our scientists need to undertake their work. This year, our former Chair, Dr Stephen Hollings took up the post as CEO of the HRI in order to strengthen the administrative and operational functions of the Institute, and to work closely with Professor Jackson to develop our partnerships with affiliates including The University of Sydney and the Sydney Local Health District. Stephen left me very big shoes to fill as Chairman of the Board, and has made an immediate impact on the running of the HRI. To Dr Hollings and to Professor Jackson, a very big thank you.

Scientific brilliance is not enough to generate world-class research. Good work requires resources, manpower and equipment. Current NHMRC grant success is less than 13%, but the funding for cardiovascular research in Australia is worse, and, as a proportion of the total research budget, is at an all-time low. This is a remarkable paradox given the prevalence

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Scientific brilliance is not enough to generate world-class research. Good work requires resources, manpower and equipment.  
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and incidence of cardiovascular disease in our community. In this environment the scientists of the HRI are critically dependent on support from donors and the work of our fundraising team. To all our donors, and our fundraising team in Australia and abroad, thank you.

The HRI is growing and facing an exciting future, underpinned by a strong history of scientific excellence. I encourage you to read the HRI Annual Review, and share in the sense of excitement and discovery that HRI research brings.

**Professor Len Kritharides**  
MBBS PhD FRACP FCSANZ FAHA FESC  
Chairman, Board of Governors,  
The Heart Research Institute

## FACE THE FACTS:

Cardiovascular disease is Australia's (and the world's)

#1 KILLER



# The Second Coming of Cardiovascular Disease

Professor Shaun Jackson

The fight against cardiovascular disease (CVD) is a never-ending journey. Despite huge progress in prevention and treatment over the past 50 years, heart disease remains Australia's number one killer. The core mission of the Heart Research Institute (HRI) – to improve our understanding of the causes and complications of heart disease – therefore remains essential. Now, however, we must redouble our efforts, as we find ourselves at a time in history where deaths from CVD appear to be rising again, most worryingly in younger age groups.

The alarming reality is that Australia is now entering the early stages of a renewed cardiovascular disease epidemic. This 'Second Coming of Cardiovascular Disease' has the potential to undo much of the gains in 'heart health' that have been achieved over the

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**The alarming reality is that in 2017, Australia as a nation finds itself in the midst of a chronic and growing cardiovascular disease epidemic.**  
 ”

past 50 years. While great progress has been made in reducing the impact of smoking, high cholesterol and blood pressure on heart health, future cardiovascular diseases are being increasingly propelled by surging rates of obesity and diabetes. Such lifestyle diseases are rapidly becoming the greatest healthcare challenge of the 21st century. It has been predicted that by 2025, up to 75% of adult Australians will be overweight or obese. The rate of childhood obesity has doubled during the last 20 years, with 1 in 5 children becoming overweight or obese. This is why research into the adverse effects of obesity and diabetes on cardiovascular disease is crucial, as 70% of diabetics will die from the complications of CVD, particularly heart disease.

#### A YEAR OF TREMENDOUS ACHIEVEMENTS

I am pleased to report that there is much to be celebrated on the research front. I continue to be impressed with the commitment and dedication of our researchers, which I must note, has been sorely tested of late by the hypercompetitive nature of medical research and the dearth of currently available research funding.

Rather than focus on the specific achievements of individual researchers, of which there are many, a powerful indicator of the overall success of the HRI's research efforts over the last 3 years (2015–2017) is the striking increase in the quality and impact of our work. Over this period, nearly 30% of all research studies from the HRI have been published in the highest ranking clinical and scientific journals, including Lancet, New England Journal of Medicine, Circulation, Journal of Clinical Investigation and a suite of Nature journals. This is an outstanding achievement by our scientists and clinical researchers, and indicates that our research is on a par with the very best medical research institutes in the world.

#### COLLABORATIONS ACROSS NEW SOUTH WALES

Beyond the wonderful work being done within the walls of the HRI and Charles Perkins Centre, we are continuing to work collaboratively with the Victor Chang Cardiac Research Institute, the New South Wales Cardiovascular Research Network, and other state cardiovascular medical research institutes to establish New South Wales as The Premier State for Heart Health. This is an exciting initiative that has the potential to profoundly benefit future research at the HRI, and is something that I look forward to updating you on in the years ahead.

Further highlighting our strong collaborative partnerships, the HRI and Victor Chang Cardiac Research Institute jointly hosted the 2017 Sydney Cardiovascular Research Symposium. This annual event brings together all stakeholders in NSW cardiovascular research to exchange ideas, explore collaborative opportunities and celebrate the vital and exciting health research sector that exists in NSW.

#### RECRUITMENT

This year the HRI has also continued to advance our international recruiting campaign in collaboration with the Charles Perkins

Centre, The University of Sydney and the Sydney Local Health District. This highly successful effort was launched in 2016 to attract exceptional national and international early to mid-career researchers who have the demonstrated potential to become global leaders in cardiovascular research.

The HRI was fortunate to recruit Dr Freda Passam as our newest scientific Group Leader. Dr Passam has a unique clinical training in haematology, with a commitment to basic and translational research in the haemostasis and thrombosis field, having received her MD and PhD in her home country of Greece. Dr Passam came to Australia in 2007 as a postdoctoral fellow at the University of New South Wales (UNSW). In 2008 Dr Passam received an International Award from the American Society of Haematology, enabling her to pursue postdoctoral studies at Harvard University (USA), returning to Australia in 2014. Prior to joining the HRI in 2017, Dr Passam was senior lecturer in Medicine at UNSW.

We also welcome Dr Ashish Misra from the Yale Cardiovascular Research Center (YCVRC), Yale University (USA), where he was a Postdoctoral Associate. Dr Misra, a recipient of the Yale Brown Coxé Postdoctoral Fellowship, holds a research interest in the cellular and molecular mechanisms of blood vessel wall development and the pathogenesis of diverse cardiovascular diseases.

“  
**This year the HRI has also continued to advance our international recruiting campaign in collaboration with the Charles Perkins Centre, The University of Sydney and the Sydney Local Health District.**  
 ”

#### INTERNATIONAL RESEARCH LINKS & COLLABORATIONS

The HRI has continued to strengthen its partnerships with Georgia Tech (USA) and Harvard University (USA) to augment the quality of bioengineering work currently undertaken at the HRI and The University of Sydney. We are also progressing a number of exciting initiatives with world-leading scientists, including those at Cambridge University (UK), to help understand the genetic basis underpinning cardiovascular diseases such as heart disease and stroke.

#### LEADERSHIP DEVELOPMENT

I am delighted to report that Dr Stephen Hollings accepted the position of CEO to work with the HRI's scientists and executive leaders in realising our ambitious future plans. Stephen has been a tremendous supporter and enabler of the transformational changes that are occurring at the HRI, first in his role as Chairman and now as CEO.

It is imperative to acknowledge the wonderful support provided by our newly appointed Chairman of the HRI Board of Governors, Professor Len Kritharides, and congratulate him on his elevation to this role. This is yet another wonderful accolade for Len, who (amongst many other career distinctions) was the first cardiologist to complete his PhD at the HRI over 26 years ago. I would also like

Left: Professor Shaun Jackson, Director of Cardiovascular Research



In 2004, renowned American cardiologist Valentin Fuster and his colleagues made the startling prediction that "one in three children born in the year 2000 will develop diabetes, resulting in a 30 per cent reduction in life expectancy". If true, this would cut short the lives of millions of Australian children by up to 25 years, making it the first time in human history that children would, on average, die earlier than their parents.

to recognise the major contributions of the rest of our Executive Team in 2017, including Director of Science Strategy Professor Ben Freedman, acting Eliza Street Scientific Director Carolyn Geczy, Fundraising Director Richard Wylie, Human Resources Director Elissa Dwyer and Executive Assistant Vania Dauner.

I am similarly pleased to announce the appointments of Dr Mary Kavurma and Associate Professor Simone Schoenwaelder to Associate Director of Research Management and Education across the HRI's two research sites at Eliza Street and the Charles Perkins Centre. Mary and Simone are wonderful young scientists who are playing a major role in building the culture of excellence that is so critical to the HRI's success.

Thank you to the HRI Operations Teams for their hard work in supporting our researchers throughout 2017. It is greatly valued by us all.

Finally, and most importantly, none of the vital work performed at the HRI would be possible without the wonderful support of our donors. Your generosity keeps our passionate and talented researchers in the lab, where they can advance their groundbreaking work.

**Professor Shaun Jackson**  
 MBBS BMedSci PhD  
 Director of Cardiovascular Research

#### FACE THE FACTS:

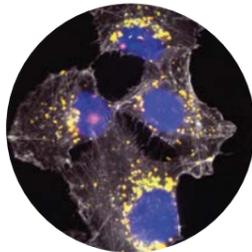
Cardiovascular disease is already the leading cause of death in Australia and also our most expensive disease, costing \$7.74 billion each year (compared to \$4.95 billion for cancer)

# 2017 Research Highlights



## Plasma-based Nanoparticles

In 2017, the HRI's **Applied Materials Group** collaborated with The University of Sydney to design unique plasma reactors which can modify gas atoms for use in medical applications, including device surface coatings. Applied Materials Group PhD student Miguel Santos made a serendipitous discovery while studying plasmas – a new class of bioactive nanoparticles. Nanoparticles hold great promise as drug carriers for medicine, imaging agents (to locate sites for treatment), and therapeutics for a wide range of diseases.



**Left:** Breakthrough multifunctional nanoparticles (bright yellow, green and red dots) interacting with cells (cell nuclei shown in blue). Image captured by Miguel Santos

**Above:** Praveesuda Michael from Applied Materials Group and Vickie Tang from Inflammation Group

## Hearts & Minds

Hypertension, or high blood pressure, is known as a 'silent killer' and is responsible for the deaths of thousands of Australians each year. The condition is also a major risk factor for other cardiovascular diseases. Now, a new treatment is on the horizon, as the HRI's **High Blood Pressure Group** has uncovered a brain chemical, the neurotransmitter PACAP, instrumental in triggering hypertension. The team is investigating whether this neurotransmitter is able to predict hypertension in lab models of diabetes and obesity, before further investigating the use of a PACAP drug in human patients.

## 4DBIOMARKER

Analysis from the HRI's **Cardiac Imaging Group's** 4DBIOMARKER project is starting to reveal fundamental insights about physiology that have not been previously possible due to inadequate imaging data. The group's comprehensive model of aortic flow provides a vastly superior prediction of pathological aortic flow in comparison to the current clinical stock measure, aortic diameter. This model will soon enable cardiac surgeons to more accurately predict which patients are at risk of dilation.

“  
The 4DBIOMARKER project is starting to reveal fundamental insights about physiology that have not been previously possible due to inadequate imaging data.  
”

## Unsurpassed Flow Image Acquired

The highest-resolution flow image ever produced was acquired by the HRI's **Cardiac Imaging Group** as part of their preparation for a porcine heart failure study with Westmead Hospital's Chief Investigator James Choong. The generated data will represent the most detailed structural, functional and electrophysiological dataset yet acquired.

“Diabetes is Australia's fastest growing disease, with approximately 1.2 million Australians diagnosed.”



## Crystal Ball Molecule Predicts Diabetes Before it Strikes

Diabetes is Australia's fastest growing disease, with approximately 1.2 million Australians diagnosed. Individuals with diabetes are twice as likely to develop cardiovascular disease. The HRI's **Cardiometabolic Disease Group** has uncovered an important molecule found in liver fat that can identify who is most at risk of developing diabetes and other cardiometabolic disorders like liver disease. This breakthrough has significant implications for detecting and preventing diabetes. The team will carry out further testing to establish more firmly if targeting this pathway can prevent diabetes or reduce its severity.

## Inspired by Nature

The HRI's **Cardiovascular Medical Devices Group** is investigating super-slippery, liquid-repellent surface coatings for medical devices such as artificial hearts, stents, grafts and bypass machines. The current materials used in most medical devices can produce dangerous side effects such as blood clots; this new coating could eliminate many critical side effects.

## Common Drug Could Help Prevent Heart Attacks

Building on their landmark discovery that colchicine, an anti-inflammatory drug used to treat arthritis, can also improve heart health in people who have suffered a heart attack, the HRI's **Cell Therapeutics Group** has shown in 2017 studies that the drug can also clear clogged arteries in heart attack survivors. The team's next step is to run a randomised controlled clinical trial to provide a more definitive result, and to conduct further mechanistic studies to better understand the drug's anti-inflammatory effects in the context of cardiovascular disease, specifically acute coronary syndrome.

### FACE THE FACTS:

What are the common causes of a heart attack & stroke?

The narrowing of arteries by atherosclerosis (the build up of cholesterol and inflammatory cells) and the cessation of blood flow by thrombosis (formation of a blood clot)

## 4D-flow: The Future of Cardiac MRI

The HRI's **Cardiac Imaging Group** generated the first-ever accurate population measurements of wall shear stress in the human aorta using an innovative 4D-flow acquisition and a novel analysis approach. This will now enable scientists to directly evaluate the key measure that drives atherosclerosis and aneurysm formation, and vascular dissections.

## New Global Drug Treatment for Preeclampsia

In 2017, the HRI's **Vascular Immunology Group** developed and tested a new drug for severe preeclampsia treatment that would allow a pregnancy to continue safely without requiring dangerous early delivery. This treatment will be safe, cost effective, and heat resistant. It would benefit women and newborns around the world, as the majority of preeclampsia cases occur in Africa, India and South America. In these locations, cost, rapid availability and safety are key factors for the success of any new medical treatment. The Group's findings are now under consideration for publication in a major international journal. The global benefit of this treatment also caught the attention of the Bill & Melinda Gates Foundation, who have funded the drug's development to date.

“**The global benefit of this treatment has also caught the attention of the Bill & Melinda Gates Foundation, who have funded the drug's development to date.**”

## Improved Treatment Options for NAFLD

Non-alcoholic fatty liver disease (NAFLD) is the most common liver disorder in the Western world. It is characterised by the abnormal accumulation of fat (steatosis) in the liver in the absence of excess alcohol consumption and incorporates a spectrum of diseases, with cardiovascular disease accounting for the majority of NAFLD patients' deaths. The HRI's **Vascular Complications Group** has made significant progress in understanding the molecular and cellular changes that occur in the liver during the progression of NAFLD. The Group's research is promising for the development of more sophisticated treatment options for patients.

## BioHEART

BioHEART is the HRI's **Cardiac Imaging Group's** assembly of a 5,000 patients biobank combining "Omics" (metabolomics, genetics, proteomics, etc) with CT coronary data. In 2017, the pilot phase (with 800 participants) was completed. The Group is partnering with Siemens to apply and extend advanced artificial intelligence analysis of plaque, which will greatly enhance the power to detect "hidden" risks not currently represented in conventional risk factors.



**“Gut ischemia is common in critically ill patients and can result in thrombosis or damage to different organs.”**

Right: Dr Melissa Farnham from High Blood Pressure Group and Dr Arnold Ju from Thrombosis Group

## Platelet-Neutrophil Macroaggregates

The HRI's **Thrombosis Group** has discovered that platelet-neutrophil macroaggregates are implicated in pulmonary thrombotic disorders commonly associated with gut ischaemia in critically ill patients. This research, published in *Science Translational Medicine* (Yuan et al. *Science Translational Medicine*; 2017), is centered on a novel "rip 'n' roll" mechanism that promotes platelet-neutrophil macroaggregates in gut ischaemia-reperfusion injury. Gut ischaemia is common in critically ill patients and can result in thrombosis or organ damage. The mechanisms of how this occurs are not yet fully understood, however studies by the Thrombosis Group have contributed great insight. These studies, led by Group members Dr Yuan, Dr Wu and Mr Alwis, demonstrated that rolling neutrophils rip

“**Platelet-neutrophil macroaggregates are implicated in pulmonary thrombotic disorders commonly associated with gut ischaemia in critically ill patients.**”

off fragments of dying platelets following gut ischaemia-reperfusion injury. The membrane fragments then facilitate the formation of macroaggregates by 'gluing' together several neutrophils, which lodge in distant organs. Macroaggregates were found to cause pulmonary thrombotic disorder that was not effectively targeted by conventional anti-thrombotic therapies. However, targeting cyclophilin D, a mitochondrial regulator of cell necrosis, did prevent neutrophil macroaggregation and pulmonary thrombosis. These results suggest that targeting platelet death pathways may help reduce pulmonary thrombosis in critically ill patients.

## TRAIL Trials

Tumor necrosis factor-related apoptosis-inducing ligand (TRAIL) is a cytokine known to regulate multiple cellular functions including cell proliferation, migration, differentiation and death. The HRI's **Vascular Complications Group** has discovered that people with increased severity of non-alcoholic steatohepatitis (NASH) have significantly reduced levels of TRAIL compared to healthy patients or patients with steatosis. The team determined that low TRAIL levels negatively correlate with alanine transaminase, a marker of liver injury. These findings show that a deficiency of TRAIL changes metabolic effects associated with increased dysfunction and inflammation in blood vessels. This work was published in the journal *Scientific Reports*.



**“With industry partner General Electric, the Cardiac Imaging Group has developed the most advanced brain imaging protocol ever.”**

## Beyond the Tape Measure

In 2017, the HRI's **Cardiac Imaging Group** initiated the Beyond the Tape Measure project, which aims to understand the pathobiology of aortic dilatation. This project has the potential to replace outmoded and imprecise diameter measures of the aorta with novel biomarkers that directly reflect the haemodynamics that drive disease.

## Chronic Diseases Connectome Project (CDCP)

The HRI's **Cardiac Imaging Group** has launched a multi-site study to better understand how the brain is affected by chronic cardiovascular and metabolic diseases, such as hypertension, heart failure, atherosclerosis, diabetes and obesity. With industry partner General Electric, the Group has developed the most advanced brain imaging protocol ever. This technology is unparalleled in its power to define the brain's circuits.



