2014

HUDSON
INSTITUTE OF MEDICAL RESEARCH

Annual Report

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Hudson Institute of Medical Research

Director
Professor Bryan Williams, PhD, (Hon) FRSNZ, FAA

Associate Directors
Professor Paul Hertzog, PhD, BSc(Hons)
Professor Peter Fuller AM, PhD, FRACP

Centre Heads
Associate Professor Ron Firestein, Centre for Cancer Research
Professor Peter Fuller, Centre for Endocrinology and Metabolism
Professor Paul Hertzog, Centre for Innate Immunity and Infectious Diseases
Professor Stuart Hooper, The Ritchie Centre
Professor Lois Salamonsen, Centre for Reproductive Health
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HUDSON STANDS FOR

WORLD-CLASS RESEARCH

283+
research publications in 2014

MULTIDISCIPLINARY ENVIRONMENT

450+
staff and students

LEADING PARTNERSHIPS

MonashHealth

MONASH University

2014 HUDSON INSTITUTE OF MEDICAL RESEARCH

Annual Report

Vision

We strive to enhance human health and the quality of life through groundbreaking, collaborative, medical research discoveries and innovation, and ensure its direct impact on the community

Values

- Excellence
- Innovation
- Collaboration
- Community

ABOUT US

The Hudson Institute of Medical Research is world-renowned for research into reproductive and baby health research, and is also a leading centre for research into infection and innate immunity, now closely tied to the latest new developments for cancer treatment. At the core of the Hudson is our focus on research excellence and discovery science, with a constant objective to have positive impact on human life.

The Hudson is home to more than 450 globally eminent, high-achieving career scientists, who work side by side with clinicians to solve some of our most challenging contemporary health problems. Formed by the merger in 2014 of two of Australia's leading medical research Institutes, Monash Institute of Medical Research and Prince Henry's Institute of Medical Research, the Hudson brings together a successful history of renowned successes, from the development of current IVF technology to changes in practices for the prevention of SIDS and the discovery of inhibin, leading to diagnostic tests for Down syndrome and for certain ovarian cancers.

It is the dynamic interchange across our research themes that creates the most exciting potential for life-altering patient outcomes. Further enriching the quality of our research and its progression to patient outcomes is our location at the Monash Health Translation Precinct (MHTP), including the brand-new and purpose-built, $84 million Translational Research Facility, which hosts clinical and research space complete with world-best technology platforms. This positioning, immediately adjacent to our close collaborators, Monash University and Monash Health, provides a rich, fertile environment for breakthrough collaboration between researchers and clinicians, focussing effort on the most pressing diseases and bringing novel science-based treatments to the clinic.

The Institute drives innovative, cutting-edge research programs through its six specialised research centres, which seek to respond to Australia's key health priorities.

- Cancer
- Genetic Diseases
- Immunity, Inflammation and Infectious Diseases
- Reproductive Health
- Fetal, Neonatal, Children's and Women's Health
- Endocrinology and Metabolism

MESSAGE FROM THE CHAIR

I am very pleased to report on the organisation's inaugural year as a merged, independent medical research Institute.

The January 1 2014 amalgamation of Monash Institute of Medical Research (MIMR) and Prince Henry's Institute (PHI) was a natural progression of the long and successful partnership between the two research leaders, and has been a resounding success.

In early January, a new Board of Directors was formed of members from both merging boards. It was decided that the newly merged organisation would be temporarily known as MIMR-PHI Institute while a new name and vision for the Institute was refined. Key to this vision was a focus on ensuring that the Institute's research has a direct impact on the community through a fusion between discovery research and the frontline expertise of our clinical colleagues.

To foster this pursuit, the Institute has now been named Hudson Institute of Medical Research, in honour of the late Professor Bryan Hudson, a world-class clinician-researcher, innovator and a visionary leader. Professor Hudson was the Founding Chair of Monash University's Department of Medicine and the Founding Director of Prince Henry's Institute. He embodies the story of the Institute as the first seed of both merging partners, which have now come together to execute his vision of carrying a simple idea through to the stage of improving and saving lives.

Since combining forces, Hudson Institute's research capability has been transformed, and a critical mass of 450 world-class researchers and students has given the Institute a driving role in setting the Australian and global research agendas. The Institute is now positioned as the research engine of the Monash Health Translation Precinct (MHTP), our close partnership with health and education leaders Monash Health and Monash University, here on the Monash Medical Centre site.

In 2014, we oversaw the beginning of construction of MHTP's federally funded, $84 million Translational Research Facility, which is on track and on budget for completion in late 2015. The building's iconic design and innovative use of 3D-modelling technology by Woods Bagot was recognised with the award of this year's RTC Integration Prize. This facility will co-locate research with clinical and technological platforms, to allow the Institute's researchers to effectively leverage the practical knowledge of clinical colleagues to ensure that the areas of critical need are investigated.

Dr Bob Edgar
Chair

MESSAGE FROM THE DIRECTOR

In January, Hudson's new Board, Institute leaders and staff worked tirelessly to bring key functions and processes together, by merging 450 staff and students and 48 research groups in four buildings. This was a major undertaking.

In order to form a clear outline of the new Institute's strategic direction, a Strategic Retreat was held for all Institute leaders in March. Out of this emerged the Institute's core drive, which was to enhance human health and quality of life through groundbreaking, collaborative, medical research discoveries and innovation, and ensure its direct impact on the community.

The retreat led to some very exciting and important initiatives for the Institute, including: the establishment of a Gender Equity working group to promote and support our female staff, who make up 68% of the Institute; a program to support our early-career researchers during this critical time in their career; a formal mentoring program for researchers to promote their professional development; and three cross-centre research affinity groups for our scientists to leverage one another's knowledge. To boost the Institute's translational research capability, we will focus on recruiting and developing clinician-researchers. To promote cross-discipline collaboration and spark unexpected ideas, a Scientific Retreat was held in July for Hudson's scientists to share their research with one another.

Hudson researchers have made several impressive breakthroughs in 2014, and have been rewarded with a successful year of funding from the National Health and Medical Research Council (NHMRC). Despite NHMRC-funded grants sinking to a record low national average of less than 17.6 per cent, the Hudson Institute was pleased to receive more than $11,912,301 from the NHMRC and ranked fourth in the country for the number of research projects funded.

