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MISSION
The mission of the Garvan Institute of Medical Research is to make significant contributions to medical research that will change the directions of science and medicine and have major impacts on human health.

WHO WE ARE, WHAT WE DO
Our researchers pioneer studies into some of the most widespread diseases affecting the community today. Research at Garvan is focused upon understanding the role of molecular and cellular processes in health and disease as the basis for developing future prevention, treatments and cures.

Garvan is leading the nation in using genomic analysis to accelerate discovery and enable precision medicine.

For more than 50 years, significant breakthroughs have been achieved by Garvan scientists in the understanding and treatment of diseases such as:

- Parkinson’s disease
- Type 2 diabetes
- Breast cancer
- Osteoporosis
- Anorexia nervosa
- Multiple sclerosis
- Arthritis
- Sjögren’s syndrome
- Mental illnesses
- Hearing loss
- Prostate cancer
- Lung cancer
- Bowel cancer
- Ovarian cancer
- Breast cancer
- Pancreatic cancer
- Alzheimer’s disease
- Sarcoidosis
- Rheumatoid arthritis
- Type 1 diabetes
- Asthma
- Mental health
- Rare diseases
- Arthritis
- Rheumatoid arthritis
- Mental health
- Rare diseases
- Asthma

Garvan’s ultimate goal is prevention, treatment or cure of major diseases.

OUR VALUES
- Excellence
- Innovation
- Collaboration
- Integrity
- Respect
- Passion

OUR ASPIRATIONS
- To become the most advanced institute in the region in the adoption, application and integration of next generation genomic and computational approaches and technologies in investigative and translational research.
- To advance knowledge in our key areas of focus that will lead to better understanding, reduced incidence and improved treatments for cancer, osteoporosis, diabetes, obesity, and immunological, skeletal and neurological diseases; and influence health policy.
- To attract, develop and support exceptionally talented researchers with leading-edge programs that address key conceptual and practical questions in human biology, and the translation of new knowledge and technologies into clinical applications.
- To embrace and uphold a culture of collegiality, collaboration, inclusivity, consideration, safety, transparency, and high ethical standards.
- To engage stakeholders and the community with our achievements and research vision, so that we attract the significant government and donor support needed to empower our transformative agenda.
THE ORGANISATION

GARVAN INSTITUTE OF MEDICAL RESEARCH
CHAIR
Dr John Schubert
EXECUTIVE DIRECTOR
Prof John Mattick
DEPUTY DIRECTOR
Prof Christopher Goodnow

GARVAN RESEARCH FOUNDATION
CHAIR
Mr Geoff Dixon
CHIEF EXECUTIVE OFFICER
Mr Andrew Giles

DEVELOPMENT AND SUPPORT GROUP

CHIEF OPERATING OFFICER
Mr Philip Knox
AUSTRALIAN BIORESOURCES
Dr Jenny Kingham
PARTNERSHIPS AND LEGAL AFFAIRS
Ms Christina Hardy
FINANCE AND ACCOUNTING
Mrs Cherry Dutton
HUMAN RESOURCES
Mr Simon Hamilton
INFORMATION TECHNOLOGY
Mr George Constantinescu
Mr Peter Modica
OPERATIONS
Mr Michael Emerson
WHS AND COMPLIANCE
Ms Lisa Moncur

CHIEF SCIENTIFIC OFFICER
Dr Marie Dziadek
COMMUNICATIONS AND EDUCATION
Mr Nick Hall
Ms Alison Heather/Dr Meredith Ross
Ms Bronwyn Terrill
GRANTS ADMINISTRATION
Ms Sonja Bates
Dr Gillian Huist/Ms Grainne Mullen
RESEARCH ETHICS AND GOVERNANCE
Dr Rayson Tan
Ms Therese Yim
STUDENT PROGRAMS
Dr Alessandra Bray/Dr Tracy Anderson

GARVAN RESEARCH FOUNDATION
COMMUNICATIONS
Ms Kylie Ironside
CORPORATE AND COMMUNITY PARTNERSHIPS
Ms Leonie Walton
PHILANTHROPY
Ms Mara-Jean Tilley
SUPPORTER ENGAGEMENT AND CARE
Ms Dimity Raftos