### FACE THE FACTS:

**45,392 LIVES CLAIMED IN 2015**

In 2015, cardiovascular disease claimed the lives of 45,392 Australians. That is 30% of all deaths... deaths that are largely preventable

# 2017 Media Highlights



## 4D is the Future

Appeared on ABC Catalyst, September 2017



Heart surgeons are always searching for a way to operate more accurately and efficiently. Dr Nikki Stamp, one of Australia's elite group of female heart surgeons, took a special interest in the work of Professor Stuart Grieve and the HRI's Cardiac Imaging Group. The Group discovered a new way to map the heart that will give surgeons the edge they need – 4D-flow imaging. This method measures the fluid dynamics within the heart and vessels in a quick, non-invasive way. Using this data, a computer model can be made to see and understand in and around the heart in a more accurate manner.

“  
The 4D-flow imaging method measures the fluid dynamics within the heart and vessels in a quick and non-invasive way.  
”

The development of 4D-flow imaging could not only change the landscape of cardiac imaging, but also the practice of cardiology in general, making it easier to diagnose conditions and help surgeons better plan their surgeries.

Watch the video on YouTube:  
[www.youtube.com/watch?v=ChkampUUVyw](http://www.youtube.com/watch?v=ChkampUUVyw)

### FACE THE FACTS:

It is estimated that 17.7 million people around the world died from cardiovascular disease in 2015, representing a staggering 31% of all global deaths. Due to the growing epidemics of diabetes and obesity, this number is expected to surge past 23 million by 2030



## Gout Drug Mends Broken Hearts

Appeared on Channel 7 News, December 2017

In a world-first in Australian research, the HRI's Cell Therapeutics Group discovered that a drug used to treat arthritis has the ability to clear clogged arteries and stop inflammation in heart attack survivors.

This landmark research paves the way for a cheap, simple, and effective treatment regime that could protect thousands of Australian heart patients from imminent heart attacks.

To date, this research is the strongest indication of a new, potent therapy capable of dramatically improving the outlook for heart patients.

“  
The Cell Therapeutics Group discovered that a drug used to treat arthritis has the ability to clear clogged arteries and stop inflammation in heart attack survivors.  
”

Full media report and video:  
[www.hri.org.au/latest-news/december-2017/gout-drug-mends-broken-hearts](http://www.hri.org.au/latest-news/december-2017/gout-drug-mends-broken-hearts)

“  
This new understanding of how clotting occurs in distinct instances will enable the discovery of new methods for treating or preventing clots, and ultimately save lives.  
”



## The Life & Death of Platelets

Appeared on ISTH TV, July 2017

At the International Society on Thrombosis and Haemostasis (ISTH) 2017 Congress in Berlin, Germany, Professor Shaun Jackson presented his work on 'Proinflammatory Function of Dying Platelets'.

The HRI's Thrombosis Group uncovered a distinct clotting mechanism triggered by ischaemic conditions that develops in the gut of critically ill patients. Gut ischaemia is a life-threatening disorder that can lead to systemic inflammation and multiorgan failure. Inflammatory changes occurring in the gut produce clots that damage other organs, particularly in the lungs. Ischaemic injury to the gut is particularly common in critical illnesses, such as severe sepsis, trauma, and transplant rejection.

This new understanding of how clotting occurs in distinct instances will enable the discovery of novel methods for treating or preventing clots, and ultimately save lives.

Full media report and video:  
[www.hri.org.au/latest-news/july-2017/the-life-and-death-of-platelets](http://www.hri.org.au/latest-news/july-2017/the-life-and-death-of-platelets)



## HRI at the Forefront of a Global Push for Stroke Screening

Appeared on Channel 9 News, May 2017

An international collaboration, AF-SCREEN, co-founded by the HRI Group Leader Professor Ben Freedman, is behind a global push to introduce national screening programs for the common heart condition, atrial fibrillation (AF).

AF affects five per cent of older Australians, in which the heart beats irregularly or rapidly. One in every three strokes is linked to AF, and is particularly severe. In about a third of AF-linked strokes, a heart condition wasn't diagnosed until after the stroke occurred.

The AF-SCREEN report calls for governments worldwide to introduce one-off screening for all older individuals. Findings indicate that screening 75 per cent of the Australian population aged 65 or older would prevent hundreds of devastating strokes every year.

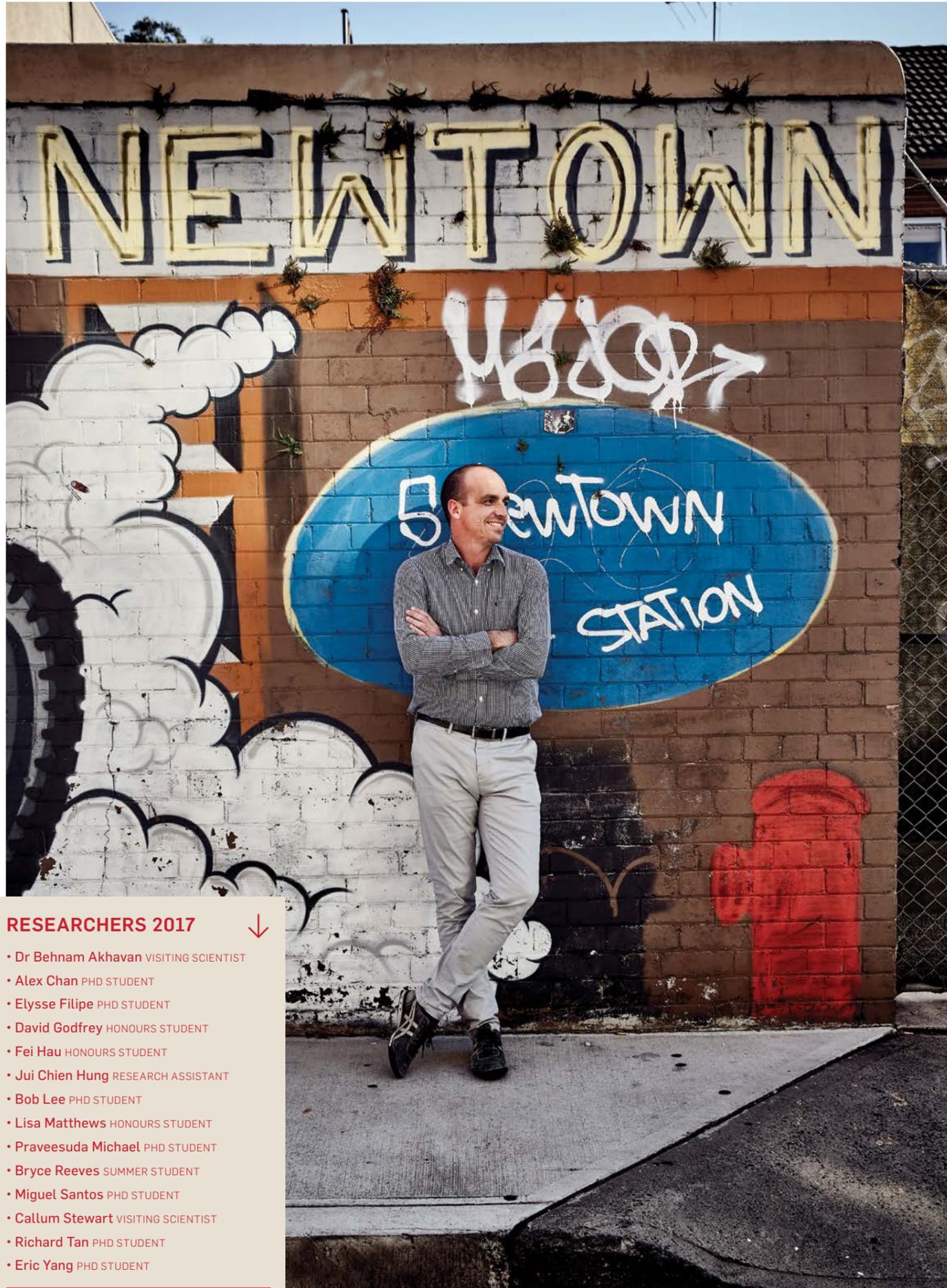
Left: Professor Shaun Jackson, Group Leader of the Thrombosis Group. Read the full Group report on Pg 38



Above: Professor Ben Freedman, Group Leader of the Heart Rhythm and Stroke Prevention Group. Read the full Group report on Pg 34

“  
Professor Ben Freedman is behind a global push to introduce national screening programs for the common heart condition atrial fibrillation.  
”

Full media report and video:  
[www.hri.org.au/latest-news/may-2017/hri-at-the-forefront-of-a-global-push-for-stroke-s](http://www.hri.org.au/latest-news/may-2017/hri-at-the-forefront-of-a-global-push-for-stroke-s)



## Applied Materials Group

### Dr Steven Wise

Group Leader  
BSc (Hons 1) PhD University Medal

The Applied Materials Group works to engineer and optimise innovative materials to be successful therapeutically in the treatment of vascular disease and, more broadly, tissue repair. The Group works with a wide range of unique biomaterials, including naturally derived proteins and polymers, and synthetically produced plasma surfaces and products.

#### GROUP MISSION

The mission of the Applied Materials Group is to develop the next generation of translatable bioactive materials – materials that can bond to living tissues – and provide better treatment options for people with cardiovascular disease.

#### IMPACT

The materials currently available for vascular repair are fundamentally incompatible with the human tissues they seek to fix. Metal alloys like stainless steel, and plastics such as those used in Gore-Tex jackets and drinking straws, are in wide use and rely on technology that has not significantly evolved for several decades. Discovery of new materials that could be used clinically would have a significant impact on the lives of countless patients.

#### RESEARCH PROJECTS & ACHIEVEMENTS 2017

##### Prolonging the Life of Stem Cells

Stem cells hold great promise in the treatment of heart failure and heart disease. To date, stem cell therapies have been limited by the failure of injected cells to firmly graft onto damaged tissue. To be therapeutically useful, the lifetime of stem cells delivered to injured tissue must be extended. The Applied Materials Group has developed new biomaterial patches which provide the physical and biological signals required by these cells to attach and grow. Screening through an array of scaffold materials, the Group has identified a recipe to increase the life of tissue repairing stems cells from 1 hour to 4 days in a pre-clinical model.

#### FACE THE FACTS:

More than 1 in 3 Australians has high blood pressure, one of the key risk factors for cardiovascular disease

**New Classes of Bioactive Materials Regulate the Inflammatory Response**  
A core interest of the Applied Materials Group is to understand the body's response to foreign, implanted materials. The Group has developed a new material which actively signals the body to control the inflammatory response to implants. This achievement is particularly relevant to diseases of the blood vessels, when inflammation and the body's own immune response are critical drivers of disease progression. These newly developed materials can direct the behaviour of the body's early response system, signalling to macrophages (inflammatory cells at the site of the injury) to switch into a reparative state, fast-tracking the healing response. Research has successfully demonstrated that the performance of patches and vascular grafts is greatly improved with this approach, with significant implications for all medical implants, and for the development of better materials for vascular repair.

#### RESEARCHERS 2017

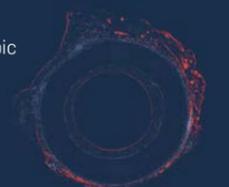
- Dr Behnam Akhavan VISITING SCIENTIST
- Alex Chan PHD STUDENT
- Elysse Filipe PHD STUDENT
- David Godfrey HONOURS STUDENT
- Fei Hau HONOURS STUDENT
- Jui Chien Hung RESEARCH ASSISTANT
- Bob Lee PHD STUDENT
- Lisa Matthews HONOURS STUDENT
- Praveesuda Michael PHD STUDENT
- Bryce Reeves SUMMER STUDENT
- Miguel Santos PHD STUDENT
- Callum Stewart VISITING SCIENTIST
- Richard Tan PHD STUDENT
- Eric Yang PHD STUDENT

#### RESEARCH HIGHLIGHT 2017

### Silk-based Biomaterials for Vascular Repair

In partnership with researchers at University of New South Wales, the Applied Materials Group successfully demonstrated that silk is a very promising material for building new synthetic blood vessels. Silk fibroin is a versatile natural polymer with remarkable mechanical properties. Purified silk is extremely well tolerated in the body, demonstrating a very low inflammatory response. The biodegradability and elasticity of silk can also be controlled during scaffold manufacture, making it a precious biomaterial.

The Silkworm Artery: Microscopic cross-section of a silk blood vessel after 6 months in a lab model



Left: Applied Materials Group Leader Dr Steven Wise pictured outside the HRI Newtown offices

# Cardiac Imaging Group

## Professor Stuart Grieve

### Group Leader

DPhil (Oxon) BSc (Hons) FRACP FCSANZCR FRANZ MBBS (Hons)

### IMPACT

Imaging is widely acknowledged as one of the top modalities that will dominate the clinical care and research landscape over the coming decades, however the ability to harness and translate new developments to the clinic lags behind technical advances. The Group spans the full spectrum from basic science to translation, providing a unique bridge across the gap between advances in technological, basic science and current clinical practice.

### ACHIEVEMENTS 2017

#### Cardiovascular and Neurovascular Phenotyping Reach Maturity

Over the last year, new imaging and analysis approaches to cardiovascular and neurovascular phenotyping pioneered by the HRI have reached maturity. The Group has begun the translational studies (4DCARE, Brain Passport, BioHEART, Digital Heart) that will move these advances toward routine use to the benefit of patients. Other achievements include the launch of Sydney Imaging (The University of Sydney's core facility) and the pre-clinical imaging facilities at the Charles Perkins Centre (CPC), as well as the launch of a hybrid suite at CPC that will enable larger scale experiments needed for aortic and heart failure projects.

“The Cardiac Imaging Group's work is focused on cardiovascular and neurovascular chronic diseases, with the aim to develop and apply methods to detect and quantify early diseases while reversible.”

”

### FACE THE FACTS:

# 80%

of premature cardiovascular disease, stroke and diabetes can be prevented

The Cardiac Imaging Group's research covers several major cardiovascular and neurovascular chronic diseases, with an emphasis on discovering fundamental biomarkers for application in the clinic. The Cardiac Imaging program is a highly multidisciplinary, translational research effort involving engineers, basic scientists, psychologists, physicians, surgeons, radiologists and imaging scientists. The Group collaborates with international and Australian researchers, and works closely with related industries to continually advance medical imaging and computational technology.

### GROUP MISSION

The mission of the Cardiac Imaging Group is to improve patient outcomes using cutting-edge imaging technology and computational methods. The Group's work is focused on cardiovascular and neurovascular chronic diseases, with the aim to develop and apply methods to detect and quantify early diseases while reversible.

### RESEARCH GOALS

The primary research goal of the Cardiac Imaging Group is to build and apply integrative, individualised heart models based on patient data that are capable of early disease detection and prediction. This is most relevant to the epidemic of heart failure, a condition which currently lacks accurate methods of early measurement and diagnosis. Further priority research focuses on the development and application of the accurate measure of currently "invisible" brain damage, secondary to cardiovascular disease or chronic disorders. The Group aims to improve practices and therefore the outcome of disease progression.

Right: Cardiac Imaging Group Leader Professor Stuart Grieve pictured in the Charles Perkins Centre



### RESEARCHERS 2017



- Samantha Barclay  
NZ SUMMER STUDENT
- Aurore Berne  
INTERNATIONAL INTERN
- Dr Fraser Callaghan  
POSTDOCTORAL RESEARCHER
- Dr Sarah Hellewell  
POSTDOCTORAL RESEARCHER
- Matthew Lyon  
RESEARCH ASSISTANT
- Vivek Ramakrishna  
INTERN
- Dr Thomas Thong  
POSTDOCTORAL RESEARCHER
- Dr Tom Welton  
POSTDOCTORAL RESEARCHER

### RESEARCH PROJECTS 2017

#### Porcine Stem Cell Heart Failure Study (funded by NHMRC Project APP)

This project combines cutting-edge stem cell biology, electrophysiology and our imaging expertise to create a porcine model of heart failure. A collaboration across the Sydney Health Partners, the HRI/CPC, University of Washington and the Millennium Institute Westmead (CI James Choong & Eddy Kizana), the project follows the Cardiac Imaging Group's successful CVRN project on PDGF in a porcine heart failure model and will showcase the technological advances developed at HRI.

#### 4DCARE

The largest prospective trial of 4D-flow cardiac MRI ever, this is a multi-site study aiming to validate the use of 4D-flow centric protocol for routine clinical use. If successful, this would cut the imaging time for cardiac MRIs by at least 50%, while improving sensitivity and specificity.

#### The Digital Heart Project

The Digital Heart Project is a new project which builds on past group studies. It will combine real world MRI, CT and ultrasounds data with clinical measures (ECG, blood biomarkers, clinical

outcomes) to build a multidimensional digital representation of the heart ("digital heart").

#### The Brain Passport Project (funded by NHMRC Project APP)

The Brain Passport Project leverages off the HRI's world-best imaging capability in diffusion imaging, with the global aim of visualising the pathology in currently "invisible" brain disorders such as concussion, surgical brain injury, depression and brain dysfunction in cardiovascular/metabolic disorders such as hypertension, diabetes and obesity.

RESEARCHERS 2017



- Dr Jacob Cao  
MEDICAL INTERN RPA, SCIENTIST
- Dr Yen Chin Koay  
POSTDOCTORAL SCIENTIST
- Barry Koh  
TALENTED STUDENTS PROGRAM,  
THE UNIVERSITY OF SYDNEY
- Courtney Louise Wood  
TALENTED STUDENTS PROGRAM,  
THE UNIVERSITY OF SYDNEY



# Cardiometabolic Disease Group

## Dr John O'Sullivan

Group Leader  
MD PhD MSc Cert Biostatistics (Harvard) FAHA FRCPI

The Cardiometabolic Disease Group aims to prevent and reduce cardiovascular complications of metabolic disease related to the global obesity epidemic. Of the four common modifiable cardiovascular risk factors (hypertension, high cholesterol, smoking, and diabetes), only diabetes continues to increase in prevalence, driven largely by the obesity epidemic. Intervention in diabetes and atherosclerosis is most effective when instituted early. Using functional genomic approaches, the Group studies early metabolic change in people at risk for cardiometabolic disease in order to find early markers, effectors, and predictors of the disease. The team performs functional studies in the laboratory to determine if these pathways are causal and can be used as therapeutic targets.