Our outstanding student program has been brought to an extremely high standard through the tireless efforts of Postgraduate Student Committee Coordinator Professor Rosemary Horne, who has committed a considerable amount of time and care to the students since 2004. In 2014 Professor Horne handed over to Professor Kate Loveland, who has taken on the role with gusto and is very keen to ensure that our students are provided with the highest quality education and inspiration at the forefront of research.

With national research funding consistently decreasing, philanthropic support has become critical to a sustainable future for the Institute. Hudson has again been fortunate to benefit from the generosity of our close supporters and friends in 2014. In particular, the Fielding Foundation has committed $1 million to the Hudson over five years to support the research of our brightest young scientists, as well as innovative research initiatives. The Cure for Life Foundation awarded Professor Terry Johns with $2.8 million to fund his vital brain glioma research. Long-time Institute supporters, the Evans family, also contributed a further $100,000 towards the Institute's bowel cancer research program.

Crucially for the sector, the Federal Government's proposed Medical Research Future Fund was announced this year and promises to be one of the most significant medical research initiatives implemented in Australia. However, we are not likely to see the benefits of this scheme for some time, so it is imperative that we continue to secure funding from new sources in order to maintain our vital research.

Finally, Hudson Institute would like to acknowledge the significant support it receives from the Federal and State Governments, philanthropic trusts and foundations and organisations in Australia and overseas. We would like to particularly thank the Victorian State Government for its funding of the Institute through the Operational Infrastructure Support Program.

Professor Bryan Williams
Director and CEO

GOVERNANCE

Dr Bob Edgar

BEcon (Hons), PhD (Econ), FAICD

Chair

Dr Edgar has extensive experience in financial services including 25 years at ANZ Bank where his final role was Deputy Chief Executive Officer. He is also Director on the Boards of Asciano Group, Federation Centres Group, Linfox Armaguard Pty Ltd and Transurban Ltd

Special responsibilities

– Member of the Finance and Audit
– Committee until March 2015

Ms Jane Bell

B Ec, LLB, LLM (Lon), FAICD

A Board member of the Company's predecessor since 2002, Jane brought her experience and knowledge across to the Company including over 22 years of experience in international banking and finance in senior legal roles in corporate treasury and financial services operations in Australia, UK, USA and Canada. Jane holds a Bachelor of Laws, Bachelor of Economics, Master of Laws (Lon) and is a Fellow of the Australian Institute of Company Directors. She is currently also Director on the Boards of Victorian Workcover Authority and the Royal Melbourne Hospital.

Special responsibilities

– Chair of Intellectual Property and Commercialisation Committee
– Member of Finance and Audit Committee

Ms Jennifer Joiner

BEcon, CPA

Jennifer has 30 years of experience in senior executive positions at Australian and global Life Sciences organisations including Thermo Fisher, IDEXX Labs, Bayer AG and GE Medical Systems Australia Pty Ltd.

Special responsibilities

– Member of Intellectual Property and Commercialisation Committee
– Chair of the Investment Committee

Professor Christina Mitchell

MBBS, PhD

Professor Mitchell is currently the Dean of the Faculty of Medicine, Nursing and Health Sciences, Monash University. Her previous positions with the university include Head of the Department of Biochemistry and Molecular Biology, which quadrupled its size and research budget under her leadership, and Head of the School of Biomedical Sciences.

A physician-scientist specialising in clinical haematology, Professor Mitchell completed her medical training at Melbourne University and consultant training in haematology at the Alfred Hospital, Melbourne. She undertook post-doctoral studies in the field of intracellular signaling at Washington University Medical School, St Louis, USA.

A member of the NHMRC Research Fellowships Peer Review Panel and the scientific advisory panels of the Garvan Institute and Peter MacCallum Research Institute, she has previously been a director of Victorian Endowment for Science, Knowledge and Innovation (VESKI) and member of the Cancer Council Victoria and FSHD Global Research Foundation scientific advisory panels. She is currently a Director on the Boards of Baker IDI and Diabetes Institute, Burnett Institute and the Council of Victorian Institute of Forensic Medicine.

Professor Pauline Nestor

BA (Hons), MPhil, DPhil

Professor Nestor is currently Pro Vice-Chancellor (Research) at Monash University. Previous appointments at Monash University have included Associate Dean (Research), Faculty of Arts and Academic Adviser to the Office of the Deputy Vice-Chancellor (Research). A highly published expert in nineteenth-century English literature and culture, Professor Nestor completed a BA (Hons) at Melbourne University, before attending Oxford University as a Rhodes Scholar. She is also a Director on the Board of ISCRR (Institute for Safety, Compensation & Recovery Research).

Associate Professor Wayne Ramsey AM

CSC MBBS MHA FRACMA

A member of the Company's predecessor since 2007, Associate Professor Ramsey has a strong background in health and management.

Following a successful military career, including the role of Director General Defence Health Service, Associate Professor Ramsey moved into research, clinical and medical services and is currently Executive Director of Medical Services and Quality for Southern Health. He currently also serves on the Board responsible for Jesse McPherson Hospital.

Mr John Weste

BSc, MBA

Mr Weste has over 30 years management and management consulting experience and expertise, including within global corporations and as a Partner/ Vice President in some of the world's leading management consulting firms. He is a Principal of the TRANSEARCH Melbourne office. He has a vast portfolio of global consulting and executive management experience having lived and worked extensively all over the world. John has partnered as a client with many of the global search firms, systematically building corporate entities and consulting with businesses across Asia, Australia, India, Europe and North America.

Mr Weste has held a number of senior executive positions with many of the major global consulting firms including Managing Director – The Richelieu Group, Partner – KordaMentha, Vice President and Head of Global Solutions – Tata Consultancy Services, Managing Vice President – Gartner Asia Pacific, and Partner – Arthur Andersen Business Consulting. His focus across these roles included Strategy Development and Execution, Organisational Change, IT-based Business Transformation Programs, Analytics and Business Intelligence, and Leadership Development.