RESEARCH

IMMUNOLOGY DIVISION
Head: Prof Stuart Tangye
Acting Head: Prof Robert Brink (Aug–Dec)
FACULTY
Prof Antony Basten
A/Prof Daniel Christ
Dr Elissa Deenick
Prof Christopher Goodnow
A/Prof Shane Grey
A/Prof Cecile King
Dr Tri Phan
Prof Jonathan Sprent

CANCER DIVISION
Head: Prof David Thomas
FACULTY
Prof Andrew Biankin
A/Prof Maija Kohonen-Corish
Prof Chris Ormandy
Dr Alex Swarbrick
Dr Paul Timpson
THE KINGHORN CANCER CENTRE
Director: Prof David Thomas

BONE BIOLOGY DIVISION
Head: Prof Peter Croucher
FACULTY
Dr Paul Baldock
Prof Jacqueline Center
Prof John Eisman
Prof Tuan Nguyen
Prof Mike Rogers

DIABETES AND METABOLISM DIVISION
Head: Prof Mark Febbraio
Acting Head: Prof Gregory Cooney (Jan–Apr)
FACULTY
Prof Trevor Biden
Prof Lesley Campbell
Prof Don Chisholm
A/Prof Jerry Greenfield
Dr William Hughes
Prof Ted Kraegen
A/Prof Ross Laybutt
Prof Katherine Samaras
A/Prof Carsten Schmitz-Peiffer

NEUROSCIENCE DIVISION
Head: A/Prof Antony Cooper
Head: Prof Herbert Herzog (Jan–Apr)
FACULTY
Prof John Mattick
Dr Greg Neely
Prof David Ryugo
Prof John Shine
Dr Bryce Vissel

GENOMICS AND EPIGENETICS DIVISION
Head: Prof Susan Clark
FACULTY
A/Prof Marcel Dinger
Prof Vanessa Hayes
Dr Tim Mercer

KINGHORN CENTRE FOR CLINICAL GENOMICS
Head: A/Prof Marcel Dinger
The long history of the Garvan Institute, founded initially by St Vincent’s Hospital and the Sisters of Charity in 1963, is rich indeed.

Garvan has been led by three outstanding Executive Directors. In its formative years Professors Les Lazarus AO, John Hickie and Gerald Milton were co-directors of Garvan. Professor Lazarus became Garvan’s first Executive Director in 1969 and was responsible for the successful establishment of Garvan and its program funding by NHMRC. Professor John Shine AO FAA succeeded Professor Lazarus in 1990. He led Garvan into the molecular biology era and oversaw its major expansion in the 1990s, through the construction of the iconic main Garvan building. He also initiated The Kinghorn Cancer Centre (TKCC), in conjunction with my predecessor Mr Bill Ferris AC.

In 2012 Professor John Mattick AO FAA was appointed Executive Director. Under his leadership and with the support of a new senior executive team – Deputy Director Professor Christopher Goodnow FAA FRS, Division Heads Professor Susan Clark FAA, Associate Professor Antony Cooper, Professor Peter Croucher, Professor Mark Febbraio, Professor Stuart Tanguy and Professor David Thomas, together with Chief Operating Officer Philip Knox, Chief Scientific Officer Dr Marie Dzidek, Clinical Coordinator Associate Professor Jerry Greenfield, and Garvan Research Foundation CEO Andrew Giles – Garvan is at the leading edge of the move into the genomics era.

The most important and exciting strategic development in 2015 has been at the Kinghorn Centre for Clinical Genomics (KCCG). This was enabled by the extraordinary generosity and unwavering support of The Kinghorn Foundation and the Centre’s innovative leader Associate Professor Marcel Dinger.

With KCCG moving towards the provision of whole genome sequencing for clinical diagnosis, Garvan is placed at the vanguard of genomics nationally and internationally, and is taking us closer to our goal of using our expertise not only for research, but for the immediate benefit of patients.

Already lives are being saved, and we expect that genomic information will not only transform personal medicine, but also the entire health system and the national economy. This is a most exciting time to be involved in medical research. It will drive a significant portion of the innovation agenda of Australia.