### GROUP MISSION

The mission of the Cardiometabolic Disease Group is to improve the detection and treatment of cardiovascular disease through the development of better diagnostic markers, predictors, and novel therapies for cardiometabolic disorders.

### RESEARCH GOALS

The goal of the Cardiometabolic Disease Group's research is to discover new biomarkers of early cardiovascular disease, new disease targets, and predictors of future disease in order to develop unique treatment therapies.

### IMPACT

In 2017, the Cardiometabolic Disease Group discovered several biomarkers of cardiometabolic disease, including a novel marker of liver fat that independently predicts diabetes over a decade in advance. By enabling earlier intervention, a transformative impact can be made on the health of the hundreds of millions of people who are diabetic or pre-diabetic.

### RESEARCH PROJECTS 2017

#### A New Therapy for Fatty Liver and Diabetes

The Cardiometabolic Disease Group recently discovered a new pathway that links liver fat to type 2 diabetes and can independently

### FACE THE FACTS:

Smoking is estimated to cause nearly

**10%**

of cardiovascular disease

predict future diabetes 12 years ahead of diagnosis. Future research will determine if this new pathway can be used to treat fatty liver disease and/or diabetes. The Group has organised the necessary expertise, transgenic models, and human cohorts to probe this finding more thoroughly and assess its therapeutic potential.

#### Novel Disease Pathways in Coronary Artery Disease

Up to 30 per cent of patients who present with myocardial infarction do not have traditional risk factors. Mirroring this observation, two-thirds of the genomic loci associated with coronary artery disease are not associated with traditional risk factors. Working with partners across Sydney, and using a functional genomic approach, the Cardiometabolic Disease Group hopes to uncover the mechanism conferring disease in patients without traditional risk factors in order to find new therapeutic targets.

#### A Novel Class of Treatments in Heart Failure

It was recently demonstrated that SGLT2 inhibitors, used to treat type 2 diabetes, unexpectedly conferred significant cardiovascular benefits, postulated to occur via enabling the heart to use alternative substrates in heart failure. Using extensive metabolomic screening platforms, the Cardiometabolic Disease Group aims to determine how these agents are leading to improved cardiovascular outcomes so that more pointed approaches may be developed.

#### Novel Therapeutic Strategies in Type 2 Diabetes

Working in partnership with the Garvan Institute, the Group is using omic technology in deeply-phenotyped cohorts of patients with liver and muscle insulin resistance to guide targeted type 2 diabetic therapy.

### ACHIEVEMENTS 2017

In 2017, the Cardiometabolic Disease Group was awarded the Sydney Medical School Foundation Chapman Fellowship 2017–2020 and received two Sydney Medical School Catalyst accolades.

Left:  
Cardiometabolic Disease Group Leader Dr John O'Sullivan pictured in the Charles Perkins Centre



## Cardiovascular Medical Devices Group

### Dr Anna Waterhouse

Group Leader  
BSc (Hons 1) PhD

The research of the Cardiovascular Medical Devices Group focuses on how medical devices – such as artificial hearts, stents and bypass machines – interact with the body. The team applies cutting-edge bioengineering tools to develop new methodologies to assess and understand the interplay of events at biointerface, and manipulate this interplay to improve medical device function. Research results are also applied to creating novel devices, diagnostics, drug and non-drug based avenues for therapies.

### RESEARCHERS 2017



- **Catherine Fiu**  
BIOMEDICAL ENGINEERING SUMMER STUDENT
- **Sally Gao**  
RESEARCH ASSISTANT
- **Ravi Jaiswar**  
SYDNEY MEDICAL SCHOOL SUMMER STUDENT
- **Melissa Kwong**  
HRI WINTER STUDENT & SUMMER STUDENT
- **Isabelle Van Vuuren**  
SYDNEY MEDICAL SCHOOL SUMMER STUDENT
- **Alanah Varricchio**  
HRI WINTER STUDENT
- **Isabelle Van Vuuren**  
SYDNEY MEDICAL SCHOOL SUMMER STUDENT
- **Stephen Yau**  
HONOURS STUDENT & BIOMEDICAL ENGINEERING SUMMER STUDENT

“  
**The Cardiovascular Medical Devices Group utilises cutting-edge bioengineering tools to develop new methodologies for understanding the interplay of events at the biointerface.**  
”

#### IMPACT

Despite the widespread use of medical devices – such as artificial hearts, vascular stents, grafts, heart valves and pacemakers – in cardiovascular medicine, many side effects, including blood clots (thrombosis) and microbe adhesion (biofouling), are promoted by the materials used to make these devices. Thrombosis caused by medical devices is currently managed with medication that can cause additional complications, such as bleeding from antiplatelet or anticoagulant drugs. Biofouling is treated with antibiotics, however antibiotics cannot always penetrate the biofilm and the overuse of antibiotics is leading to antibiotic resistant pathogens. An increased understanding of biointerface interactions and methodology could lead to the development of new, more compatible materials and devices, ultimately reducing the use of drugs and risks for patients.

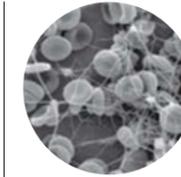
#### RESEARCH GOALS

The goal of the Cardiovascular Medical Devices Group is to develop materials that reduce foreign reactions in the body, therefore decreasing the incidence of blood clot formation and biofouling.

#### RESEARCH PROJECTS & ACHIEVEMENTS 2017

##### Biointerfaces

Understanding the interactions of medical devices with patients' blood, proteins and cells will enable the development of more sophisticated and compatible materials used in medical devices that diagnose and treat cardiovascular disease. To achieve these goals, the Cardiovascular Medical Devices Group utilises cutting-edge bioengineering tools to develop new methodologies for understanding the interplay of events at the biointerface. This includes immobilising proteins or creating anti-adhesive coatings, and investigating the biological response to the materials' interface using advanced microscopy and surface analysis tools.



Above: Magnified blood clot starting to form on a material surface

Left: Dr Anna Waterhouse pictured in her Charles Perkins Centre office

#### Bioengineering Smart Materials

Medical device thrombosis and biofouling leading to sepsis causes significant morbidity and mortality worldwide. There is an urgent need to reduce the complications that arise from drugs designed to combat these life threatening conditions. Using bioengineering strategies, increasingly sophisticated materials can be constructed. Combining physical, chemical and biological surface modification methods, medical devices can be manipulated to interact with, repel or adhere to proteins or cells in a way that improves medical device function, creates novel diagnostics and devices, and progresses both drug and non-drug based avenues for therapies.

### RESEARCH HIGHLIGHT 2017

#### Biomimetic Model Systems

Advances in material fabrication techniques and 3D printing in micro and nanotechnology have revolutionised bioengineering, allowing high precision manipulation of materials for modelling medical systems and devices in the lab. Using these strategies, biomimetic in vitro model systems can be generated to recreate physiological conditions to evaluate medical device materials, geometries and drugs. Device failure mechanisms and how different disease states contribute to these failures can be investigated with the aim of developing new treatments or preventative therapies.

“Understanding the interactions of medical devices with patients' blood, proteins and cells will enable the development of more sophisticated and compatible materials used in medical devices that diagnose and treat cardiovascular disease.”

“  
**Advances in material fabrication techniques and 3D printing in micro and nanotechnology have revolutionised bioengineering.**  
”

## Cell Therapeutics Group

### Associate Professor Sanjay Patel

Group Leader  
FCSANZ FRACP MBBS (Hons 1) PhD



Above: Associate Professor Sanjay Patel talks to Channel 7 about the effects of oral colchicine. Read more on Media Highlights, pg 20

The Cell Therapeutics Group's research aims to develop novel therapies for targeting atherosclerosis (arterial blockages) and its consequences of heart attack and stroke. The treatment mission is to bypass arterial blockages by stimulating new blood vessel growth which will restore blood flow to affected regions. The Cell Therapeutics Group works in collaboration with the HRI Clinical and Translational Groups, drawing upon their expertise.

“  
The Cell Therapeutics Group mission is to reduce death and disability associated with heart and lower limb arterial disease by reducing atherosclerotic plaque build-up.  
”

#### IMPACT

Cell Therapeutics research has the potential to reduce death and disability caused by heart and lower limb arterial disease by reducing atherosclerotic plaque build-up in the blood vessels. This work also has the potential to reduce symptoms associated with insufficient blood supply to the heart and legs by stimulating the growth of new blood vessels in patients with arterial blockages.

Right: Associate Professor Sanjay Patel pictured at The University of Sydney

#### RESEARCH PROJECTS & ACHIEVEMENTS 2017

##### Boosting the Pro-angiogenic Properties of Stem Cells

The Cell Therapeutics Group continues to study the ability of a novel stem cell type (induced pluripotent stem cells) to boost new blood vessel growth in limbs with insufficient blood flow, and to aid in wound healing. The Group is also working in cooperation with other HRI Groups to design a scaffold on which stem cells can be delivered to tissue in a way that increases their longevity. Success with these studies is reflected in two papers published in the International Journal of Cardiology and Stem Cell Research and Therapy.

##### Determining the Anti-atherosclerotic Properties of TRAIL

Through collaboration with the HRI's Vascular Complications Group, the Cell Therapeutics team continues to study potential therapies to boost TRAIL, a mediator with marked anti-inflammatory and anti-atherosclerotic properties, in patients with coronary disease. This work has resulted in several 2017 presentations at international cardiovascular meetings, with two papers in preparation.

In partnership with researchers at the Kolling Institute, the Group is also studying novel drugs to boost new blood vessel formation.

#### RESEARCH HIGHLIGHT 2017

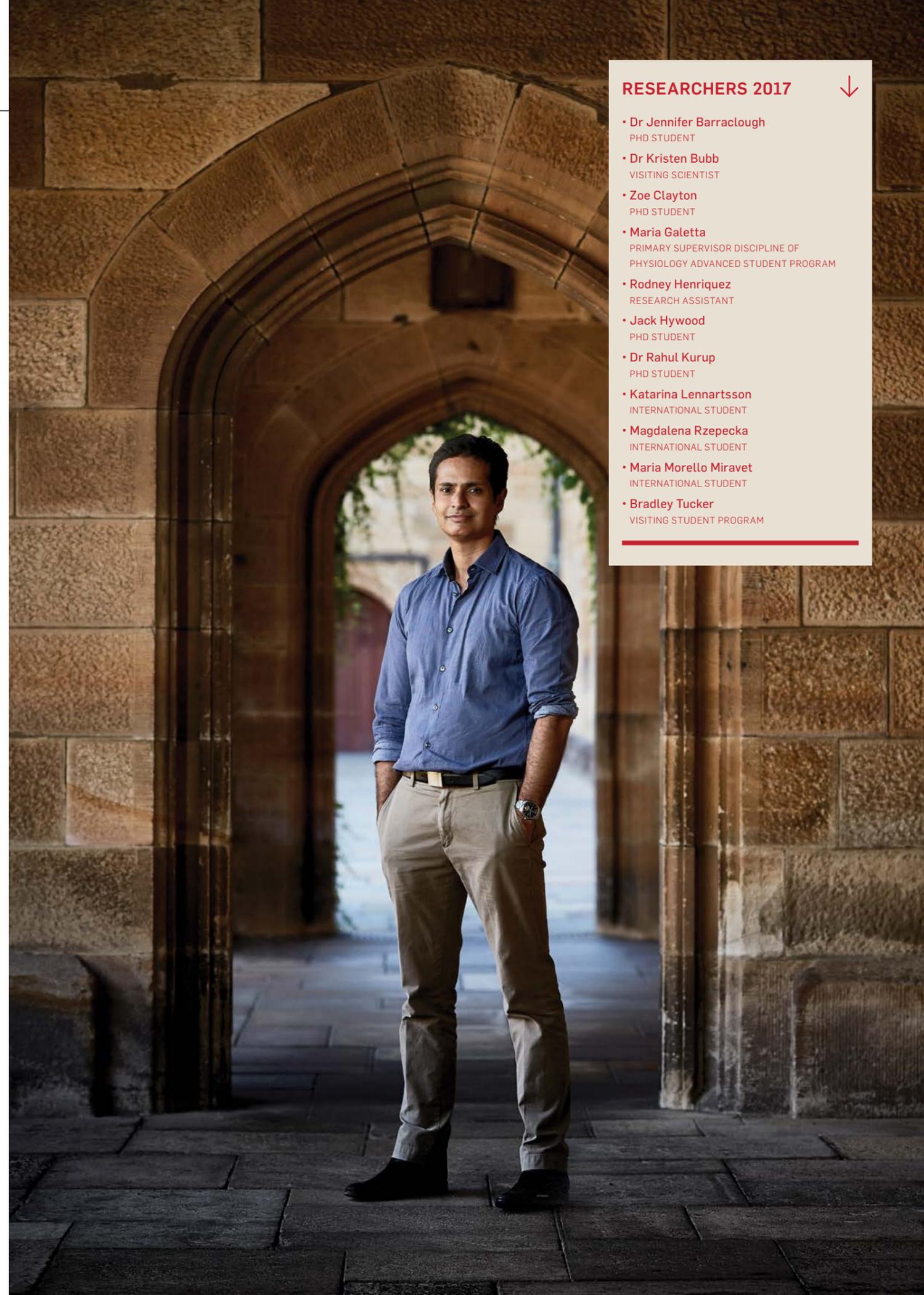
##### Anti-inflammatory and Anti-atherosclerotic Effects of Oral Colchicine

In 2017, the Cell Therapeutics Group showed for the first time that oral colchicine therapy reduces the "vulnerability" of human atherosclerotic plaque, making it less likely to rupture and acutely block blood flow to heart muscle. This exciting work was published in the prestigious Journal of American College of Cardiology (Imaging) and received considerable media attention. The first author of this paper was a finalist in the Young Investigator Prize session at the Cardiac Society of Australia and New Zealand Annual Meeting.

#### RESEARCHERS 2017



- Dr Jennifer Barraclough  
PHD STUDENT
- Dr Kristen Bubb  
VISITING SCIENTIST
- Zoe Clayton  
PHD STUDENT
- Maria Galetta  
PRIMARY SUPERVISOR DISCIPLINE OF  
PHYSIOLOGY ADVANCED STUDENT PROGRAM
- Rodney Henriquez  
RESEARCH ASSISTANT
- Jack Hywood  
PHD STUDENT
- Dr Rahul Kurup  
PHD STUDENT
- Katarina Lennartsson  
INTERNATIONAL STUDENT
- Magdalena Rzepecka  
INTERNATIONAL STUDENT
- Maria Morello Miravet  
INTERNATIONAL STUDENT
- Bradley Tucker  
VISITING STUDENT PROGRAM



# Clinical Research Group

## Professor David Celermajer

Group Leader

AO PhD MBBS MSc (Oxon) DSc FAHA FRACP FAA

The aim of the Clinical Research Group is to detect heart and blood vessel abnormalities at an early stage before a condition becomes irreversible. The Group designs interventions to treat a wide range of abnormalities, with a particular focus on the prevention of atherosclerosis in children and young adults exposed to risk factors for early heart disease such as obesity, passive smoke in the home, smoking themselves, or high levels of cholesterol. The Clinical Research Group also studies patients of all ages with pre-diabetes or diabetes, and babies who are born small at full term.

### GROUP MISSION

The primary mission of the Clinical Research Group is to detect cardiac and vascular disease more promptly, in order to administer treatments at an optimal early stage to prevent critical consequences.

### RESEARCH GOALS

The Clinical Research Group's goals are to detect and prevent complications from three formidable types of heart disease: 1) Atherosclerosis – the narrowing of main blood vessels and the primary cause of heart attack and stroke, 2) Pulmonary vascular disease – the narrowing of main blood vessels to the lungs, which can lead to an overload of the right side of the heart, and 3) Congenital heart disease – inborn heart problems, especially in adolescents and adults suffering from this chronic condition.

Right: Professor David Celermajer pictured at the Charles Perkins Centre

**"The Group designs interventions to treat a wide range of abnormalities."**

### FACE THE FACTS:

Around

**200**  
CHILDREN

die every  
year due to  
cardiovascular  
disease

Congenital  
heart disease  
affects

**ONE IN**  
**EVERY**  
**100**  
**BABIES**

### IMPACT

Early detection and prevention of advanced heart disease may save hundreds of thousands of lives each year.

### RESEARCH HIGHLIGHTS & ACHIEVEMENTS 2017

In 2017, Clinical Research Group member Dr Kelly Stanton finished data collection for her ongoing study of exercise in Army recruits, documenting in detail the effects of various degrees of exercise training on parameters of cardiovascular health.

PhD student Dr Jennifer Barraclough also concluded collecting data for research on patterns of obesity in childhood, and the health effects of different weight gain patterns on cholesterol levels and body fat distribution in teenagers.

Group Leader Prof Celermajer spent a two-month sabbatical at the University of Vienna, Austria, establishing novel collaborations in heart research with Austrian thought leaders. Amongst other publications, this resulted in Prof Celermajer publishing a German language editorial in the foremost Austrian newspaper, *Der Standard*, about cigarette smoking in Austrian youth.

Also in 2017, the Clinical Research Group published the largest series in literature to date concerning the outcomes of young adults born with one pumping chamber in their heart rather than two who underwent the preferred operation for this condition, the Fontan procedure.

**"** Early detection and prevention of advanced heart disease may save hundreds of thousands of lives each year. **"**

### RESEARCHERS 2017

- Dr Clare Arnott  
VISITING SCIENTIST
- Dr Julian Ayer  
VISITING SCIENTIST
- Dr Jennifer Barraclough  
PHD STUDENT
- Vivian Kienzle  
SENIOR RESEARCH ASSISTANT
- Dr Gonzalo Martinez  
VISITING SCIENTIST
- Calum Nicholson  
RESEARCH ASSISTANT
- Dr Kelly Stanton  
PHD STUDENT



The Group also successfully demonstrated that, among children who gain weight, gain in the first two years of life has more adverse consequences for teenage health than weight gained between two and five years of age.