Mr Graeme Wise

B.Eco (Monash), FAICD

Mr Wise began his career as Marketing Specialist, including 15 years working with Alcoa, based in Australia and the UK. In 1981, he made a switch to retailing, firstly with Myer and then two years later founding Adidem Pty Ltd to build and operate the Australian branch of the Body Shop chain of retail stores. The Adidem Group now comprises several companies, of which Graeme is Chairman, including publishing, hospitality and computer solution businesses. Graeme is also involved in a number of philanthropic activities as a patron of the Big Issue newspaper and founder of the Wise Foundation.

Professor Euan Wallace AM

MBChB MD FRCOG FRANZCOG FAHMS

Professor Euan Wallace is Co-Head, (Department of Obstetrics and Gynaecology) of The Ritchie Centre at Hudson Institute of Medical Research; Carl Wood Professor and Head of Department of Obstetrics and Gynaecology at Monash University. As Head of The Ritchie Centre (2010-2014) he brought together leading research groups in women's health, fetal and neonatal physiology, infant and child health and, stem cell biology to create a translational research centre. Together with Professor Stuart Hooper (Centre Executive Head) and Professor Nick Freezer (Co-Head, Paediatrics), Professor Wallace continues to build The Ritchie Centre to become one of the word's leading research centres in women's and children's health.

CHIEF OPERATING OFFICER'S REPORT

In 2014, the merger of Monash Institute of Medical Research and Prince Henry's Institute created a climate of rapid change as we rallied to bring the two organisations together.

To ensure this process was collaborative and well-communicated internally, it was supported by an external consultant who initiated staff meetings and social events, and facilitated staff consultations to inform the development of new internal processes, systems and structures.

In 2014, the merger of Monash Institute of Medical Research and Prince Henry's Institute created a climate of rapid change as we rallied to bring the two organisations together. To ensure this process was collaborative and well-communicated internally, it was supported by an external consultant who initiated staff meetings and social events, and facilitated staff consultations to inform the development of new internal processes, systems and structures.

The first step was to employ all staff in the new Institute and establish an organisational structure. This took the form of six, research-themed centres, which now coordinate each of their research groups and members.

Our first few months were spent combining two sets of teams for every department, including HR, Finance, Purchasing, Communications and Fundraising, and reviewing their respective systems, processes and policies against the needs of the new Institute. This resulted in the implementation of several brand-new IT systems for payroll, purchasing and finance.

Hudson staff approached this with enthusiasm, despite being very thin on the ground. A full review of the Institute's fundraising was conducted and we will look to appoint a full-time Fundraising Manager in 2015 as philanthropic donations become critical to the Institute's sustainability. A new website was created for us to share Hudson's successes with our supporters and the community.

With the Institute now double its size, key appointments were made to cope with the added demand. A Chief Financial Officer and Company Secretary, Rob Merriel, was appointed in May, along with several new Finance and HR team members.

To oversee the management of Hudson's key functions and objectives, including recruitment, research equipment, social events, students and OHSE, a new set of committees was established in early 2014 using a broad and active engagement of a cross-section of staff.

Negotiations surrounding our inaugural Enterprise Bargaining Agreement (EBA) have commenced and our groups of employee and employer representatives are making very positive progress towards the formation of a new EBA for all staff.

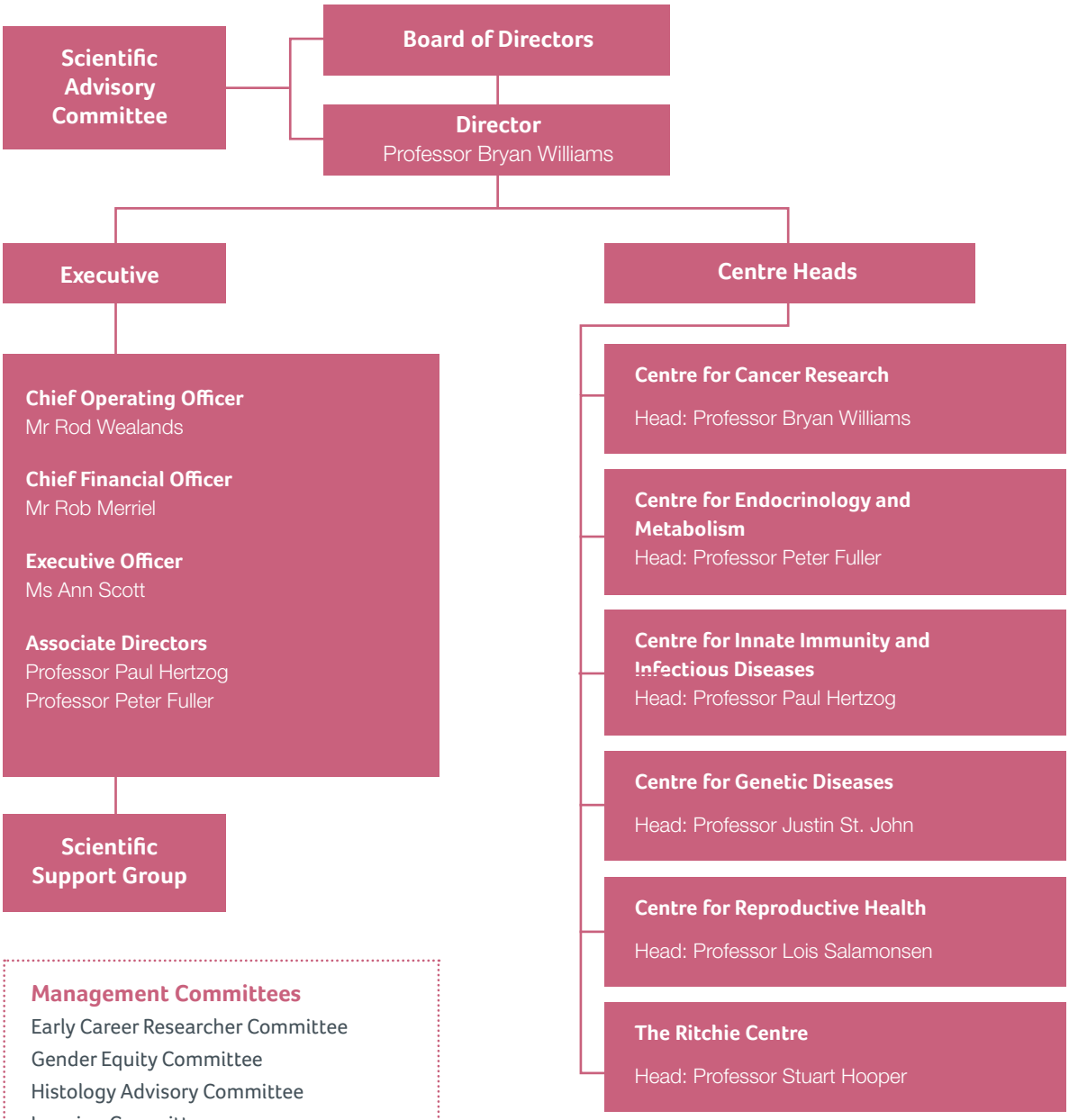
We have now moved into a period of planning for the Institute's future as we develop Hudson's strategic plan, which will outline our priorities for the next three years.