Garvan researchers, students and support staff are outstanding by any measure. Each and every one is dedicated to their work and to the mission of Garvan, that is, to make significant contributions to medical research that will change the directions of science and medicine and have major impacts on human health. Their vision, intellects and energies enable Garvan to stay at the forefront of medical research, establish new technologies and push the boundaries of medical discovery and health innovation globally.

As always, I thank the members of the Garvan Institute Board, who freely donate their time and expertise to guide Garvan. I warmly thank the longstanding directors who retired in 2015, namely Mr Greg Paramor AO and Professor Peter Smith, for their contributions to Garvan over many years. And I welcome aboard our new directors, Mr Stephen Johns, Emeritus Professor Jack Martin AO, Professor Rodney Phillips and Mr Russell Scrimshaw.

I convey the Board’s gratitude to the Garvan Research Foundation, chaired by Mr Geoff Dixon, and to the many wonderful individuals and organisations whose generosity provides the financial lifeblood of the Institute. Their gifts are listed on page 60.

We look forward to continuing to benefit the world in 2016.
2015 was a year of rebuilding and development, as we embrace the future in discovery and translation, enabled by powerful new genomics, genetics and imaging technologies, and a shift from reductionism to systems analysis by the acquisition and analysis of big data.

Garvan’s leadership has been strengthened by the arrival of Professor Christopher Goodnow FAA FRS as Deputy Director, and Professor Mark Febbraio as the new Head of the Diabetes and Metabolism Division.

The Cancer Division has been expanded by the appointments of Professor David Bowtell and Associate Professor Elgene Lim to enhance Garvan’s research and clinical translation in ovarian and breast cancers, respectively.

Garvan also established a new Division of Genomics and Epigenetics. Headed by Professor Susan Clark FAA, the goal of the Division is to understand the information contained in the genomes of individuals, the changes in this information as well as in its organisation and expression during our life and in the development of diseases such as cancer and diabetes.

Garvan’s Kinghorn Centre for Clinical Genomics (KCCG) continues to develop as one the world’s leading whole human genome sequencing facilities. This centre, led by Associate Professor Marcel Dinger, now has more than 40 gifted production staff, software engineers and bioinformaticians, building the world’s best pipeline for generating and analysing human genome sequences. The logistics, robotics and quality control systems within KCCG are now operating at a very high level, enabling the facility to sequence thousands of genomes in 2015.

Our capability in clinical genomics is helping scientists in Garvan, and all over the world, to further understand the idiosyncrasies and influences of our genetic inheritance and genetic factors in the many different dimensions of human biology.

In 2015, we launched Solvanix Pty Ltd, a company set up to commercialise Garvan’s patented technology to improve the stability of therapeutic monoclonal antibodies.

We also introduced the latest in mouse genetic engineering technology (called ‘CRISPR’), which is revolutionising genetic analyses. Along with new tools for cell sorting and live imaging by ‘intravital microscopy’, we have a complete suite of armoury to investigate and understand human disease.

Garvan has, under the leadership of our Chief Scientific Officer Dr Marie Dziadek, been progressively reviewing and updating its policies and procedures. This includes, most recently, research governance, proactivity in gender equity, and the transition to electronic laboratory notebooks.

Our researchers have had another productive year contributing to the international canon of biomedical knowledge by publishing high quality research developments in their respective areas, as outlined in this report. This is enabled by their continued attainment of peer-reviewed grant and fellowship support, despite the increasing challenges in obtaining government funding within the medical research sector.

This also underscores the vital importance of the extraordinary philanthropic support that Garvan receives from generous and far-sighted individuals and the community, which enables us to operate and be brave.

On behalf of Garvan, I thank everyone in our community for unwavering support of our mission and our research endeavours. I acknowledge the warm and active partnership that we enjoy with our key partners, St Vincent’s Hospital and UNSW Australia. I would also like to extend my gratitude to everyone at Garvan, researchers and support staff alike, for their outstanding contributions in 2015.

We exist to make a difference to the communities we serve, and have strives to do so in 2015.
The Garvan Research Foundation had a truly outstanding year thanks to the ongoing generosity of individuals, foundations and corporations from across Australia, with almost $50 million in donations being received in 2015.