In collaboration with the HRI's Cell Therapeutics Group, Clinical Research published an important paper studying the effects of colchicine on plaques in the coronary arteries, showing a beneficial influence on the composition of plaques. This will lead to a large-scale clinical trial, currently in the stages of planning.

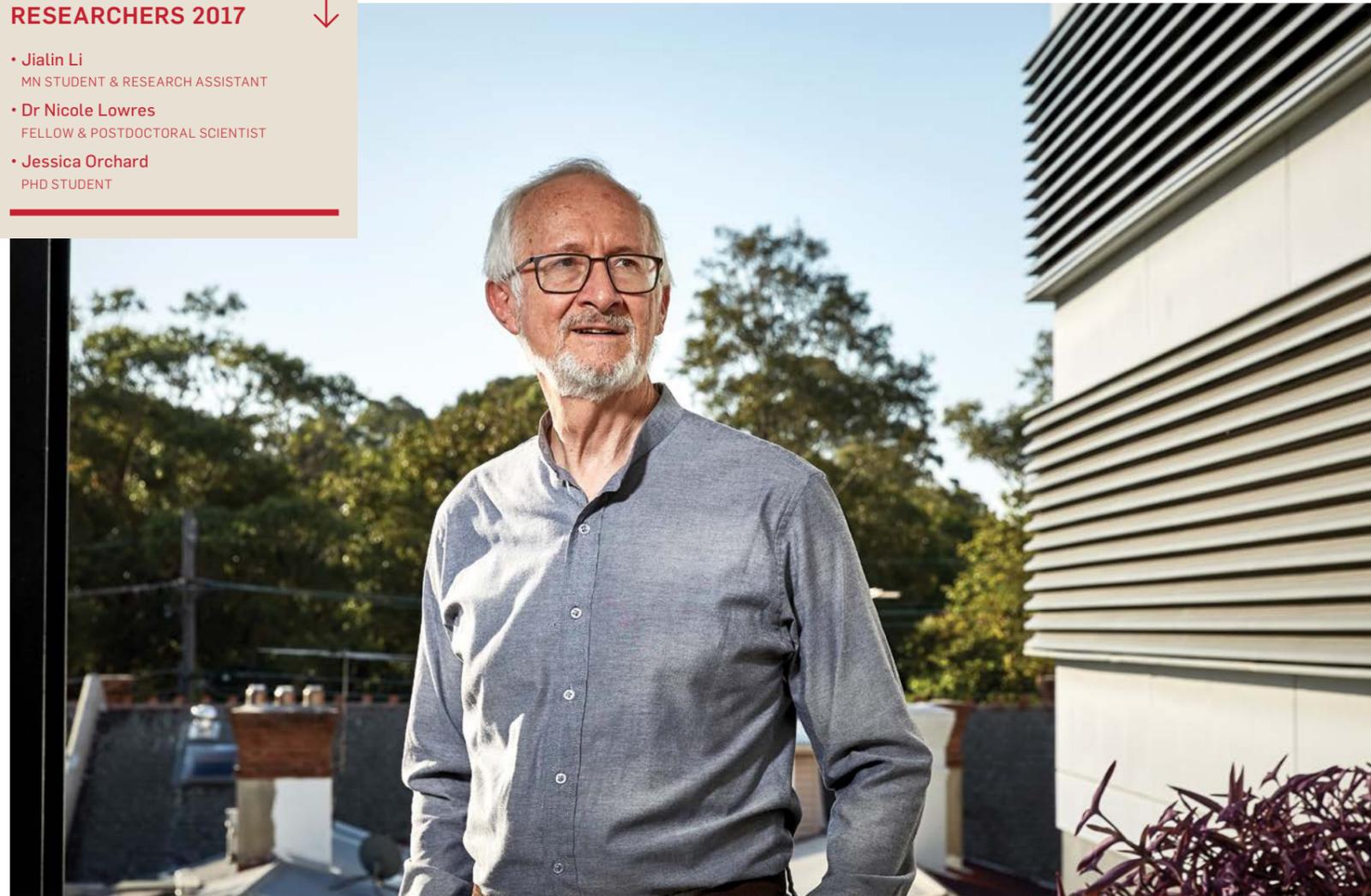
The most innovative, practice-changing article published by the Clinical Research Group in 2017 appeared in the world's premier cardiovascular journal, *The European Heart Journal*, on the causes and consequences of errors in the management of young adults with congenital heart disease. This article will have implications for the whole of life health care service provision for children and adults with congenital heart diseases, with the potential to save many children and young adults from the consequences of management errors, which are often catastrophic.

**"** Recent studies have shown that the origins of heart disease and vessel disease can begin even earlier – in the foetus. **"**

## RESEARCHERS 2017



- Jialin Li  
MN STUDENT & RESEARCH ASSISTANT
- Dr Nicole Lowres  
FELLOW & POSTDOCTORAL SCIENTIST
- Jessica Orchard  
PHD STUDENT



## Heart Rhythm and Stroke Prevention Group

### Professor Ben Freedman

Group Leader  
FACC FAHA FCSANZ FESC FRACP MBBS OAM PhD

The Heart Rhythm and Stroke Prevention Group's research relates to clinical implementation, with a focus on finding novel ways to implement strategies that reduce stroke by detecting unknown silent atrial fibrillation (AF). AF is the most common type of abnormal heart rhythm – it is estimated that individuals over the age of 40 have a one in four lifetime risk of developing AF. This abnormal heart rhythm disturbs the flow of blood inside the heart, leading to the formation of clots. Such clots can break off and travel to the brain, blocking brain arteries and causing severe strokes. AF is also a marker of abnormalities of the heart muscle and lining, both of which are predisposed to forming clots. AF is responsible for 1/3 of all strokes – strokes that are largely preventable by anticoagulant medications that prevent clots from initially forming. Unfortunately, AF is frequently silent, especially in older people who are at the greatest risk of stroke. The first sign of AF is often the severe stroke itself.

The Heart Rhythm and Stroke Prevention Group's AF screening research extends through collaborations with primary care and specialist clinics in the USA, Shanghai, Hong Kong, and UK.

The Group's main activities relate to determining how best to

“  
**AF is the most common abnormal heart rhythm – it is estimated that individuals over the age of 40 have a one in four lifetime risk of developing AF.**  
”

screen for AF at scale, and preventing as many strokes as possible. The more people screened and treated, the more strokes prevented.

Another major interest of the Group is to determine whether the indigenous population has a higher burden of AF by collaborating with the University of Auckland and the Poche Centre of The University of Sydney to screen in remote and rural Australia and in New Zealand.

#### GROUP MISSION

The mission of the Heart Rhythm and Stroke Prevention Group is to prevent strokes caused by silent AF through screening for this condition in various settings, and to treat AF using electronic decision support tools to increase effective preventive treatment.

#### IMPACT

The Group continues global advocacy for AF screening through the AF-SCREEN International Collaboration (a collective founded in part by Group Leader Prof Ben Freedman). This forum is likely to affect health guidelines, influence future government policy and have a global impact on stroke reduction. To recognise his leadership, Prof Freedman was awarded the Global Impact Award at the HRI's 2017 Illuminate award dinner.

#### ACHIEVEMENTS 2017

- Hosted the Second Consensus conference of the AF-SCREEN International Collaboration to promote research discussion and awareness of the potential for AF screening to reduce the global prevalence of stroke.

#### FACE THE FACTS:

**Atrial fibrillation (AF) is responsible for 1/3 of all strokes.**

**AF is frequently silent, especially in older people who are at greater risk of stroke, with the first sign of AF being a severe stroke**

- Publication of the AF-SCREEN International Collaboration white paper on screening in the journal *Circulation*, the flagship journal of the American Heart Association.
- Launched a screening program to be used in local pharmacies. The Group developed novel technology – a miniature ECG machine which attaches to the back of a smartphone – to allow instant, on-site screening with an initial diagnosis generated in 30 seconds. Unrecognised AF was detected in 15 out of 1,000 people screened.
- Completion of three pilot studies in general practice showing that practice nurses were ideally placed to screen older patients coming to see the doctor, and that screening by practice nurses during fluvax was effective in screening about a third of the eligible patients in the practice.

#### PROJECTS 2017

- The Heart Rhythm and Stroke Prevention Group partnered with researchers at the Chinese University of Hong Kong to screen in local cardiac clinics, general practices and communities (over 15,000 people screened)
- A study among metropolitan general practices using smartphone ECG and an electronic decision support tool
- A study of recurrence of postoperative AF after non-cardiac surgery and serious non-cardiac illness in Royal Perth Hospital and Gosford Hospital
- Collaboration with researchers in Royal Melbourne Hospital to detect AF post-stroke in Australia, Hong Kong and China
- Collaboration with researchers in Shanghai to screen in community centres (over 4,000 people screened)
- Collaboration with pharmacists in London to screen in pharmacies and test pathways for referral for treatment

Left: Professor Ben Freedman pictured at the HRI offices in Newtown, Sydney

## High Blood Pressure Group

### Professor Paul M Pilowsky

Group Leader  
BMBS BMedSc (Hons) FAHA PhD

#### GROUP MISSION

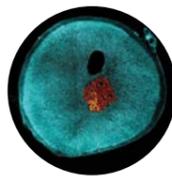
The mission of the High Blood Pressure Group is to determine how the central nervous system manages long-term control of blood pressure, and how the brain copes when these systems malfunction. Most recently, focused research has begun to address the role of inflammatory and ischaemic systems in the brain in relationship to blood pressure control.

#### ABOUT

The High Blood Pressure Group's research addresses all aspects of the brain's control of blood flow to different areas of the circulatory system.

#### IMPACT

High blood pressure is the cause of many severe health conditions, such as heart attacks, blindness, kidney disease, stroke and early death. The High Blood Pressure Group's work is aimed at learning how high blood pressure is caused in order to develop new preventative measures.



Above: Cross section of adrenal gland image by Dr Polina Nedoboy, High Blood Pressure Group

Right: Professor Paul M Pilowsky pictured at The University of Sydney

#### RESEARCH GOALS

Blood pressure, the pressure applied by circulating blood on the walls of your arteries as it is pumped around the body, plays a vital role in the proper functioning of the heart and circulation. Blood pressure constantly changes in response to the activity requirements of the body. However, high blood pressure (or hypertension) is a pathological condition where blood pressure remains persistently higher than normal. Hypertension is a major cause of cardiovascular disease and occurs in progressive disorders such as sleep apnoea and epilepsy. If left untreated, worsening hypertension can lead to kidney failure, heart attack or stroke. Hypertension is almost always preceded by increased excitatory nerve signals from the brain.

“  
Blood pressure, the pressure applied by circulating blood on the walls of your arteries as it is pumped around the body, plays a vital role in the proper functioning of the heart and circulation.  
”

How does increased sympathoexcitation cause hypertension? Persistent activation of the sympathetic nervous system – especially when intermittent – causes a vicious spiral of narrowing of arteries, hypertension, organ damage and further increases in sympathoexcitation. The focus of the Group's research is to tease apart the mechanisms responsible for excessive sympathoexcitation that results in cardiovascular disease. The Group's most recent findings have implicated two factors in the dangerous elevation of blood pressure: the brain chemical, pituitary adenylate cyclase activating polypeptide (PACAP), and the activity of microglia – the immune cells of the brain, which express receptors for nearly every brain chemical known. Specific studies will focus on PACAP signalling and the interaction between microglia and central cardiovascular neurons.

#### ACHIEVEMENTS 2017

The High Blood Pressure Group's 2017 achievements include determining that seizure leads to sympathoexcitation, brain inflammatory cells are protective, brain neurons that regulate blood pressure have a very specific side-to-middle relationship, brain immune cells respond to changes in blood pressure, women and men respond differently to consumption of carbohydrates, the peptide orexin causes a prolonged increase in sympathetic activity and enhances the response to low oxygen, and immune cells in the spinal cord play a role in the sympathoexcitatory and proarrhythmogenic response in chronic epilepsy.

#### RESEARCHERS 2017



- Myfanwy Cohen  
PHD STUDENT
- Dr Melissa Farnham  
UNIT LEADER
- Zohra Kakall  
PHD STUDENT
- Seungjae Kim  
PHD STUDENT
- Dr Polina Nedoboy  
POSTDOCTORAL SCIENTIST



## RESEARCHERS 2017

- Imala Alwis  
SENIOR RESEARCH SCIENTIST
- Hannah Casbolt  
VISITING STUDENT
- Brianna Coulter  
RESEARCH ASSISTANT
- Dr Roxane Darbousset  
POSTDOCTORAL SCIENTIST
- Dr Arnold Ju  
POSTDOCTORAL SCIENTIST
- Blair Lowry  
NZ SUMMER STUDENT
- Jessica Maclean  
PHD STUDENT
- Dr Sophie Maiocchi  
POSTDOCTORAL SCIENTIST
- Emily McCarthy  
NZ SUMMER STUDENT
- Dr Laura Norton  
POSTDOCTORAL SCIENTIST
- Dr André Samson  
POSTDOCTORAL SCIENTIST
- Associate Professor Simone Schoenwaelder  
SR PRINCIPAL RESEARCH FELLOW
- Dr Amelia Tomkins  
POSTDOCTORAL SCIENTIST
- Dr Mike Wu  
POSTDOCTORAL SCIENTIST
- Dr Yuping Yuan  
SR RESEARCH FELLOW



## Thrombosis Group

### Professor Shaun Jackson

Group Leader  
MBBS BMedSci PhD

The Thrombosis Group adopts an “all-encompassing” approach to research, considering biochemical, biophysical and biomechanical factors that impact blood clot formation in vitro and in vivo, as well as their capacity to exacerbate the development of pathological clots leading to ischaemic organ damage. This comprehensive approach has provided important novel insight, not only into how blood clots form, but also to explain why the drugs targeting bloodborne chemicals that are currently administered to cardiovascular patients are inconsistently successful.

#### GROUP MISSION

The mission of the Thrombosis Group is to establish a new and innovative approach to the prevention and treatment of heart disease and stroke, and position Australia as a leader in the discovery and development of novel therapies for the treatment of atherothrombotic diseases.

#### RESEARCH GOALS

Thrombosis Group research undertaken in the HRI laboratory is focused on: determining the mechanisms underlying clot formation in healthy individuals, and applying this knowledge to better understand the mechanisms leading to platelet hyperactivity and pathological blood clot formation to ultimately develop safer and more effective therapies to treat cardiovascular diseases, including heart attack, stroke, diabetes and the metabolic syndrome.

#### IMPACT

Atherothrombosis is arguably Australia’s greatest healthcare problem, affecting over 50 per cent of the adult population. Despite intense investigation over the last 40 years into the discovery and development of more effective antithrombotic drugs, the impact of these therapies on mortality rates has remained disappointingly low. This situation is likely to worsen in the future due to the rapidly

growing incidence of obesity, diabetes and the metabolic syndrome – diseases that are typically more resistant to the benefits of “classical” antithrombotic therapy. The comprehensive research approach adopted by the Thrombosis Group is designed to identify and target thrombosis risk in such diseases.

“**Atherothrombosis is arguably Australia’s greatest healthcare problem, affecting over 50 per cent of the adult population... This situation is likely to worsen in the future due to the rapidly growing incidence of obesity, diabetes and the metabolic syndrome...**”

#### ACHIEVEMENTS 2017

Throughout 2017, the Thrombosis Group continued research into understanding the mechanisms behind blood clot formation in both healthy and disease settings. Scientists from the Group presented their work at several national and international conferences, including the International Society of Thrombosis and Haemostasis and the Australian Society for Vascular Biology. The Thrombosis Group produced several high impact publications, including a plenary original research paper published in the periodical *Blood*, and an original research article in *Science Translational Medicine*. This research was also presented at numerous national and international conferences (see pg 18 for more information).

In the plenary paper published in *Blood* (Samson et al. *Blood*; 2017), the Thrombosis Group defined a previously unidentified role for the endogenous fibrinolytic system in

#### FACE THE FACTS:

Heart disease affects one out of every six Australians, which accounts for more than...

**42 mil**  
Australians

“**The Thrombosis Group continued research into understanding the mechanisms behind blood clot formation in both healthy and disease settings.**”

regulating clot retraction. Clot retraction is important for maintaining blood clot stability and ensuring the blood vessel remains patent. Clot retraction has also been implicated as a potential reason current thrombolytic therapies are not overly effective. This process has not been studied effectively, as there has been no method to visualise the clot in vivo until now. The Thrombosis Group developed a model to visualise clot retraction in vivo which, for the first time, allowed the team to investigate the process of clot retraction. These studies revealed clot retraction and fibrinolysis are mechanistically linked, and uncovered that the endogenous fibrinolytic system plays an important role in facilitating clot retraction. This new model will aid in the study of fibrinolysis and clot retraction, and potentially provide new targets for the development of thrombolytic therapy.