Rod Wealands
Chief Operating Officer

Rob Merriel
Chief Financial Officer

Key to this plan will be to address Australia's financially uncertain research environment; establishing the Institute's new identity among the wider research community; and providing outstanding support to our researchers to ensure that they continue their delivery of scientific excellence. I look forward to sharing details of this strategy with you after it has been finalised in early 2015.

ORGANISATIONAL CHART



Management Committees

Early Career Researcher Committee
Gender Equity Committee
Histology Advisory Committee
Imaging Committee
MHTP Genomics Advisory Committee
MHTP Postgraduate Administration
OHSE Committee
Purchasing Committee
Recruitment Committee
Seminar Committee
Social Club Committee
EBA Committee
Equipment Committee
Student Society Committee

RESEARCH HIGHLIGHTS

New pathways for treating pulmonary hypertension

Professor Stuart Hooper

Fetal and neonatal health researcher, Professor Stuart Hooper, describes the transition to air breathing as 'the most critical and high-risk event we experience other than traumatic injury and death,' with premature babies the most vulnerable.

"We are interested in the critical period of transition to air breathing at birth and how it is managed," Professor Hooper said.

For a baby to survive the transition to newborn life at birth, he or she must start using their lungs immediately and blood-flow through the lungs must dramatically increase.

For over 40 years it has been accepted that when air enters the lungs of a newborn for the first time, aeration of the lung will stimulate blood flow only in aerated regions. Professor Hooper and his team have dispelled this belief by using phase-contrast X-ray imaging and angiography. They showed that partial aeration of the lung caused a global increase in pulmonary blood flow, even in unventilated regions.

As such, this study has uncovered a new and previously unrecognised mechanism by which lung aeration stimulates the increase in pulmonary blood flow at birth.

This has implications for infants who develop pulmonary hypertension after birth, which is a major cause of death in newborn infants. Uncovering this mechanism has opened up new opportunities for dilating the lung's blood vessels and treating infants with pulmonary hypertension.

Lang JA, Pearson JT, te Pas AB, Wallace MJ, Siew ML, Kitchen MJ, Fouras A, Lewis RA, Wheeler KI, Polglase GR, Shirai M, Sonobe T, Hooper SB. (2014) Ventilation/perfusion mismatch during lung aeration at birth. J Appl Physiol (1985). 117(5):535-43.

Protecting against viral infection

Dr Anthony Sadler

There are millions of viruses in the world, from the common cold to hepatitis, contributing to a major global burden of disease.

Many viruses even cause cancers such as liver, cervical and lymphoma. Hudson researchers are working to understand how our immune system works to resist virus and diminish detrimental consequences of an infection.

Our scientists are interested in understanding how the family of enzymes called protein kinases function, in order to target their activity to therapeutically treat diseases. Kinases regulate every part of our physiology and inappropriate kinase activity forms the basis of many disease states.

In a paper published in the Journal of Molecular Cell Biology, lead author Dr Tony Sadler and his colleagues have identified the mechanism of action for a particular kinase called protein kinase R (PKR), which is important in the immune response to viral infection.

The team have described how PKR acts in these stress responses to limit virus infection and ensuing conditions. Dr Sadler says that when PKR is activated, virus replication is inhibited, immune responses are induced and stress is alleviated. The team has identified a protein interface between PKR and its protein substrate that is critical for this protective response to begin.

"Our discovery is significant because we now know how this kinase functions, leading to the protective response," said Dr Sadler. "If this mechanism can be harnessed, a new therapy can be developed to modulate PKR activity, and so treat viral-induced pathology."

Liu MS, Wang D, Morimoto H, Yim HC, Irving AT, Williams BR, Sadler AJ. (2014) Molecular dynamics reveal a novel kinase-substrate interface that regulates protein. J Mol Cell Biol. 6(6):473-85.

Blocking deadly inflammation and bacterial diseases

Dr Maria Kaparakis-Liaskos

The World Health Organisation has identified bacterial infections such as cholera, shigellosis and typhoid fever as some of the most problematic diseases in the world.

They are all caused by Gram-negative bacteria, and a receptor in the immune system, known as NOD1, plays a fundamental role in detecting them.

When NOD1 detects a common component contained within all Gram-negative bacteria, including those that cause these problematic infections, an immune response is initiated leading to severe inflammation.

Inflammation is an important response to infection or injury, but too much inflammation can cause a countless number of severe chronic inflammatory diseases.

In a study published in Cell Host & Microbe, Hudson researchers have discovered, for the first time, the exact location of the site where NOD1 and Gram-negative bacteria interact, causing the initiation of an immune response that drives inflammation in the body. Crucially, the team has also identified the mechanisms of NOD1-driven inflammation and, potentially, a therapy to inhibit it.

Lead researcher Dr Maria Kaparakis-Liaskos hopes that this major step forward could lead to treatments that limit the diseases caused by Gram-negative bacteria and other NOD1-mediated chronic inflammatory diseases.

"In our study we used a patented inhibitor to limit NOD1-driven responses and demonstrated that it actually blocked the production of inflammation in response to bacteria," said Dr Kaparakis-Liaskos.

"These findings will enable the development of clinical therapies to block NOD1 and, therefore, prevent inflammation during bacterial infections as well as a range of other NOD1-associated chronic inflammatory diseases."

Irving AT, Mimuro H, Kufer TA, Lo C, Wheeler R, Turner LJ, Thomas BJ, Malosse C, Gantier MP, Casillas LN, Votta BJ, Bertin J, Boneca IG, Sasakawa C, Philpott DJ, Ferrero RL, Kaparakis-Liaskos M. (2014) The immune receptor NOD1 and kinase RIP2 interact with bacterial peptidoglycan on early endosomes to promote autophagy and inflammatory signaling. Cell Host Microbe. 15(5):623-35.

Preventing and treating pre-eclampsia

Associate Professor Guiying Nie

Pre-eclampsia is a condition of pregnant women that can lead to serious complications for both mother and baby. The condition causes high blood pressure and a large amount of protein in the urine, and can result in impaired liver and kidney function.

Hudson researchers have identified a new risk factor for the development of pre-eclampsia. Associate Professor Guiying Nie and her team have found a previously unknown enzyme and demonstrated that high levels of this enzyme can cause pre-eclampsia.

The enzyme is a new member of the HtrA family of proteases and is found in the unborn baby's placenta

Associate Professor Nie says that her team has provided novel insights into regulating these proteases for therapeutic purposes.

"Now that we know that this family of proteases can increase the risk of pre-eclampsia, we can target them through regulation to develop new treatments for the condition," said Associate Professor Nie.

"If not monitored closely, pre-eclampsia can be fatal for some women. We hope the knowledge we have gained from our studies can be used to prevent pre-eclampsia from becoming a serious and even life-threatening condition," said Associate Professor Nie.

Singh H, Nero TL, Wang Y, Parker MW, Nie G. (2014) Activity-modulating monoclonal antibodies to the human serine protease HtrA3 provide novel insights into regulating HtrA proteolytic activities. PLoS One. 9(9):e108235.

Protecting the heart from the world's biggest killer

Dr Morag Young

Heart disease is the leading cause of death globally, killing 17.5 million people each year and causing an estimated 31 per cent of all deaths worldwide (World Health Organisation).

To help combat this major clinical and economic burden, Hudson researchers are working to identify new mechanisms to halt the progression of heart disease in order to develop novel treatments for heart failure.

Dr Morag Young and her team are looking at a receptor in the heart known as the mineralocorticoid receptor (MR), and its role in the development of heart disease. Crucially, they have shown that activating this receptor drives inflammation and a process called cardiac fibrosis, which stiffens the heart's fibrotic cardiac muscle and leads to heart failure.

"We know," Dr Young explains, "that antagonists of the MR, such as spironolactone and eplerenone, are very protective for the heart tissue and blood vessels. However, the clinical use of these drugs is limited by a frequently occurring side effect, hyperkalaemia, a condition of abnormally elevated potassium levels in the blood that can result in cardiac arrest."

Dr Young believes that the solution to this is to develop cardiac-selective antagonists that block MR signalling in cardiac cells only.

"This type of drug would provide the excellent cardiac protection of current antagonists without the side effects elsewhere in the body," said Dr Young.

"We are working to develop cardiac-selective MR antagonists by identifying the specific pathways that the MR regulates in heart cells and cells of the vessel wall. Our goal is to test them further in clinical samples to confirm their validity as a potential treatment.

"We are also investigating the cell-selective role of the MR in heart cells to determine whether antagonists can provide added cardiac protection when given to patients very soon after suffering a heart attack. Our animal studies suggest that without MR signalling the heart muscle recovers better."

The potential treatments could come in the form of rapid treatment with MR blockers when patients are hospitalised for heart attack, and as a preventative for people with a high risk of cardiovascular disease (such as someone with high cholesterol) before a cardiac incident to prevent cardiac stiffening.

Rickard AJ, Morgan J, Chrissobolis S, Miller AA, Sobey CG, Young MJ. (2014) Endothelial cell mineralocorticoid receptors regulate deoxycorticosterone/salt-mediated cardiac remodeling and vascular reactivity but not blood pressure. Hypertension. 63(5):1033-40.

ENGAGING WITH OUR COMMUNITY

Hudson Institute cares deeply about improving the health and wellbeing of people in the community and we are committed to rewarding their investment in science. The community is essential to the Institute and we rely on their support and much-needed funding to be able to carry forward vital research.

Hudson researchers share their knowledge with the community to increase peoples' engagement with science and inspire the next generation of researchers. In 2014, Hudson researchers participated in more than 50 community events, school talks, Institute tours and camps, with school students, community groups and public initiatives.

Students discover life in the lab

A group of budding scientists got a glimpse of life in the lab during Hudson's work experience program in September. The year 10 and 11 students from MacRobertson Girls' High School, Norwood Secondary College and Melbourne High School relished the opportunity to work alongside researchers, observing IVF fertilisation, dissecting mice and purifying plasmid DNA. This important initiative provides young Victorians with the opportunity to engage with the world of science and learn about the possibilities of a career in research.

Can Too tour Hudson Cancer Centre

A group of 20 enthusiastic Can Too fundraisers, including Founder/Chair Annie Crawford AM, had a chance to get up close to their cause during a visit to the Hudson Institute in November. The group were thrilled to join Hudson's cancer researchers for an early breakfast and tour of the Centre for Cancer Research.

Cancer research remains a key priority for the Hudson Institute, which is conducting research into the molecular mechanisms underlying the development, growth and metastasis of tumours, as well as the relationship between the innate immune system and cancer. Can Too is a Health Promotion Foundation that raises money for cancer research, prevention and care, through running, swimming and cycling events. They provide important funding for the Institute's breast cancer research.

Can Too tour group with Dr Keven Knower

Inner Wheel strenthens ties to vital cord blood research

The Institute hosted a group from Inner Wheel Australia who were keen to learn more about The Ritchie Centre's cord blood research, which was made possible through their funding. Professor Graham Jenkin and his team provided the visitors with an overview of their vital research, which uses stem cells from babies' umbilical cords to improve their brain function after they have suffered severe asphyxia at birth. The team hope that this research will help to eradicate life-long conditions caused by birth asphyxia, such as cerebral palsy. The Inner Wheel group were very excited by what they saw, even gowning up during their guided tour of the state-of-the-art facilities. The centre has very strong ties with the Inner Wheel, which has provided ongoing grant funding for their cord blood research for many years. Professor Jenkin also made a keynote speech at the Inner Wheel Service Club's cord blood research fundraising dinner in Warrnambool later in the year.