#### PROJECTS 2017

- Investigating the role of cell death pathways in regulating the proinflammatory function of platelets and leukocytes during ischaemia-reperfusion injury
- Identifying new pathways regulating platelet hyperactivity and thrombosis in diabetes
- Developing novel approaches to thrombolysis
- Understanding the mechanisms of clot retraction

Left: Professor Shaun Jackson in front of Charles Perkins Centre, The University of Sydney

# Vascular Complications Group

## Dr Mary Kavurma

Group Leader  
BSc (Hons) PhD

### Individual Team Member Achievements 2017:

**Dr Siân Cartland** awarded Australian Vascular Biology Society Young Investigator/Early Career Researcher Oral Presentation Runner-Up and the HRI Early Career Researcher Award

**Mr Sergey Kuznetsov** successfully completed Honours

**Mr Pradeep Cholan** achieved a finalist position in the Three Minute Thesis competition

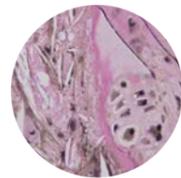
### RESEARCH PROJECTS 2017

In 2017, Vascular Complications Group projects examined the following themes:

- Mechanisms that control and reduce oxidative stress in vascular cells in disease
- How white blood cell functions protect against atherosclerosis
- Finding novel ways to improve cardiomyocyte function in ischaemic heart disease
- Identifying new ways that insulin gene expression is regulated in diabetes
- Identifying new molecules that protect against non-alcoholic fatty liver disease in diabetes
- The effect of chemokine inhibition on angiogenesis
- Examining vascular cell-specific effects on blood vessel structure and function, and in angiogenesis

### ACHIEVEMENTS 2017

A significant achievement of the Vascular Complications Group was a featured publication in the Scientific Reports journal. The Group identified that patients with increased severity of non-alcoholic fatty liver disease (non-alcoholic steatohepatitis (NASH)) had significantly reduced levels of circulating TRAIL compared to healthy patients or patients with steatosis. Moreover, plasma TRAIL levels negatively correlated with alanine transaminase, a marker of liver injury. Importantly, these findings were supported by in vivo mouse models with TRAIL deletion. In response to a Western diet, *Trail<sup>-/-</sup>* mice developed many features of NASH and type-2 diabetes. These mice also exhibited injured vasculature which were resistant to insulin and highly inflamed. Furthermore, the research showed that TRAIL blocked the accumulation of fat in hepatocytes (the main cells of the liver) in vitro. Collectively, these findings indicate that a deficiency of TRAIL changes metabolic effects associated with increased dysfunction and inflammation in blood vessels.



**Above:** Microscopic image of a brachiocephalic artery that supplies blood to the right arm and the head and neck

**Right:** Dr Mary Kavurma pictured outside of the HRI's Newtown offices

The Vascular Complications Group's research uses various models, genetic manipulation, biochemical and molecular biology tools to dissect how blood vessels become dysregulated, with an emphasis on changes to gene expression, vascular cell adaptation and function in both normal and abnormal settings in the blood vessel wall.

### GROUP MISSION

The mission of the Vascular Complications Group is to understand the pathogenesis of blood vessel disease, and using this knowledge, identify new strategies to improve function and reduce the burden of vascular disease in people.

### IMPACT

Provide new knowledge as to how blood vessels become dysregulated in cardiovascular disease and related pathologies. This will help uncover new strategies and therapeutics to combat disease, ultimately improving quality of life and life expectancy.

### RESEARCH GOALS

1. To understand how tumour necrosis factor-related apoptosis-inducing ligand (TRAIL) protects against atherosclerosis, specifically acting on the endothelium and monocyte/macrophages, 2. To find new molecules that regulate glucose and cholesterol homeostasis, and how these become dysfunction in type 2 diabetes and its complications and 3. Examine the effect of M3 (chemokine inhibitor) on ischaemic vs. pathological blood vessel formation.

### RESEARCHERS 2017

- **Dr Siân Cartland**  
SENIOR POSTDOCTORAL SCIENTIST
- **Pradeep Cholan**  
PHD STUDENT
- **Scott Genner**  
RESEARCH ASSISTANT
- **Sergey Kuznetsov**  
HONOURS STUDENT
- **Megan Nash**  
VISITING STUDENT
- **Dhanya Ravindran**  
PHD STUDENT





**RESEARCHERS 2017** ↓

- Dr Shikha Aggarwal PHD STUDENT
- Dr Katrina Chau PHD STUDENT
- Kezia Eyre MEDICAL & HONOURS STUDENT
- Professor Angela Makris VISITING SCIENTIST
- Dr Renuka Shanmugalingam PHD STUDENT
- Dr Suzanne Pears PHD STUDENT
- Dr Bei Xu SENIOR RESEARCH ASSISTANT

# Vascular Immunology Group

**Professor Annemarie Hennessy**

Group Leader  
AM MBBS PhD FRACP

The Vascular Immunology Group's research focuses on how placentas work and their benefits to women that we treat. Professors Hennessy and Makris, and Drs Aggarwal, Chau and Shanmugalingam are active physicians caring for over 100 women annually with preeclampsia, hypertension, vascular and kidney diseases. Our research scientists, Dr Xu and Dr Pears, are expert in growing placentas and support the projects of the group. The placenta and women's health research adds important and novel dimensions to the overall research plan at the HRI.

Our work is strongly driven by a women's action group, The PEARLS Group, who provide community engagement and review of research plans, as well as funding to support the Vascular Immunology Group's work.

**IMPACT**

The Vascular Immunology Group's work is directly translatable to women in pregnancy, resulting in an immediate impact through translational research efforts. Our group has a strong international and national reputation for the quality and effect of our research plans. If preeclampsia could be prevented, then one of the strongest risk factors for women's heart disease could also be prevented or reduced. This is an important long-term goal for women's heart health.

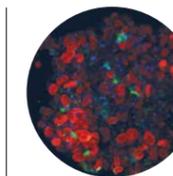
**RESEARCH GOALS 2017**

The Vascular Immunology Group's research goals are to better understand the causes of preeclampsia. By measuring the functions of the placenta and discovering indications that preeclampsia is inevitable, we seek to provide new safe treatment which would allow the pregnancy to progress to full term, thus reducing the burden of premature delivery.

**PROJECTS 2017**

**Safer Prolongation of Pregnancy**

A study of placenta growth and treatments that provide for a safer prolongation of pregnancy without premature delivery.



Above: Confocal image of an in vitro three-dimensional model of the heart. Image by Dr Carmine Gentile

**The Potential for Placental Growth to Prevent and Reverse Preeclampsia**

Placental growth factor is a recently discovered protein originating in the placenta which is responsible for blood supply and oxygen to the placenta and baby.

**The Impact of a Placenta Leak**

The new discovery of a toxin occurring from a placenta leak in which the baby's haemoglobin is released into the mother's blood stream has the potential to allow for new treatments to stop the toxic effect of preeclampsia.

**The Role of Placenta Antibodies in Causing Blood Vessel Damage and Hypertension**

A study of 351 women enrolled in a past preeclampsia study, it also involves growing placentas in the laboratory and looking at the impact of specific antibodies on placental growth.

**ACHIEVEMENTS 2017**

The Vascular Immunology Group's PhD students, Dr Renuka Shanmugalingam and Dr Katrina Chau, were worthy recipients of awards in the Three Minute Thesis competitions in 2017. These are an important demonstration of the skill to tell a complex story of research to a wide audience in just three minutes. Their success reflects their ability but also how directly relevant to women's everyday lives their research is.

Professor Makris and Professor Hennessy are Editors in Chief for each of the two main international pregnancy hypertension journals, and review regularly for all of the major hypertension journals, especially with regard to women's health and cardiovascular disease.

Dr Katrina Chau won the Basic Sciences Prize at the Annual Scientific Meeting of the Society for Obstetric Medicine of Australia in 2017 for her work entitled: Effect of placental growth factor on trophoblast integration into endothelial cell networks in the presence of inflammation. (Chau, Xu, Makris, Hennessy).

**"It is the mission of the Vascular Immunology Group to better understand the causes of preeclampsia (high blood pressure in pregnancy), the condition's impact on women during pregnancy and long-term cardiovascular health."**

Left: Group Leader Professor Annemarie Hennessy at the HRI offices in Newtown, Sydney

## PHD STUDENTS

**Dr Shikha Aggarwal**  
Vascular Immunology Group

**Jennifer Barraclough**  
Cell Therapeutics Group

**Alex Chan**  
Applied Materials Group

**Dr Katrina Chau**  
Vascular Immunology Group

**Pradeep Cholan**  
Vascular Complications Group

**Zoe Clayton**  
Cell Therapeutics Group

**Myfanwy Cohen**  
High Blood Pressure Group

**Elyse Filipe**  
Applied Materials Group

**Jack Hywood**  
Cell Therapeutics Group

**Zohra Kakall**  
High Blood Pressure Group

**Seungjae Kim**  
High Blood Pressure Group

**Dr Rahul Kurup**  
Cell Therapeutics Group

**Bob Lee**  
Applied Materials Group

**Jeixi Liao**  
Thrombosis Group

**Jessica Maclean**  
Thrombosis Group

**Praveesuda Michael**  
Applied Materials Group

**Jessica Orchard**  
Heart Rhythm and Stroke Prevention Group

**Dr Suzanne Pears**  
Vascular Immunology Group

**Dhanya Ravindran**  
Vascular Complications Group

**Miguel Santos**  
Applied Materials Group



**Dr Renuka Shanmugalingam**  
Vascular Immunology Group

**Dr Kelly Stanton**  
Clinical Research Group

**Richard Tan**  
Applied Materials Group

**Eric Yang**  
Applied Materials Group

**Gloria Yuen**  
Translational and Bioengineering Group



Above: Zohra Kakall from High Blood Pressure Group. Left: Applied Materials Group. Right: Jessica Maclean from Thrombosis Group

## SELECT PRIZES & AWARDS

**Dr Melissa Farnham**  
High Blood Pressure Group  
NAB Women in Medical Research  
Career Re-Start Grant

**Dr Melissa Farnham**  
High Blood Pressure Group  
USYD Equity Brown Fellowship

**Dr Arnold Lining Ju**  
Thrombosis Group  
AHRIA 2017 Early Career  
Researcher Award

**Dr John O'Sullivan**  
Cardiometabolic Disease Group  
Sydney Medical School Foundation  
Chapman Fellowship

**Dr Katrina Chau**  
Vascular Immunology Group  
Best Scientific Presentation Award  
SOMANZ 2017 Annual Meeting

**Dr Nicole Lowres**  
Heart Rhythm and Stroke Prevention Group  
Heart Foundation CVRN Grant

**Dr Nicole Lowres**  
Heart Rhythm and Stroke Prevention Group  
NSW Health Early Career  
Postdoctoral Fellowship

**Dr Sophie Maiocchi**  
Thrombosis Group  
University of Sydney Kickstart Grant

**Dr Laura Norton**  
Thrombosis Group  
NHMRC Early Career Fellowship

**Associate Professor Simone Schoenwaelder and Dr Alice Groocoe**  
Thrombosis Group  
Strategic Education Grant for Open  
Learning Environment (OLE)

**Professor Ben Freedman**  
Heart Rhythm and Stroke Prevention Group  
Healthcare Pioneers Award  
Atrial Fibrillation Association

**Dr Steven Wise**  
Applied Materials Group  
Optiver Asia Pacific Philanthropy Award

**Dr Steven Wise**  
Applied Materials Group  
Qantas Side by Side Grant

**Dr Steven Wise**  
Applied Materials Group  
Sydney Research Excellence Initiative (SREI)

**Dr Roxane Darbousset**  
Thrombosis Group  
NSW Cardiovascular Symposium  
Rising Star Award

**Dr Mike Wu**  
Thrombosis Group  
University of Sydney Kickstart Grant

**Cardiac Imaging Group**  
CIA on NHMRC Project Grant  
APP1030610

**Cardiac Imaging Group**  
CIA on NHMRC Project Grant  
APP1130609

**Cardiac Imaging Group**  
CIE on NHMRC Project Grant  
APP1126276

**Cardiometabolic Disease Group**  
NHMRC/ASTAR Australia-Singapore  
Call for Research in Obesity and  
Metabolic Disease

**Cardiovascular Medical Devices Group**  
University of Sydney Kick Start Grant

**Cardiovascular Medical Devices Group**  
Laffan Fellowship

**Cell Therapeutics Group**  
Ramaciotti Biomedical Investment Grant

**Cell Therapeutics Group**  
NHMRC Project Grant

**Cell Therapeutics Group**  
NSW EMC Fellowship

**Heart Rhythm and Stroke Prevention Group**  
Heart Foundation Vanguard Grant

### SELECT TRAVEL AWARDS

**Dr Anna Waterhouse**  
Cardiovascular Medical Devices Group  
International Union Pure & Applied  
Chemistry Travel Fellowship

**Dr Roxane Darbousset**  
Thrombosis Group  
ISTH Young Investigator Travel Award

**Dr Roxane Darbousset**  
Thrombosis Group  
NHF NSW CVRN Travel Scholarship

**Dr Roxane Darbousset**  
Thrombosis Group  
THANZ S&E Trust Travel Grant

**Seungjae Kim**  
High Blood Pressure Group  
2017 Australasian Neuroscience Society  
Scientific Meeting Award

**Jessica Maclean**  
Thrombosis Group  
Australian Vascular Biology Society  
(AVBS) Award



## SELECT CONFERENCES & PRESENTATIONS



**Associate Professor Simone Schoenwaelder, Professor Shaun Jackson, Dr Roxanne Darbousset, Dr Yuping Yuan** "A novel regulator of platelet procoagulant function." Sydney Cardiovascular Symposium, Sydney, Australia, December.

**Associate Professor Simone Schoenwaelder, Professor Shaun Jackson, Dr Yuping Yuan, Dr Roxanne Darbousset** "A regulation of the mitochondrial respiratory reserve linked to platelet phosphatidylserine exposure and procoagulant function." International Society of Thrombosis and Haemostasis (ISTH), Berlin, Germany, June.

**Professor Paul Pilowsky, Zohra Kakall** "Activation of mu-opioid receptors in the rostral ventrolateral medulla enhances glucose uptake in healthy rats." Central Cardiorespiratory Control: Future Directions Scientific Meeting, The Heart Research Institute, Sydney, Australia, December.

**Zohra Kakall, Professor Paul Pilowsky, Dr Polina Nedoboy** "An investigation of the possible role of neurons and microglia in hypoglycaemia-associated autonomic failure." Central Cardiorespiratory Control: Future Directions Scientific Meeting, The Heart Research Institute, Sydney, Australia, December.

**Professor Paul Pilowsky, Zohra Kakall, Dr Melissa Farnham** "Antagonism of glutamate or PACAP in the rat rostral ventrolateral medulla prevents sympathetic long-term facilitation." Australian Society for Medical Research Conference, Westmead Hospital, Sydney, Australia, June.

**Dr Yuping Yuan, Zohra Kaplan** "Biophysical regulation of leukocyte recruitment by the 3-Dimensional structure of platelet thrombi." Nesbitt, W., Ju, A., Jackson, S.P., XXVI Congress of the International Society on Thrombosis and Haemostasis, Berlin, Germany, July.

**Associate Professor Clare Hawkins** "Role of macrophages in the production of extracellular traps during chronic inflammation – a pathway to lesion development in atherosclerosis?" 23rd Annual Scandinavian Atherosclerosis Conference, Humlebæk, Denmark, April.

**Professor Paul Pilowsky, Seungjae Kim** "Carotid body and subfornical organ AT1R-mediated sympathoexcitation following single or repetitive hypoxia requires intrarenal ischemia in rats." Central Cardiorespiratory Control: Future Directions, Sydney, Australia.

### FACE THE FACTS:

Since 1980, Australia has managed to cut the death rate for cardiovascular disease by more than two thirds. But there is still more work to be done

**Dr Katrina Chau, Dr Bei Xu, Professor Annemarie Hennessy, Dr Angela Makris** "Effect of placental growth factor on trophoblast integration into endothelial cell networks." 13th Asian Pacific Congress of Hypertension, Singapore, October.

**Professor Paul Pilowsky, Myfanwy Cohen, Dr Mary Kavurma** "LPS causes greater upregulation of IL-1b in the hypothalamus compared to cortical or cardiovascular control sites." Australasian Neuroscience Society Annual Scientific Meeting, Sydney, Australia, December.

**Zohra Kakall, Professor Paul Pilowsky, Myfanwy Cohen, Dr Mary Kavurma, Dr Siân Cartland, Dr Melissa Farnham, Dr Polina Nedoboy** "Microglia receptor expression in hypertensive rats." Symposium: qPCR, Past, Present and Future, Sydney, Australia, May.

**Dr Siân Cartland** "Monocyte/macrophage TNF-related apoptosis-inducing ligand (TRAIL) is protective in atherosclerosis." Australian Vascular Biology Society Annual Meeting, Mooloolaba, Australia, September.

**Dr Yuping Yuan, Associate Professor Simone Schoenwaelder, Imala Alwis, Dr Mike Wu, Professor Shaun Jackson** "Platelet necrosis induces neutrophil macro-aggregation and pulmonary thrombosis following gut ischemia." International Society of Thrombosis and Haemostasis (ISTH), Berlin, Germany, July.

**Associate Professor Simone Schoenwaelder, Professor Shaun Jackson, Dr Amelia Tomkins, Jessica Maclean** "Recanalisation, reperfusion, and functional recovery- three R's for successful outcome after thrombolysis: development of an in-situ carotid artery thrombo(ly)sis (iCAT) preclinical stroke model." Australian Vascular Biology Society (AVBS), Sunshine Coast, Australia, September.

**Dr Tom Welton** "Reproducibility of brain network metrics in people with multiple sclerosis." ISMRM, Honolulu, USA, April.

**Tessa Barrett, Associate Professor Clare Hawkins** "Cellular effects of HOSCN – benign or deadly?" 10th International Human Peroxidase Meeting, Breckenridge, USA, August.

**Associate Professor Clare Hawkins** "Role of the myeloperoxidase oxidant hypothiocyanous acid (HOSCN) in the adaptation of cells to oxidative stress during inflammation" Joint OCC World Congress and Annual SFRR-E Conference 2017 on Metabolic Stress and Redox Regulation, Berlin, Germany, October.

**Leila Reyes, Associate Professor Clare Hawkins, Dr Benjamin Rayner** "Selenomethionine supplementation protects against oxidative induced damage during experimental myocardial ischaemia/reperfusion injury." Society for Free Radical Biology and Medicine, Baltimore, USA, November.

**Associate Professor Clare Hawkins** "A role for chlorinated nucleosides in the promotion of inflammation and endothelial dysfunction in atherosclerosis?" Joint OCC World Congress and Annual SFRR-E Conference 2017 on Metabolic Stress and Redox Regulation, Berlin, Germany, June.



**Dr Arnold Ju** "Visualizing cooperative mechanosensing of GPIIb and GPIIb-IIIa on a single aspirated platelet." Congress of the International Society of Thrombosis and Haemostasis (ISTH), Berlin, Germany, July.