'Dr Kev' gives primary students a new tease on science

Hudson Institute has participated in the CSIRO 'Scientists in Schools' program for many years. This important initiative creates and supports long-term partnerships between schoolteachers and scientists, and allows scientists to provide valuable ideas and inspiration for teachers and students. Our scientists find the program highly rewarding, as the interaction with enthusiastic students gives them back a fresh perspective on science.
Dr Kevin Knower has taken part for four years. This year he visited Mossgiel Park Primary School in Endeavour Hills five times to conduct practical science lessons with the students. The students learnt about melting points and freezing by using dry ice, bacterial hygiene by growing bugs in petri dishes, and how to isolate DNA from strawberries.

Year six teacher, Cathy Cavedon, said, "It's been wonderful to be involved in the Scientists in Schools program with Doctor Kev. The students have embraced the program and always look forward to doing activities that are engaging and outside the normal classroom parameters."

Mossgiel Park Primary School student, Aina, says, "Dr Kev is interesting to listen to and is a very good scientist," whilst 12-year-olds Chelsea and Zhenni say, "Dr Kev's experiments are fun, interesting and unique."

At left: Inner Wheel supporters, September 2014
Below: Can Too supporters, December 2014

PLATFORMS AND FACILITIES

In the pursuit of research excellence, Hudson scientists have access to the latest innovative and world-class capabilities and expertise through our integrated network of Technology Platforms. Comprehensive genomics and biomarker discovery platforms, and high-resolution micro-imaging, flow cytometry and histology capabilities, enable our research at the molecular and cellular level. Along with our cell therapies, bioinformatics and biobanking platforms, they underpin and promote a multidisciplinary approach to our translational research.

The MHTP Medical Genomics Facility hosts genomic technologies, providing critical insight into gene structure and function that advances our research towards early detection, prevention and treatment of disease.

Home to three complementary and integrated suites of genomic technologies, we acknowledge the generous funding from our philanthropic partners that enabled their establishment:

1. The Gandel Charitable Trust Sequencing Centre, hosting Sanger sequencing, Real-Time PCR technologies, and Microbial and Cell identification services.

2. Australian Cancer Research Foundation (ACRF) Centre for Cancer Genomic Medicine, hosting Next-Generation Sequencing (NGS) capabilities.

3. Single Cell Genomics Centre, hosting the state-of-the-art Fluidigm C1 and BioMark microfluidic systems, enabling automated genomic and transcriptomic analysis of individual cells.

Our latest Single Cell Genomics Centre was founded following a successful 2014 ARC LIEF grant led by Professor Paul Hertzog through Monash University. Establishment of the Centre has been a major achievement during the year and the Centre will be officially launched in late 2015.

Our Technology Platforms are critical for the generation of data in numerous publications and advances to improved health outcomes.

"Using our next-generation sequencing technologies, Professor Brendan Jenkins from within the Centre for Innate Immunity and Infectious Diseases is investigating pancreatic cancer samples taken by fine-needle aspiration. The aim is to identify specific gene expression signatures for patient management and predictive biomarkers for more effective treatment in the clinic"

"Using our Mass Spec technologies, Dr Andrew Stephens and his team from the Cancer for Cancer Research recently

Ms Vivien Vasic, Technologies Platform Manager

identified a previously unknown protein modification in ovarian cancer patients, leading to ongoing research and development of both a new diagnostic test and the development of improved therapeutic strategies for cancer treatment"

NURTURING THE NEXT GENERATION OF SCIENTISTS

Our Students

Hudson Institute provides tomorrow's scientific leaders with an innovative and stimulating learning environment so they can develop the skills and confidence to reach their full potential and take their place as drivers of future discovery.

Students in 2014:	
Honours, Masters, PhD students	104+
Graduates	60

Postgraduate Student Committee

In 2014, Hudson's Postgraduate Student Committee was headed by Professor Rosemary Horne, who joined the MIMR committee in 2004 and chaired it from 2008. Towards the end of the year, Professor Horne handed this portfolio to Professor Kate Loveland, who now chairs the committee with support from coordinator Rachael Unwin.
The committee provides support and mentoring for Hudson students and their supervisors, with the aim of ensuring that the progress of each student towards the completion of their degree is as seamless as possible. The committee aims to ensure that each student is able to manage their workload, expectations, career development and any issues that may arise. In 2014, the committee coordinated higher degree confirmations, Progress Review, Final Review seminars and PhD scholarship applications. It also ran instructional sessions on time management, thesis writing and scholarship applications.

Hudson Institute Student Society

Hudson Institute Student Society is a student-run society that organises social events and facilitates student education and training. The society represents the interests of all Institute students and aims to create a positive social and academic environment, enabling students to excel in their research degrees. In 2014, the society hosted the annual Trivia Night and Dumplings and Bar Night, which encourage student networking, mentoring and socialising. Hudson Institute Student Society also hosted important educational events such as the Three Minute Thesis competition and the Hudson Institute Student Symposium.

Student Society Committee, L - R: Jean Tan, Justin Lang, Katharine Johnson, Amy Winship, Gavin Brooks (President), Justine Olcorn (Vice-President), Lexie Prokopuk, Harriet Fitzgerald, Melinda Dolan

Hudson Institute Student Society Committee 2014
President: Gavin Brooks
Vice-President: Justine Olcorn
Secretary: Maria Nguyen
Treasurer: Heba Zahid
Assistant Treasurer: Harriet Fitzgerald
Student Representatives: Amy Winship, Sophea Heng, Katharine Johnson, Lexie Prokopuk, Suzan De Boer, Kimberley D'Costa, William Berry, Kieren Marini, Justin Lang, Jean Tan, Melinda Dolan

2014 Student events

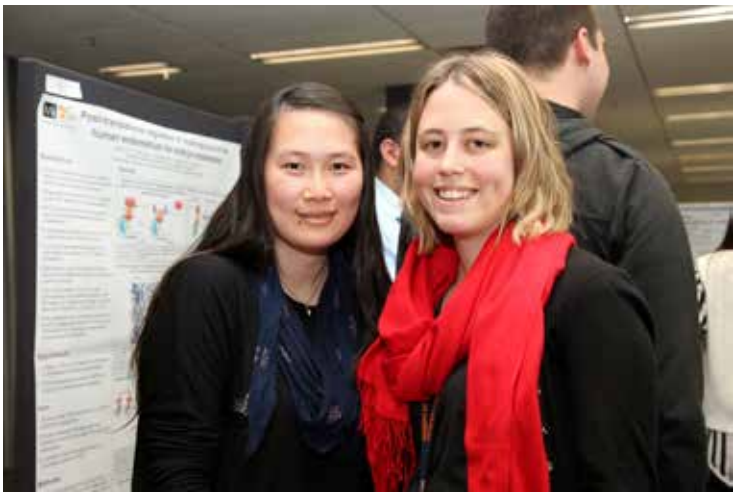
Three Minute Thesis competition
In July, 30 of the best and brightest students competed in the 2014 Three Minute Thesis competition. Impressing with innovative slides, this year's presentations were of an exceptionally high standard, covering topics including 'social networking from a bacterial point of view', 'the prevention of ventilation-induced brain injury', and 'what makes an embryo beautiful'.

Postgraduate Student Symposium

In October, postgraduate students participated in the Institute's annual Student Symposium, aimed at providing students with an important opportunity to practice presenting their work and share what they have achieved during the year. This event was generously sponsored by Life Technologies, Novo Nordisk and the Monash Postgraduate Association.

Student Open Day

In August, Hudson Institute opened its doors to busloads of students for the 2014 Student Open Day. A collaboration between the students and Hudson Institute staff the Open Day was a showcase of student research opportunities at the Institute and an opportunity for prospective students to meet researchers and join their research groups to undertake Honours, PhD or Masters qualifications.



Hudson PhD students Sophea Heng and Harriet Fitzgerald

2014 Graduates

Hudson Institute congratulates each one of its 60 Honours, Masters and PhD students on the successful completion of their higher education studies.
We are proud to host a record number of graduates in 2014.

PhD
Luis Malaver Ortega
Samuel Forster
Lori Turner
Jacqueline Melville
Kristina Sobotka
Dr Monika Skubisz
Dr Daniela Ulrich
Dr David Oehme
Nur Akmarina
Jenna Haverfield
Kyren Lazarus
Anzari Atik
Justin Chen
Karinna Fyfe
Amy Sutherland
Kevin Tuan-An Luu
Tracey Quinn
Agnieszka Pindel
Lauren Kerr
Cynthia Gonzalez
Yu (Carol) Dou
Vanessa Yeung
Samantha Grimley

Masters
Kavitha Vaithiyanathan

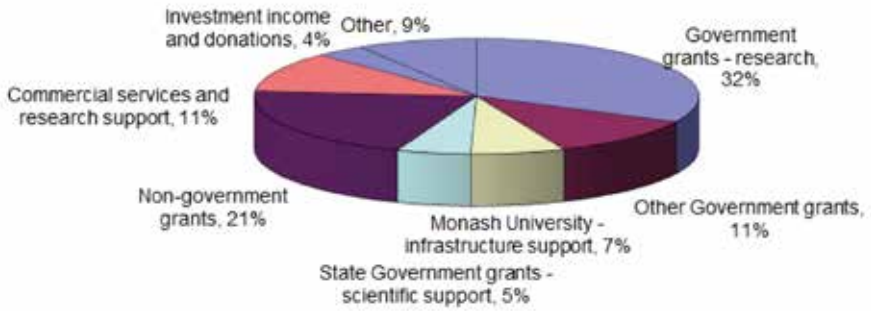
Bachelor of Biomedical Sciences - Honours
Catherine Cochrane
Adriana Krysta
Raymond Lai
Yih Rue Ong
Katy Pascoe
Andrew Pham
Yan Zhi (Shawn) Tan
Marcus Zavou
Megan Huynh
Khotila Tharmarajah
Vicky Wong
Lujain Almarhoumi
Ishmael Inocencio

Bachelor of Science - Honours
Jessica Crawshaw
Jacinta Lee
Tammy Mei Ern Lim
Vy Ngoc Tuong Nguyen
Vanessa Orlowski
Paris Papagianis
Yu Han Tan
Joshua Ooi
Jennifer Oyanedel
Elizabeth Mary Senn

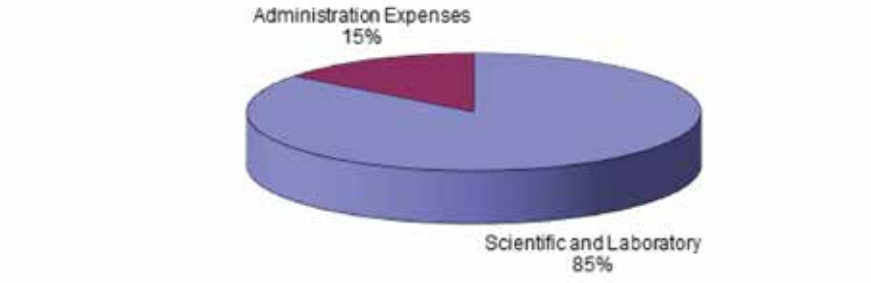
Bachelor of Medical Sciences - Honours
William Archer Berry
Devika Bhatia
Marina Ghobrial
Phil Thuc Ha
Catherine Jap
Kieran Kailun Lee
Kai Zheong (Teddy) Lim
Adam Louws
Zoe Rebecca Church Marks
Fiona Jillian Stenning
Ronit Rachel Travers
Tandyo Triasmoro
Madison Naidu

FINANCIAL YEAR AT A GLANCE

Income



Expenditure



Revenue		2014
Government grants - research	32%	14,637,986
Other Government grants	11%	5,081,812
Monash University - infrastructure support	7%	3,100,000
State Government grants - scientific support	5%	2,433,214
Non-government grants	21%	9,316,333
Commercial services and research support	11%	5,103,595
Investment income and donations	4%	1,629,522
Other	9%	3,959,707
		45,262,169

Expenditure		
Scientific and Laboratory	85%	38,920,781
Administration Expenses	15%	6,616,108
		45,536,889
Total deficit		**-274,720**

OUR SUPPORTERS

Our donors and supporters are instrumental to our capacity to translate discovery into real and lasting health outcomes for patients. Together we continue to improve diagnosis, treatment, and prevention of disease.