**Dr Arnold Ju** "Synergistic inside-out and outside-in activation of integrin  $\alpha\text{IIb}\beta_3$ " Congress of the International Society of Thrombosis and Haemostasis (ISTH), Berlin, Germany, July.

**Professor David Celermajer** "The role of mathematics in health research" The A.L. Blakers (Academy of Sciences) Lecture, National Mathematics, Summer School, Canberra, Australia January.

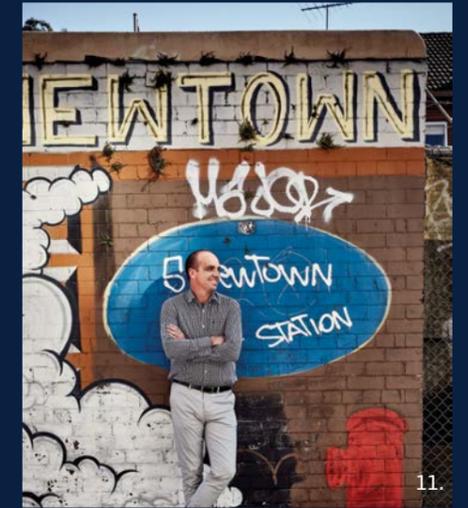
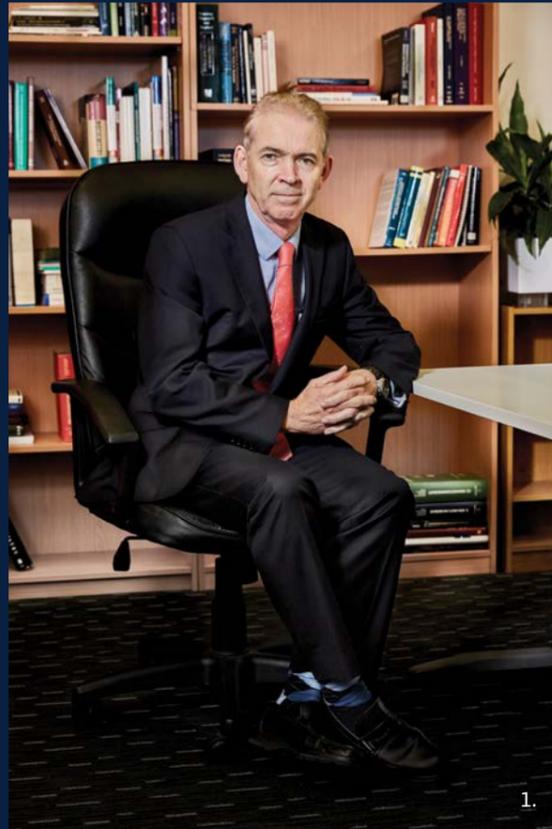
**Professor David Celermajer** "New frontiers in early diagnosis of pulmonary vascular disease." PHT Academy, Vienna, Austria, June.

**Professor David Celermajer** "Childhood obesity and endothelial dysfunction." World Congress of Paediatric Cardiology, Barcelona, July.

**Leila Reyes, Associate Professor Clare Hawkins, Dr Benjamin Rayner** "Selenomethionine supplementation protects against oxidative induced damage during experimental myocardial ischaemia/reperfusion injury." Society for Free Radical Biology and Medicine, Baltimore, USA November.

**Yunjia Zhang, Dr Siân Cartland, Associate Professor Clare Hawkins, Dr Benjamin Rayner** "Dietary selenomethionine supplementation limits extracellular trap formation and reduces lesion burden in a mouse model of atherosclerosis." Society for Free Radical Biology and Medicine, Baltimore, USA, November.

**Top:** Professor Shaun Jackson presents a lecture at Illuminate 2017, HRI's annual signature event. Read more about this event on [Pg 62](#)



1. Dr Stephen Hollings 2. Dr John O'Sullivan 3. Dr Anna Waterhouse 4. Jessica Maclean from Thrombosis Group 5. Applied Materials Group 6. Richard Wylie 7. Praveesuda Michael from Applied Materials Group and Vickie Tang from Inflammation Group 8. Professor Paul M Pilowsky 9. Associate Professor Sanjay Patel.

10. Applied Materials Group 11. Dr Steven Wise 12. Dr Mary Kavurma 13. Professor Ben Freedman 14. Dr Melissa Farnham from High Blood Pressure Group and Dr Arnold Ju from Thrombosis Group 15. Elissa Dwyer 16. Vickie Tang from Inflammation Group 17. Professor Shaun Jackson

**Freedman, B., Calkins, H., Camm, J. et al.** Screening for atrial fibrillation: a report of the AF-SCREEN international collaboration. *Circulation*, 135:1851-67.

**Samson, A.L., Alwis, I., Maclean, J., Priyananda, P., Hawkett, B., Schoenwaelder, S.M., Jackson, S.P.** Endogenous fibrinolysis facilitates clot retraction in vivo. *Blood*, Dec 7; 130(23):2453-2462. doi:10.1182/blood-2017-06-789032.

**Brazilek RJ, Tovar-Lopez FJ, Wong AKT, Tran H, Davis AS, McFadyen JD, Kaplan Z, Chunilal S, Jackson SP, Nandurkar H, Mitchell A, Nesbitt WS.** Application of a strain rate gradient microfluidic device to von Willebrand's disease screening. *Lab Chip*, Jul 25; 17(15):2595-2608.

**Yuan Y, Alwis I, Wu MCL, Kaplan Z, Ashworth K, Bark D, Pham A, Mcfadyen J, Schoenwaelder SM, Josefsson EC, Kile BT, Jackson SP.** Neutrophil macro-aggregates promote widespread pulmonary thrombosis following gut ischemia. *Sci Transl Med*, 9:409. doi:10.1126/scitranslmed.aam5861.

**Ju, L., Chen, Y., Li, K., Yuan, Z., Liu, B., Jackson, S.P., Zhu, C.** Dual biomembrane force probe enables single-cell mechanical analysis of signal crosstalk between multiple molecular species. *Scientific Reports*, Oct 27; 7(1):14185. doi:10.1038/s41598-017-13793-3.

**Li J, Lowres N, Jing K, et al.** Quality and cultural sensitivity of linguistically appropriate CVD information for Chinese immigrants: a review of online resources from heart foundations. *J Cardiovascular Nursing* 2018 Jan 23. doi: 10.1097/JCN.0000000000000457

**Bauman A, Alharbi M, Lowres N, Gallagher R, Stamatakis E.** Exercise, Physical Activity, and Cardiovascular Disease. *Vasan R, Sawyer, D.* The Encyclopedia of Cardiovascular Research and Medicine Oxford: Elsevier Inc; 2018(1): 274-280.

**Ju, L., Chen, Y., Li, K., Yuan, Z., Liu, B., Jackson, S.P., Zhu, C.** Dual biomembrane force probe enables single-cell mechanical analysis of signal crosstalk between multiple molecular species. *Scientific Reports*, 7(1):14185. doi:10.1038/s41598-017-13793-3.

**Simons, L., Ortiz, M., Freedman, B., Waterhouse, B.J., Colquhoun, D.** Medium to long-term persistence with non-vitamin K oral anticoagulants in patients with atrial fibrillation: Australian experience. *Curr Med Res Opin*, Jul; 33(7):1337-1341.

**Freedman, B., Boriani, G., Glotzer, T., Healey, J., Kirchhof, P., Potpara, T.**

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## FACE THE FACTS:

OVER  
**90%**

OF AUSTRALIANS  
HAVE AT LEAST  
ONE RISK  
FACTOR FOR  
CARDIOVASCULAR  
DISEASE

Modifiable factors include:  
poor diet,  
physical inactivity,  
smoking, high cholesterol,  
and high blood pressure, while non-modifiable risk factors include age, sex, family history, ethnicity



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## FACE THE FACTS:

# 1.2m

AUSTRALIANS HAVE DIABETES

Diabetes is Australia's fastest growing chronic disease. 1.2 million Australians have diabetes

It's time for change...

A new person is diagnosed with diabetes every 5 minutes





# Board of Governors

The Board of Governors is chaired by Professor Leonard Kritharides and comprises deans from medical schools, nominees from The Sydney Local Health District, affiliates of The University of Sydney, leaders of corporate sectors, and the Director of Cardiovascular Research of the Heart Research Institute. The Board is responsible for the

governance of the Heart Research Institute. It approves and monitors budgets and scientific progress. Members are balanced to represent the corporate and scientific community. The majority of the Board positions are available to be filled via election by the members of the incorporated company, the Heart Research Institute Ltd.

## CHAIRMAN

**Professor Leonard Kritharides**  
MBBS PHD FRACP FAHA FCSANZ



Professor Len Kritharides is Head of Department and Director of Cardiology at Concord Repatriation General Hospital (CRGH) Sydney, Professor of Medicine at The University of Sydney, Head of the Atherosclerosis Research Laboratory Group at the ANZAC Research Institute and Deputy Clinical Director of the Cardiovascular Stream of the Sydney Local Health District. In 1994, he completed a PhD in macrophage biology at the Heart Research Institute. After postdoctoral research at the Heart Research Institute and in the USA, he took up an appointment as Staff Specialist in Cardiology at Concord Hospital in 1998 and became Head of Department in 2003.

Professor Kritharides was awarded a NSW Government Community Services Award for his contribution to Concord Repatriation General Hospital in 2006, the President's Medal for contributions to the Cardiac Society of Australia and New Zealand in 2013, and the Distinguished Researcher Award by the Australian Vascular Biology Society in 2014. He is currently Chair of the Cardiovascular Health and Advisory Committee of the National Heart Foundation, and Chair of the Specialist Training Committee in Cardiology of the Royal Australian College of Physicians. He is also Chairman of the Heart Research Institute.

## FORMER CHAIRMAN

**Dr Stephen Hollings**  
BA(HONS) PHD FAICD



Dr Stephen Hollings is CEO of the Heart Research Institute, after stepping down as Chairman and a Director of HRI on 24 May 2017. He consults for companies on strategy, digital opportunities as well as challenges, and marketing, with a portfolio skewed to the health sector.

He sits on the Board of the Heart Research Institute (UK), Relationships Australia (NSW) and RASE Pty Limited. Currently he is deputy Chair of the Global Access Partners' National Standing Committee on Energy and the Environment.

Dr Hollings is a senior executive and non-executive director with extensive experience in highly competitive, customer-driven industries. He has successfully led businesses through periods of growth and development, as well as through times of unprecedented change created by economic

turbulence, industry restructuring and disruptive technology. In his various Chair, CEO and senior executive roles he has become known for providing a strong focus on, and a personal commitment to, the development of emerging leaders, providing organisations with a robust talent pipeline. He has played a key role as an executive coach and mentor for over 20 years.

Previously, Dr Hollings was Director of Sales Strategy at NewsCorp Australia, Chairman of the Audited Media Association of Australia, Chairman of CareerOne.com.au and a Director of the Community Newspaper Group. He has a PhD in history from The University of Sydney, is a Foundation Fellow of the Institute of Company Directors and an Honorary Life Fellow of the International Marketing Institute of Australia.

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MBBS PHD FRACP FAHA FCSANZ

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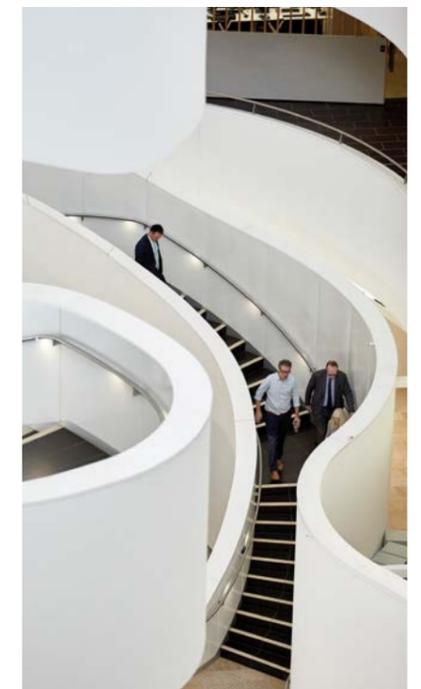
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Above: Charles Perkins Centre

# Board

# of

# Governors

**Mr John Batistich**  
BBUS MGMT GAICD



**Mr John Batistich** is an Advisor to a range of technology start-ups and Non-Executive Director of FoodCo. He has more than 25 years of experience in research, marketing, digital innovation and general management with blue chip companies including Westfield, Wrigley, Pepsico and Kimberly Clark. Mr Batistich holds a Masters in Management degree from Macquarie Graduate School of Management majoring in Human Resources, a Bachelor of Business degree from the University of Western Sydney majoring in Marketing, and a Certificate in Digital Marketing from the Association for Data-driven Marketing and Advertising.

**Mr Barry Brownjohn**  
BCOMM



**Mr Barry Brownjohn** is an experienced banking and finance executive whose skill sets include capital markets, risk management, corporate advisory and business planning. His Senior Executive roles have included capital markets and investment banking businesses in Asia, North America and in Australia, serving as Managing Director of Bank of America. Utilising his extensive industry experience and understanding of technology in financial services, he has served as an advisor to incumbent industry participants and new businesses seeking to bring innovative business models and enabling technologies into the market. Non-Executive Director roles have included Citigroup Pty Ltd, Dexus Property Group, Bakers Delight Holdings Pty Limited and The South Australian Financing Authority. Barry has a Bachelor Degree in Accounting Finance and Systems from the University of New South Wales.

**Professor Shaun Jackson**  
MBBS PHD FRACP



**Professor Shaun Jackson** is an NHMRC Senior Principal Research Fellow and faculty member at the prestigious Scripps Research Institute in La Jolla, San Diego. Professor Jackson was a co-founder of the Australian Centre for Blood Diseases in Melbourne, and a founder of Kinacia, an Australian biotechnology company developing novel diagnostic and therapeutic products aimed at preventing blood clotting. He is currently the Head of Cardiovascular Research at the Heart Research Institute and Charles Perkins Centre, as well as Research Director of Atherothrombosis services within the Department of Cardiology at the Royal Prince Alfred Hospital. Professor Jackson's research interests are focused on the areas of atherothrombosis and cardiovascular disease. He established an independent research laboratory in the Monash Department of Medicine at Box Hill Hospital (1998-2003). In 2004 he moved to the Alfred Medical Research and Education Precinct, where he co-founded and became Research Director of the Australian Centre for Blood Diseases.

**Professor Wendy Jessup**  
BSC PHD



**Professor Wendy Jessup** completed her tertiary scientific training at the Universities of Manchester and Sheffield in the United Kingdom. She moved to Australia in 1989 to take up a position at the Heart Research Institute. She was promoted to leader of the Cell Biology Group in 1994, and became Deputy-Director until shortly before her departure in 2002. Through to 2012, Professor Jessup was a Principal Research Fellow at the National Health and Medical Research Council, and a Professor and Principal Research Fellow in the Faculty of Medicine at the University of New South Wales, where she co-led the Macrophage Biology Group at the Centre for Vascular Research. She is now a Principal Research Fellow in the Atherosclerosis Laboratory at the ANZAC Research Institute.

**Dr Teresa Anderson**  
BAPPSC PHD



**Dr Teresa Anderson** is Chief Executive of the Sydney Local Health District with over 30 years' experience as a clinician and manager in the public health system. Her roles included General Manager, Liverpool Hospital and Director, Clinical Operations at the former Sydney South West Area Health Service. A graduate of the University of Sydney with a Bachelor of Applied Science (Speech Pathology), Dr Anderson then went on to complete a PhD in Linguistics at Macquarie University in the Early Identification and Treatment of Communication Disorders in Infancy. Dr Anderson is also current Chair of the Sydney Research Council, a partnership between The University of Sydney, Sydney Local Health District and Medical Research Institutes.

**Ms Cath Rogers**  
BCOM MBA CFA GAICD



**Ms Cath Rogers** has held several global finance and technology focused roles, as part of a successful software venture in London, Accenture strategy consulting in Sydney, ABN AMRO corporate finance in Sydney, and Credit Suisse investment banking in Sydney, New York and Latin America. Ms Rogers has also worked with the World Bank Group's International Finance Corporation in Washington DC, Masdar Capital, a sovereign wealth fund in Abu Dhabi, Anchorage Capital Partners in Sydney and AirTree Ventures, a Sydney-based venture capital fund focused on digital and software investments. Cath is the co-founder of a technology venture called the Digital Receipt Exchange. She holds a Bachelor of Commerce majoring in Finance from the University of New South Wales and Master of Business Administration from INSEAD in France. Cath is also a Chartered Financial Analyst and a Graduate of the Australian Institute of Company Directors.

**Professor Stephen Simpson**  
AC FAA FRS



**Professor Stephen Simpson** is Academic Director of the Charles Perkins Centre, a University of Sydney cross-faculty initiative aimed at researching and implementing cross-disciplinary approaches to alleviating the burden of obesity, diabetes, cardiovascular disease and related conditions. He is also the Executive Director of Obesity Australia. After completing an undergraduate degree at the University of Queensland, he pursued a PhD at the University of London. Professor Simpson spent 22 years at the University of Oxford, first in Experimental Psychology, then in the Department of Zoology and the Oxford University Museum of Natural History. He returned to Australia in 2005 as an Australian Research Council Federation Fellow, then ARC Laureate Fellow. In 2007 Professor Simpson was elected a Fellow of the Australian Academy of Science, and in 2013 he was elected a Fellow of the Royal Society of London as "one of the world's foremost entomologists and nutritional biologists". In 2015 he was made a Companion of the Order of Australia "for eminent service to biological and biomedical science."

**Mr Rod Halstead**  
LLB (Syd) LLM (Lon) FAICD



**Mr Rod Halstead** ceased to hold the position as Honorary Solicitor for The Heart Research Institute upon joining the Board. Mr Halstead is presently Director - Strategic Corp/M&A at the law firm Clayton Utz. Prior to holding that position he had many years' experience as a Partner at Clayton Utz, with a preceding position at the law firm Mallesons Stephen Jaques. Mr Halstead has considerable Board experience and regularly advises Boards and Senior Management of major Australian corporate and financial institutions, in respect to business and governance related matters. Mr Halstead was appointed a Governor of the Board on 24 May 2017.