Our anonymous donors are joined by:
ACEA Biosciences Inc.
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Mr Noel Allanson
Amgen
ANZ Trustees
AstraZeneca AB
Australasian Sarcoma Study Group
Australian Cancer Research Foundation
Australian Communities Foundation
Australian Mitochondrial Disease Foundation (AMDF)
Australian Research Council
Mr John & Mrs Meredith Baldwin
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Cancer Australia
Cancer Council NSW
Cancer Council Victoria
CASS Foundation Limited
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Collier Charitable Fund
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Mr Peter Laver
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Monash Partners Academic Health Science Centre
NGM Biopharmaceuticals Australia Pty Ltd
National Health and Medical Research Council
National Heart Foundation
National Institutes of Health USA

Novartis Pharmaceuticals
Ophthalmic Research Institute of Australia
Osteoporosis Australia
Ova Science Inc.
Ovarian Cancer Research Foundation
P & M Harbig (Holdings) Pty Ltd
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Royal Australasian College of Physicians
ROCAN F4R
Roche Products Pty Ltd
Mrs Jill Ross-Perrier
Royal Australasian College of Physicians
Professor Lois Salamonsen
Mrs Janette Smith
Society for Reproductive Biology
Professor Ronald Taft
The Mason Family
Therapeutic Innovation Australia
Mrs Jean Thomas
VicSuper
Victorian Cancer Agency
Victorian Government Operational Infrastructure Support Program
Professor Bryan Williams
World Wide Cancer Research
Ms Denise You
Zouki Group of Companies

Hudson Institute would like to acknowledge the significant support it receives from the Federal and State Governments, philanthropic trusts and foundations and organisations in Australia and overseas. We would like to particularly thank the Victorian State Government for its funding of the Institute through the Operational Infrastructure Support Program.

To support the Institute please visit www.hudson.org.au or call 03 8572 2701.

SUPPORTING OUR RESEARCH

Our supporters provide crucial funding that enables the Hudson Institute to stay at the cutting edge of research. Every year we receive donations from generous individuals – some of whom make a donation in memory of a loved one and others who may make an impact through a legacy gift or bequest. In 2014, the Institute received more than 450 donations from our valued supporters.

Ride for Research

This March was the tenth anniversary of the Institute's annual fundraising event and was the most successful yet, raising more than $37,000 for vital research equipment. Hudson's 'Ride for Research (R4R)' is part of the Murray to Moyne event, a gruelling 520 km cycle from Echuca to Port Fairy in just 24 hours.

The efforts of Hudson's riding team of Institute staff and supporters have given Hudson researchers access to a brand-new state-of-the-art xCELLigence System, which monitors cell behaviour and allows our researchers to gain data from multiple time points using only one experiment, meaning they can translate discoveries to patients sooner. It has expanded our capacity to tackle cancer, infertility and immunological diseases such as septic shock and influenza A.

The success of the event was only possible thanks to the efforts of the riding team, volunteers, donors, Andrew McCallum, and sponsors BankVic, VicSuper, Davies Collison Cave and Zouki.

For the love of Grace

After losing their 15-month-old daughter Grace to severe lung complications caused by premature birth in 2013, Donna O'Sullivan and Mark Connor decided to use their tragedy to make a difference for other families affected by chronic lung diseases. They started a Hudson appeal in Grace's memory so that those at Grace's funeral could make a donation in her name. In addition to this, the family worked tirelessly to raise funds through their community and those affected by their story. The Grace Addison Connor fund at the Hudson Institute now has more than $20,000 to bring our researchers closer to finding treatments for these tiny patients.

Learning about our supporters

In November, almost 100 of our supporters completed our donor survey. The information provided has delivered valuable insights about the type of people who support the Institute and their reasons for doing so. Additionally, these responses to our donor survey have helped us to find other Victorians who are passionate about improving lives through medical research. The support of all those who took part is greatly appreciated.

An open letter from Hudson's lead donor

The Fielding Foundation has been a supporter of the Hudson Institute for many years, and in 2014, we decided to cement our commitment to the Institute by making a real and lasting contribution. The Fielding Foundation will donate $1 million over five years to support the Institute's areas of greatest need – research innovation and supporting their brightest young researchers.

To ensure that the researchers of the Hudson Institute can continue their vital work, the organisation needs a reliable source of income. As the number of research projects receiving government funding decreases every year, it is imperative that medical research institutes like the Hudson secure funding from a diverse range of sources, including individuals, companies, trusts and foundations.

As a donor, we see no greater cause to direct our support than to an organisation dedicated to improving the health and wellbeing of the community. Health affects us all. It is the one critical need we all share, and sadly, disease and injury will affect either us or someone we love in our lifetime. The current state of health worldwide is extremely poor, with more than 50 million people still living with a life expectancy of less than 45 years. Medical research is the most effective way to improve the quality and length of life for all people.

By creating a personal relationship with the Institute, we are able to share with them what matters to our Foundation. Hudson's CEO, Professor Bryan Williams, listened to our desire for our contribution to have the greatest impact possible and one that was fully translational. Our two-way relationship means that we have the opportunity to hear from Professor Williams what he believes are his most pressing funding needs. Together we looked at how our support could best serve their research and bolster the Institute as a whole to make the biggest impact on health as a result.

Professor Williams explained to our Board that two of the Institute's major priority areas were to support their brightest young researchers through critical periods in their careers when funding is difficult to secure and to boost the Institute's commercialisation activity.

These were two areas that we could identify with. Coming from a background in business, I recognise the importance of commercialisation and agree that the success of the Hudson Institute will depend on how well its researchers can connect their innovative ideas with companies to generate additional funding. The Fielding Foundation also feels extremely proud to know our ongoing support will secure the careers of outstanding young scientists who, without this funding, may have had to end their research careers and their research projects.

We are very proud to have our contribution reflect areas we feel passionate about. The Hudson Institute is an outstanding organisation and one with which the Fielding Foundation are honoured and proud to be associated. Please join with us in supporting the much needed work of the Hudson Institute and improve healthcare today and for future generations.

Peter Fielding
Chairman
Fielding Foundation


HUDSON
INSTITUTE OF MEDICAL RESEARCH