## International Board of Governors



### Elena Pintado

BCOM

**Elena Pintado** is Director, Brand Development for Newell Brands, a \$13bn global consumer goods company. In her role, Elena leads marketing for the Appliances and Cookware division in APAC region. The role encompasses innovation development, brand strategy and communications for brands such as Sunbeam and Crock-Pot. Elena is a marketing professional with more than 15 years' experience in the FMCG, consumer goods and healthcare industries. Her previous roles have included Marketing Manager at Johnson & Johnson responsible for the Women's Health portfolio, as well as with GlaxoSmithKline Consumer Healthcare where Elena worked for seven years developing award-winning marketing campaigns for products such as Nicabate, Panadol, Sensodyne, Cartia and Zovirax. Elena holds a Bachelor of Commerce from the University of New South Wales, majoring in Marketing and International Business.

### Sathy Sappany

BCOM ACMA CPA

**Sathy Sappany** is Head of Finance at the Heart Research Institute Ltd, as well as a member of CPA Australia and the Chartered Institute of Management Accounts in the UK. Sathy has over 20 years' experience in senior Finance and Business Management positions, providing strategic decision support to Boards specially in the not-for-profit sector.

### Tony Pollitt

**Tony Pollitt** is the Director – Business Affairs, Movies at Foxtel, the Australian subscription television network. Tony qualified as a Chartered Accountant in 1989 and worked for Coopers & Lybrand in Sydney and London. In 1998, Tony was appointed Chief Operating Officer responsible for the finance and internal operations of Showtime. Tony currently manages a Foxtel team that negotiates the content supply arrangements for movie and external channel partners, and works with Foxtel's production team to structure contracts for locally produced shows.

### Stephen Moodey

BBUS MBA CPA

**Stephen Moodey** is the Area Finance Director for GlaxoSmithKline Consumer Healthcare Australia and New Zealand, providing decision support to the division's General Manager across strategic, financial and operational dimensions. He has more than 18 years' experience as a financial professional in the delivery of financial processes, reporting, analytics and business partnering, forecasting and budget development. Stephen holds a Masters in Business Administration (Executive) from the Australian Graduate School of Management, is a member of the Australian Society of Certified Practising Accountants and holds a Bachelor of Business degree from the University of Technology, Sydney majoring in Accounting and Finance.

### John Batistich

BBUS MGMT GAICD

**John Batistich** is an Advisor to a range of technology start-ups, Non Executive Director of FoodCo and has more than 25 years of experience in research, marketing, digital innovation and general management with blue chip companies including Westfield, Wrigley, Pepsico and Kimberly Clark. John holds a Masters in Management degree from Macquarie Graduate School of Management majoring in Human Resources, a Bachelor of Business degree from the University of Western Sydney majoring in Marketing and a Certificate in Digital Marketing from the Association for Data-driven Marketing and Advertising.

### Matthew Dobbin

BBUS MA (APPL) EXEC LEADERSHIP (INSEAD)

**Matt Dobbin** is a Consulting Partner at PricewaterhouseCoopers Australia. Matt has over 20 years' international consulting experience with a focus on corporate strategy and driving business improvement initiatives across a range of organisations. His specific areas of expertise include strategy implementation, business process re-engineering, business integration and major change management. He has extensive international experience working with major clients in the USA, Middle East, Europe, Asia and New Zealand. Matt has been involved in a broad range of industries driving strategy implementation including health, logistics, construction, utilities, public sector and retail. Of particular interest he has worked with a number of medical research institutes throughout his career.

### Kerry Cunningham

**Kerry Cunningham** is the Director of International Partnerships for Blackmores Ltd, Australia's number 1 vitamin & dietary supplement company in the ASX 100. Kerry has over 20 years' experience in the pharmaceutical and health industry working in Australia, New Zealand and Thailand. Kerry has had an extensive career at Blackmores in senior leadership positions driving the change agenda. Additionally she has held board positions with Complementary Medicines Australia and Chaired the Marketing & Communications Committee. Her extensive experience in pharmacy saw her appointed to the Advisory Board of UTS Faculty of Pharmacy.

### Dr Stephen Hollings

BA (HONS) PHD FAICD

**Dr Stephen Hollings** is CEO of the Heart Research Institute, after stepping down as Chairman and a Director of the HRI on May 24, 2017. He also consults to companies on strategy, digital opportunities and challenges, and marketing, with a portfolio skewed to the health sector. He sits on the Board of the Heart Research Institute (UK), Relationships Australia (NSW) and RASE Pty Limited. Currently he is also deputy Chair of the Global Access Partners' National Standing Committee on Energy and the Environment. He is a senior executive and non-executive director with extensive experience in highly competitive, customer-driven industries and has successfully led businesses through periods of growth and development as well as through times of unprecedented change created by economic turbulence, industry restructuring and disruptive technology. In his various Chair, CEO and senior executive roles he has become known for providing a strong focus on and a personal commitment to the development of emerging leaders, providing organisations with a robust talent pipeline. He has played a key role as an executive coach and mentor for over 20 years. Previously, Stephen was Director of Sales Strategy at NewsCorp Australia, Chairman of the Audited Media Association of Australia and of CareerOne.com.au and a Director of the Community Newspaper Group. He has a PhD in history from The University of Sydney, is a Foundation Fellow of the Institute of Company Directors and an Honorary Life Fellow of the International Marketing Institute of Australia.

## Members of the Institute



### MEMBERS OF THE INSTITUTE

**Prof David Allen**  
MBBS PHD FAA

**Dr Teresa Anderson**  
BAPP SC PHD

**Dr Brian Bailey**  
MBBS FRACP FACC

**Ian Bailey**  
MBBS FRACP FACC

**Mr James Bain**  
AM

**Mrs Phillipa Baird**

**Prof Philip Barter**  
MBBS PHD FRACP

**Mr John Batistich**  
BBUS MGMT GAICD

**Marcus C Blackmore**  
AM

**Mr Len Bleasel**  
AM

**Mr Barry Brownjohn**  
BCOMM

**Dr Timothy Cartmill**

**Prof Colin Chesterman**

**Mr John Cloney**

**Mrs Giselle M Collins**  
BEC CA GAICD

**Dr Susan Conde**

**Mr John C Conde**  
AO

**Mr James Creer**

**Prof Michael Davies**  
BSC DPHIL CCHEM FRACI

**Mr Craig Davison**  
MMGT GDIP MKTING GAICD

**Prof Roger Dean**  
MA PHD DSC FIBIOL

**Dr R Dunn**  
MBBS FRACP FACC

**Mr John Fairfax**  
AO

**Prof P Fletcher**  
MBBS PHD FRACP

**Mr Michael Ford**

**Prof Ben Freedman**  
BSC (MED) MBBS PHD OAM

**Prof Carolyn Gecky**  
PHD

**Mr Chris A Hadley**  
BA ASIA

**Mr Rod Halstead**  
LLB LLM

**Prof Phillip J Harris**  
AM BSC MBBS DPHIL  
FRACP FACC

**Dr Stephen Hollings**  
BA (HONS) PHD FAICD

**Dr Philip Hoyle**

**Prof Shaun Jackson**  
MBBS PHD FRACP

**Dr R Jeremy**

**Prof Wendy Jessup**  
BSC PHD

**Ms Maggie Johns**

**Mr Peter Jollie**  
AM

**Prof Geoffrey M Kellerman**  
AO FRACP FRACPA FRAACB

**Prof David Kelly**  
AM

**Prof Len Kritharides**  
PHD FRACP FCSANZ FAHA

**Mr Chris Last**

**Mr John Laws**  
CBE OBE

**Ms Joann Lewis**  
BCOM ACA FELLOW FINSIA

**Mr Frank Lowy**  
AO

**Mr Robert Miller**

**Dr Lynne Pressley**

**Dr John G Richards**

**Assoc Prof David R Richmond**  
AM MB CHB MSC FRACP  
FRCP FACC

**Ms Cath Rogers**  
BCOM MBA CFA GAICD

**Ms Mary Salteri-Shaw**

**Dr Laurie A Scandrett**

**Dr B Scott**  
AO

**Prof Stephen Simpson**

**Mr David Smithers**

**Prof Keith Stanley**

**Dr Gregory Stewart**

**Prof Roland Stocker**

**Mr Tony Stuart**  
BA COMM

**Mr R Utz**

**Mr Raymond Vaughan**  
AO

**Ms Clare Walsh**

**Mr R F E Warburton**

**Dr Thomas Wenkart**

**Prof Judith Ann Whitworth**

**Mr Richard Wylie**

**Dr John Yiannikas**

**Mr Stephen John Patterson**

**Mr Sathy Sappany**

**Mr Ross A Hohnen**  
AM OBE (DECEASED)

**Mr Kevin J Kirby**  
AO (DECEASED)

**Mr AG (Geoff) G Lee**  
AM OAM FAO (DECEASED)

**Dr RW (Bruce) Reid**  
AM KNO (DECEASED)

**Dr Carlo Salteri**  
AC (DECEASED)

**Sir Nicholas Michael Shehadie**  
AC OBE (DECEASED)

### CHANGES TO THE BOARD OF GOVERNORS

**Mr Rod Halstead**  
LLB LLM

**Prof Shaun Jackson**  
MBBS BMEDSCI PHD

**Prof Stephen Simpson**  
AC FAA FRS

### PROFESSIONAL ADVISORS TO THE BOARD OF GOVERNORS

**Honorary Solicitor**  
**Mr Rod Halstead**  
LLB LLM (CLAYTON UTZ)

**Head Auditor**  
**Mr Cameron Roan**  
(PARTNER KPMG)

### FOUNDING FELLOWS

The following members have been recognised with the title of Founding Fellow for their exceptional work in establishing the Heart Research Institute.

**Prof Phillip J Harris**  
AM BSC MBBS DPHIL FRACP  
FACC

**Mr Ross A Hohnen**  
AM OBE (DECEASED)

**Assoc Prof**  
**David R Richmond**  
AM MB CHB MSC FRACP  
FRCP FACC

### HONORARY FELLOWS

The following members have been recognised with the title Honorary Fellow for their outstanding service to the Heart Research Institute and contributions as voluntary Governors. The present Board of Governors is indebted to these Fellows for their generous philanthropic work and endowments to the HRI.

**Marcus C Blackmore**  
AM

**Mrs Giselle M Collins**  
BEC CA GAICD

**Mr Chris A Hadley**  
BA ASIA

**Prof Geoffrey M Kellerman**  
AO FRACP FRACPA FRAACB

**Mr Kevin J Kirby**  
AO (DECEASED)

**Mr AG (Geoff) G Lee**  
AM OAM FAO (DECEASED)

**Dr RW (Bruce) Reid**  
AM KNO (DECEASED)

**Dr Carlo Salteri**  
AC (DECEASED)



# Thriving Through Tough Times

If you want an easy life, becoming a medical researcher is not the way.

The Heart Research Institute recruits PhD students who have proven throughout their university careers to be amongst the best and the brightest. Cardiovascular research attracts brilliant scientific minds, however increased competition for limited funding intensifies the pressure for output. Academic experts have estimated that over the past decade, base expectations for a year of reasonable productivity in the field of scientific study (in regard to papers and conference presentations) has – at a minimum – tripled.

The job of a medical researcher necessitates multitasking – lab experiments, exhaustive paper writing, frequent conference presentations and endless networking.



Professional demands increase as scientists attempt to advance their careers and take on associated jobs, such as teaching, student supervision, grant writing, and additional administrative tasks. For translational researchers, there is the further requirement of constantly consulting with patients and doctors to ensure their work is yielding tangible, practical solutions. Scientists also have the burden of protecting their intellectual property (through methods such as patents) while concurrently working to attract industry partners who might, one day, want to commercialise their discoveries.

Research is not a nine-to-five job. It's nights and weekends. It's contemplating grant-writing strategy while getting the kids dressed in the morning. It's going to sleep at night obsessing over the next critical breakthrough. It's competing to stay in the top 10% of the field internationally, under the ever-looming threat of your research being abruptly discontinued due to a lack of sufficient funding.

With the success rate for receiving grants from the Federal Government's major medical research funding vehicle (NH&MRC) at an all-time low of 13%, it is a very challenging time to be a medical researcher in Australia.

“  
**Research is not a nine-to-five job. It's nights and weekends. It's contemplating grant-writing strategy while getting the kids dressed in the morning.**  
”

This fight for funding detracts from HRI scientists' true purpose and passion – saving lives. Our scientists entered the medical field in order to research, discover and heal. They work to contribute not only to the global common good, but also to your individual health and the hearts of your loved ones.

Therefore, you, our donors and supporters, play the most crucial role. You keep our talented scientists in the lab, where their brilliance is used. As a result of your help, HRI researchers can continue their work towards the next great breakthrough.

To our wonderful, generous donors and advocates who have provided funding, however big or small, to support the Heart Research Institute – thank you for your life-saving contributions!

**Richard Wylie**  
Director, Global Fundraising & Brand

**Right:** Jui Chien Hung, Bob Lee and Alex Chan of the Applied Materials Group, and Zohra Kakall of the High Blood Pressure Group



## FACE THE FACTS:

Heart disease is the most expensive disease in Australia, comprising approximately 12% of the total health budget

# Fundraising Report

## Illuminate 2017

“It is through the support of an evening like this that the HRI is able to continue its vital work, and we thank all those involved for their generosity and support in making Illuminate 2017 possible.”



### AWARD RECIPIENTS

**Charles Perkins Centre Student Researcher Award**  
Jessica MacLean  
Thrombosis Group

**Charles Perkins Centre Student Researcher Award, Highly Commended**  
Elysse Filipe  
Applied Materials Group

**Unity4 Best Publication Award**  
Richard Tan  
Applied Materials Group

**Global Interactive Early-Career Researcher Award**  
Dr Siân Cartland  
Vascular Complications Group

**Mentor of the Year Award**  
Associate Professor Simone Schoenwaelder  
Thrombosis Group

**Mentor of the Year Award, Highly Commended**  
Dr Steven Wise  
Applied Materials Group

**Global Impact Award**  
Professor Ben Freedman  
Heart Rhythm & Stroke Prevention Group

lluminate, the Heart Research Institute's annual signature event, was held on 24 November 2017. The occasion brought together leading scientists and international guests for an evening of scientific discovery, learning, and celebration.

As an evening of science and collaboration, the event began with an address by Professor Shaun Jackson, the HRI's Director of Cardiovascular Research, highlighting 'The Second Coming of Cardiovascular Disease'.

Guests then moved to the lawns of The University of Sydney's Refectory, where they enjoyed a scientifically themed art show and were given the unique opportunity to mingle with the HRI's top scientists and award winners.

Attendees enjoyed a sumptuous and heart healthy dinner specially curated by nutritionist Michele Chevalley. Early-Career Researcher Awards were presented to talented scientists who accomplished exceptional achievements in 2017.

The esteemed Mentor of the Year Award was presented to Associate Professor Simone Schoenwaelder of the Thrombosis Group, whose continued support, guidance, and encouragement has proven essential to the success of many young scientists. Congratulations to all award recipients!

A highlight of the evening was an interactive panel discussion about cardiovascular disease research led by HRI Group Leaders including Associate Professor Sanjay Patel, Dr Steven Wise, Associate Professor Simone Schoenwaelder, Dr John O'Sullivan and special guest Dr Justine Schelle, who spoke of her experience as a patient suffering from cardiovascular disease.

lluminate 2017 also recognised the support and generosity that enables the HRI to continue its vital work. Thank you to all those who attended, and a special thanks to our sponsors Sydney Local Health District, Unity4, Global Interactive and One Contact, who made this magical evening possible.



### WHEN

14 December 2017

### WHERE

The Heart Research Institute, Newtown, Sydney

### WHO

Hearts for Eternity Legacy Members

## Chairman's Christmas Brunch

The HRI's annual Chairman's Christmas Brunch was held on 14 December 2017. This informal event allows the HRI to thank patrons for their generosity, particularly Gift in Will benefactors. The occasion is an opportunity for the HRI staff and scientists to meet donors in person, and discuss how their support is making a difference in the fight against cardiovascular disease. The brunch was hosted at the HRI's Eliza Street headquarters and followed by a tour of the laboratories.



## Charity Housie

The HRI would like to thank all clubs and venues that provide continuing support to ensure the success of the Charity Housie Program. Groups involved in this initiative contribute a valuable monetary donation to provide for the program's overheads and services, as well as raise awareness of the HRI within the general community. Without their support the Charity Housie Program would not be possible.

In particular, the Fundraising team would like to extend our thanks to the management and staff of:

Arena Sports Club, Bankstown RSL  
Cabramatta Leagues  
Campbelltown RSL  
Camden RSL  
Erina Rugby League Club  
Ourimbah Lisarow RSL  
Parramatta Leagues  
Raymond Terrace Bowling Club  
Club Toukley  
West's Ashfield

## Support for the HRI's Newest Group

The Ramaciotti Foundations, managed by Perpetual, continued to invest in the HRI's groundbreaking science throughout 2017. The Foundations awarded a \$150,000 Health Investment Grant to the HRI's newest Group Leader, Dr Freda Passam. This grant will support Freda's work to develop a new class of drug targeting a blood-clotting enzyme, with the aim to prevent clots that lead to strokes and heart attacks from forming.

## Behind the Scenes Laboratory Tours

In 2017, the HRI hosted a number of 'Talk and Tours', providing supporters the opportunity to tour HRI's facilities and experience the world of research up close, in action. It is vital that the community can witness first-hand the remarkable research funded by public supporters. Guests learn about HRI discoveries directly from our scientists, who also host a tour of our laboratories.

Left: HRI staff and supporters pictured at the annual Chairman's Christmas Brunch

Below: Supporters view the latest HRI scientific lab equipment during a 'Talk and Tour'

“It is vital that the community gets to see the HRI's groundbreaking research in action.”





Left: Hearts for Eternity sculpture at the HRI headquarters



## Hearts for Eternity

Hearts for Eternity members are special benefactors who have bequeathed a donation to the HRI in their Will. These gifts provide the long-term funding needed to achieve scientific breakthroughs. We recognise and engage Hearts for Eternity members through offering behind-the-scenes laboratory tours with the intimate opportunity to witness the HRI's research first-hand.

These generous donors are honoured with the Hearts for Eternity memorial sculpture, displayed at the entrance of the HRI's headquarters. The sculpture is an interpretation of the heart and circulatory system, and illustrates the inter-relationship of the HRI scientists, staff, and supporters. Each Gift in Wills benefactor is honoured with a hand-crafted plaque inscribed with their name and displayed on the sculpture for posterity. On 14 September 2017, as part of Include a Charity week, the HRI held a morning tea to celebrate and honour Gift In Wills patrons.



## Feel the Beat

The HRI's inaugural Feel the Beat campaign launched in September to coincide with World Heart Day. We focused on atrial fibrillation (AF), a relatively common irregularity in your heart beat and a risk factor for devastating strokes. Thank you to all the 250,000+ people who used this campaign to prioritise their heart health by checking their pulse, a way of screening for AF. Highlights included bringing our hand-held smartphone AF screening tool directly to staff at JJ Richards, Blackmores & the Blackmores Institute, Bioceuticals, Optiver, Dimension Data, and customers at the NAB Newtown branch. This extremely successful initiative will be continued in 2018.

Above: HRI staff during Feel the Beat campaign

## International Giving

The HRI is supported by over 38,000 international donors, including a high volume of New Zealand and United Kingdom based contributors. The HRI's local partnerships in these countries continue to grow and enable our mission to globally fight the world's number one killer. The HRI appreciates all of our international donors for their continued support.

**38,582**  
INTERNATIONAL  
DONORS SUPPORTED  
HRI IN 2017

## Partnership with HeartHero®

Just in time for Christmas, the HRI launched a new partnership with HeartHero®, a handy clip-on capsule for carrying aspirin to treat the initial symptoms of a heart attack. HeartHero® is offered at a discount to HRI supporters, and proceeds from every capsule sold are generously donated to the HRI. Thank you HeartHero®!

“  
**HeartHero® – a clip-on capsule for carrying emergency aspirin to treat initial heart attack symptoms.**  
”



## Corporate Support at Christmas

Thank you to the staff at both Calibre Business Advisory and Optiver for donating to the HRI this Christmas. Both companies generously matched their staff's donations, with Calibre Business Advisory adding another zero to the cheque! Supporting life-saving research is truly a remarkable gift.

## Virtual Tour

The Trusts, Foundations & Corporate Partnerships team was delighted to host the first ever "virtual tour" of the HRI in October. Using 3D footage of our labs, the tour was guided live by our scientists, with participants able to listen over the phone while following the tour in 3D on their tablet or computer. Viewers could ask questions and receive answers in real time via a chat box. We were thrilled to give supporters who are unable to access in-person lab tours (either due to geography or timing) the opportunity to experience our world-class facilities.

## Hearts for Eternity Members

Mrs S Anketell	Mr & Mrs R & M Kippax
Mr & Mrs R & S Banham	Ms J I Kirby
Miss M Blums	Mrs N Kulakowski
Mr L Boyd	Mr R Lane
Mr R O Bushnell	Mrs D McGregor
Mrs V Chick	Mr D A McWhinney
Mr E Flesh	Mr I Palmer
Mr N Foun	Mr & Mrs F & J Pengelly
Mrs J Glading	Mr K Scott
Mrs N Graeme-Evans	Mrs J Scott
Mrs J Gray	Mrs M Sinclair
Mr S J Hopkins	Mr J Stone
Miss H M Howie	Mrs E Van Der Knaap
Ms D Janes	Miss D E Watt
Mr A Jenkins	Mr R J White AO
Mr E E Kajewski	Mr R Wylie
Mr G Kaudeer	Anonymous (51)

## Major Gifts

Thank you to the following philanthropists, companies, and trusts for their generous contributions to the HRI's work in 2017:

Calibre Business Advisory  
Charles Perkins Centre, The University of Sydney  
The Clive and Vera Ramaciotti Foundations managed by Perpetual  
Eclipse Environmental  
Eventide Homes NSW  
Global Interactive  
Lin Huddleston Charitable Foundation  
James N Kirby Foundation  
JJ Richards and Sons Pty  
One Contact  
Rebecca L Cooper Medical Research Foundation  
Sydney Local Health District  
Zorich Group

## Gift in Wills Received 2017

Estate of Robert Onslow Bushnell  
Estate of Ernest Flesh  
Estate of Sidney James Hopkins  
Estate of Heather M Howie  
Estate of Edwin Ernest Kajewski  
Estate of Joyce Ileene Kirby  
Estate of Nathalie Kulakowski  
Estate of Donald Andrew McWhinney  
Estate of Keith & Joyce Scott  
Estate of Robert J White  
Anonymous (7)

## Fundraising Staff

Michael Farrugia Fundraising Legal & Compliance Manager  
Louise Groves Donor Services Representative  
Siobhan Hanbury-Aggs Head of Regular Giving  
Sharon Hodgson Head of Philanthropy (Partnerships Manager)  
Caroline Lels Digital Communications Specialist  
Alessandra Martines Corporate & Trusts & Foundations Manager  
Melanie Murphy Regular Giving Coordinator\*  
Larnie Narayan Philanthropy Executive  
Nathan O'Brien Fundraising Business Analyst  
Pat Ordenes Digital Fundraising Manager\*  
John O'Shea Pledge Program Manager  
Laura Petrocchio Gift in Wills Relationship Manager  
Lisa Petrocchio Single Giving Programs Manager  
Sarah Quan Single Giving Programs Coordinator  
Rosemary Warwick Donor Services Coordinator  
Richard Wylie Director, Global Fundraising and Brand  
Helena Yiu Database and Transactions Executive  
Valentin Ziegler International Fundraising Manager

## Marketing & Communications Staff

Sarah Hawkesford Marketing and Communications Manager  
Betty Loi Content Manager  
Emma Phillips Marketing and Communications Executive\*

\*Departed the HRI in 2017

## HOW TO GET INVOLVED



- Make a donation
- Become a regular giver (for as little as \$25 per month)
- Remember the Heart Research Institute in your Will
- Give a gift In Celebration or In Memory of a loved one
- Donate tax-free through your salary with Workplace Giving
- Raise money with a personal challenge – run a marathon, ride a bike or swim!
- Harness the power of your business to support vital research as a corporate partner
- Get up close to the science – visit us for a Talk & Tour of HRI
- Purchase an item from our Wishlist at [www.hri.org.au/get-involved/research-wish-list](http://www.hri.org.au/get-involved/research-wish-list)

## FOLLOW US ON SOCIAL

- Like us on Facebook [facebook.com/HRIAust](https://www.facebook.com/HRIAust)
- Follow us on Twitter [twitter.com/HRIAust](https://twitter.com/HRIAust)
- Watch us on Youtube [youtube.com/HRIAust](https://www.youtube.com/HRIAust)

## GET IN TOUCH

For more information, visit us at [www.hri.org.au](http://www.hri.org.au) or contact us on 1800 651 373.

**Thank you to all of the HRI's 2017 supporters for joining us in the fight against cardiovascular disease**



**GROSS INCOME**  
\$25.8 million  
December 2017

**NETT PROFIT**  
\$4.3 million

**INVESTED PROFIT**  
\$1.3 million  
towards scientific equipment and information technology



## FINANCE

### Income

HRI derives its income mainly from fundraising, bequests and government grants from Australia and overseas. Our gross income for the year to December 2017 was \$25.8 million, compared to \$29.6 million in the prior year, noting that we received some large bequests in 2016.

### Expenditure

The Fundraising team continued with its strategy to diversify its income streams to ensure a sustainable portfolio of programs in future years. HRI continued our investment in IT to better support our scientific teams and fundraising efforts with up-to-date and reliable platforms. We maintained a similar level of staffing costs while streamlining our operational expenses.

### Operating Result

Expenditure for the year to December 2017 was greater than income generated mainly due to investment in donor acquisition programs, and the Institute returned a \$0.98 million net deficit. The donor acquisition program will yield higher revenues in future years.

“  
**The Institute has no debt and our researchers benefit from the Institute’s ownership of its \$20 million primary research facility on Eliza Street in Newtown, Sydney.**  
”

### Asset Base and Cash Flow

The HRI has a strong balance sheet and a good asset base that will assist us to smooth any fluctuations in income in any single year and enable our scientific staff to have greater security of tenure. The Institute has no debt and our researchers benefit from the Institute’s ownership of its \$20 million primary research facility on Eliza Street in Newtown, Sydney.

Our cash flows remain healthy with \$0.9 million generated from our operating activities of which \$0.8 million was invested in both scientific equipment and information technology platforms, with the remaining surplus set aside for use in future years in medium term deposits. In 2017, our investment funds, which are being managed by JBWere, increased marginally to \$10.2 million. These funds sit alongside the existing Salteri Endowment of \$3.4 million. These funds not only provide a healthy investment income for the Institute but additionally provide a pool of resources to continue the fight against cardiovascular disease in future years.

A copy of our full annual financial report is available from our website or by contacting the Heart Research Institute at [support@hri.org.au](mailto:support@hri.org.au)

## INFORMATION TECHNOLOGY

In 2017, the HRI Information Technology projects were driven by new legislation regarding data protection and security.

Due to the European Union’s updated regulations, the IT team prioritised testing and upgrading the HRI infrastructure to meet the requirements of PCI Compliance, a prerequisite for any organisation processing consumers’ credit card details.

The IT department anticipates receiving a PCI Compliance certification in 2018.

Other major 2017 projects included upgrading operations systems for both Finance and Fundraising. This resulted in improved efficiency and reduced costs for servers and software.

The HRI has increased presence in the Cloud by migrating Finance and Fundraising servers to Azure. This has reduced the Institute’s physical footprint and lowered the total cost of ownership and disaster recovery.

IT worked closely with science groups to improve access to research results, storage, and increase data availability. The department is looking forward to a busy 2018 with a focus on scientific and research technologies.

## HUMAN RESOURCES

2017 has continued to see the attraction of top talent and an ongoing focus on

developing existing talent. The HRI launched the Sydney Cardiovascular Research Fellowship program in conjunction with The University of Sydney and Charles Perkins Centre, which saw high calibre applicants, both local and international, apply for this prestigious opportunity over the next five years.

In 2017, HR also led the second New Zealand Summer Scholarships program supported by the generous contributions of New Zealand donors. Excitingly, one of the previous year’s scholars has returned to join the HRI and The University of Sydney to complete further study.

Diversity has continued to be a key focus with the HRI Diversity Council. A range of initiatives particularly targeted at improving career opportunities for female scientists was launched in 2017.

“  
**2017 has continued to see the attraction of top talent and an ongoing focus on developing existing talent.**  
”

## OPERATIONS & SCIENTIFIC STAFF

**Linda Peterson Brown**  
HUMAN RESOURCES ADVISOR

**Vania Dauner**  
EXECUTIVE ASSISTANT

**Elissa Dwyer**  
DIRECTOR, HUMAN RESOURCES

**Lei Hong**  
FINANCIAL ACCOUNTANT

**Rob Jones**  
HUMAN RESOURCES ADVISOR

**Belle Kong**  
RESEARCH GRANTS & CONTRACTS

**Jasmine Lam**  
SENIOR ACCOUNTANT

**Andrew Leech**  
GENERAL MANAGER COMMERCIALISATION\*

**Michelle Morgan-Mar**  
RECEPTIONIST/ADMINISTRATOR

**Erin O’Brien**  
RECEPTIONIST/ADMINISTRATOR

**Adam O’Halloran**  
INFORMATION TECHNOLOGY DIRECTOR\*

**Tym Richardson**  
BUILDING & FACILITIES MANAGER

**Sathy Sappany**  
HEAD OF FINANCE

**Snezana Stojanovska**  
ACCOUNTS PAYABLE OFFICER

**Brett Szmajda**  
RESEARCH & INNOVATIONS MANAGER\*

**Goran Tkalcec**  
INFORMATION TECHNOLOGY ADMINISTRATOR

**Morgan Jones**  
SCIENTIFIC & FACILITIES SUPPORT TECHNICIAN

**Jo Lyons**  
HUMAN RESOURCES ADVISOR

**Phil Morgan**  
LAB MANAGER

\*Departed HRI in 2017

# Operations Report

The purpose of the Heart Research Institute Operations Team is to provide first-class support to our scientists, and to ensure all teams have the equipment and services required to drive their research forward with minimal hindrances.



Left: The HRI state-of-the-art research lab facility in Newtown, Sydney



## Thank you, from the bottom of our hearts.

No matter what role you play, either within HRI or as an external collaborator or supporter, you are pivotal to the quest to reduce the number of people suffering from cardiovascular disease.

Thank you for helping to keep our scientists in the lab. Together, we can fight the second coming of cardiovascular disease.

## It takes a heart of gold to end heart disease.

To make a tax-deductible donation, please mail this form to Heart Research Institute, 7 Eliza Street, Newtown NSW 2042. You can also donate online at [hri.org.au](http://hri.org.au) or by calling 1800 651 373.

### YOUR DETAILS

Title

First name

Surname

Street address

Suburb

State  Postcode

Phone

Email

[See over for payment details](#)



Please send me information about leaving a gift to the Heart Research Institute in my Will.

AR17



# You have a big heart. For that, we thank you.

Donations \$2 and over are tax-deductible.  
Thank you for your support.

Please accept my gift of \$ \_\_\_\_\_

I would like to make this a regular gift.  
Please debit from my account monthly.

Please charge my credit card:

Visa  MasterCard  Amex  Diners

Card number:

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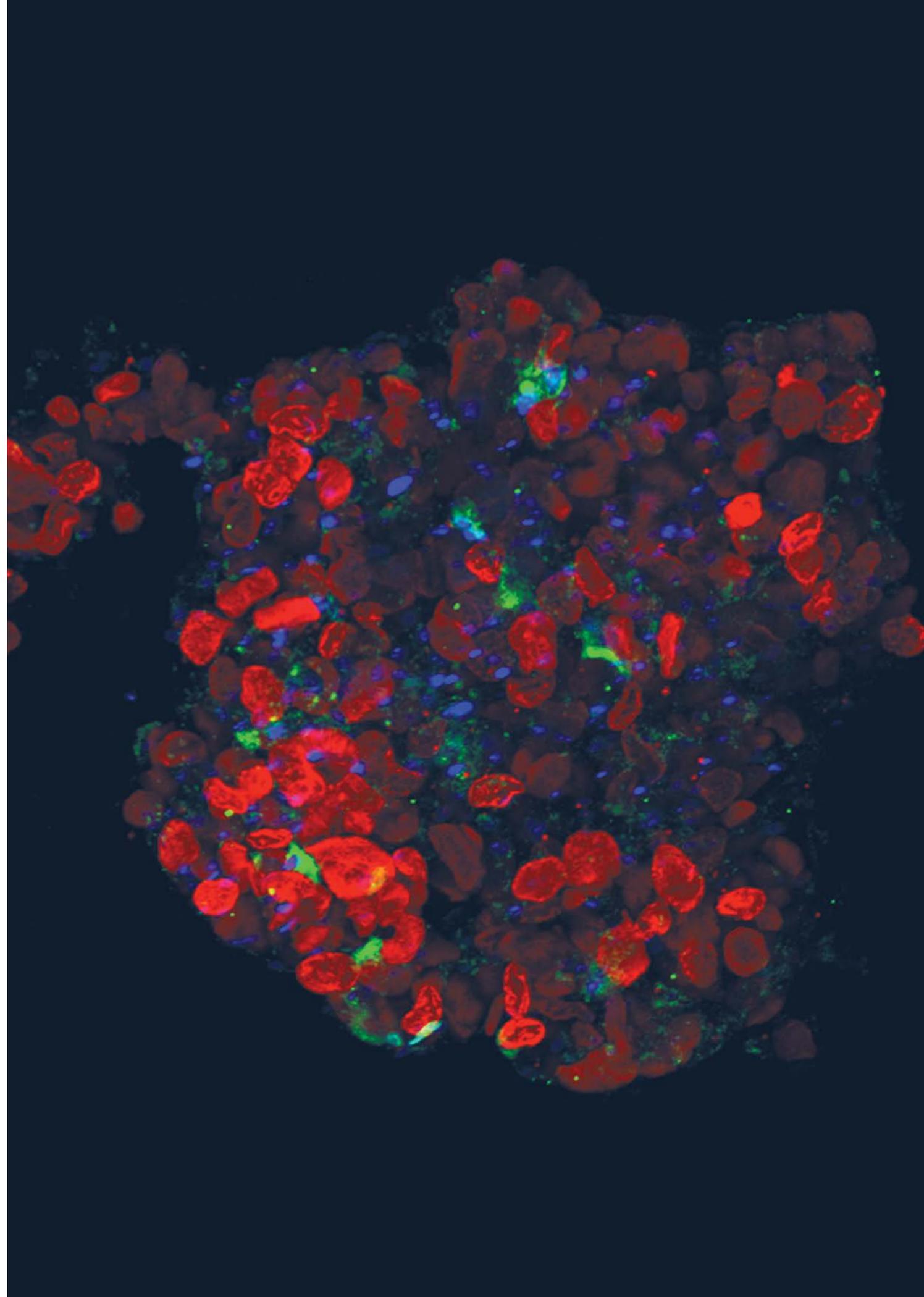
Signature \_\_\_\_\_

Expiry date \_\_\_\_\_

I authorise the Heart Research Institute to deduct this amount from my credit card on receipt of this form. If monthly pledge has been ticked, please deduct this amount from my credit card accordingly. This authority will remain valid until revoked in writing by me or the Heart Research Institute.

Heart Research Institute  
7 Eliza Street, Newtown NSW 2042  
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See over for details





Today's Research, Tomorrow's Cure