The impact of this support cannot be underestimated, in particular the fact that Garvan continues to receive ongoing support from significant donors such as The Kinghorn Foundation; Mrs Janice Gibson and the Ernest Heine Family Foundation; Mrs Jane Hemstritch; The Alan Elder Trust; The Bill and Patricia Ritchie Foundation; The Walker Family Foundation; Alan and Lynne Rydge; the Roth Charitable Foundation; The Ross Trust; Mr Len Ainsworth and the NAB Foundation.

A highlight of the year was the launch of the DreamLab smartphone app in partnership with the Vodafone Foundation. This innovative app harnesses the processing power of individual smartphones to form a super computer that is helping Garvan’s researchers understand a piece of the cancer puzzle.

Garvan is also very fortunate to have a wonderful group of corporate partners. In 2015 this included THE ICONIC, Karen Walker and Bobbi Brown who supported Garvan’s ‘Fashion Targets Breast Cancer’ campaign. The Ridley Corporation supported the ‘Medical Research and Rural Health – Garvan Report 2015’ which used evidence-based data to provide insight into the health issues facing rural and regional populations across Australia. Thank you all.

We received several significant bequests in 2015. These support Garvan’s core research areas and are used to strengthen our strategic reserves. We continue to be particularly grateful to these supporters for their long-term vision. Donations to Garvan in memoriam or in lieu of gifts or flowers also provided steady support throughout the year.

The 2015 Garvan Gala was another outstanding success. A special thanks to Mr Neil Perry and Mr Guillaume Brahimi who again designed the menu, and to Ms Virginia Trioli who joined us again as Master of Ceremonies.

Young Garvan enjoyed another great series of informative forums, as well as the annual ‘All Ribbons Ball’ in support of Garvan’s research. Congratulations and thank you to all the members of the Young Garvan Committee for their effort and commitment.

I would like to acknowledge the work of the Foundation’s Chief Executive Officer, Andrew Giles. His work and that of his Executive team and staff who helped achieved incredible results in 2015. We cannot underestimate the role that our wonderful volunteers play in enhancing the Foundation’s ability to support the research at Garvan.

I would also like to acknowledge the ongoing support of my fellow Board members for their commitment and diligence throughout the year. A particular thanks to the retiring Board member Ms Melinda Conrad for her years of dedication and service to Garvan.

Finally, I would like to offer a sincere thank you to each and every one of the organisations and individuals who have given their time, talent and funds to support Garvan’s work throughout 2015.
The impact of the community’s support of Garvan in 2015 cannot be underestimated. As you will read throughout this Annual Report, the number of breakthroughs, the level of citations and the impact of the work carried out at Garvan has reached new heights – thanks to your support.

In addition to its ongoing world-class research, in 2015 Garvan launched a series of national initiatives that demonstrated the importance of our research, the value of our leadership and the impact of the community’s investment in Garvan. These included:

Establishing the Pancreatic Cancer Alliance

In 2015 Garvan was able to bring together a unique collaboration of organisations and individuals to form a new national Pancreatic Cancer Alliance. The members (Avner Pancreatic Cancer Foundation; Cancer Australia; GI Cancer Institute; Karen Livingstone; Pancare Foundation; Patron – Tracey Spicer, and #PurpleOurWorld) all share Garvan’s view that greater awareness of pancreatic cancer is needed. They also agree that this is best achieved working together to reduce costs, maximise impact and ensure a consistent message. In its first few months Garvan supported the new Alliance to take significant steps to improve coordination and communications between the various not-for-profit organisations, and a range of major initiatives are planned for 2016.

Launching the ‘Medical Research and Rural Health – Garvan Report 2015’

In July, the Australian Grains Industry Conference in Melbourne saw the launch of ‘Medical Research and Rural Health – Garvan Report 2015’. This Report brought together, for the first time, the most pertinent evidence-based data to better understand the health issues facing rural and regional populations across Australia. The report was a result of Garvan’s ‘Healthy Families, Healthy Communities’ program which we have run for the past three years with the Ridley Corporation in rural and regional areas. The Report aimed to increase understanding of the need for, and importance of medical research across the broader community. It did this by providing up-to-date insight into the main health issues facing rural and regional communities today; identifying who in those communities are affected; why the challenges exist and what is the outlook and way forward to rectify some of these major health issues. Importantly the Report considered the role that medical research and, in particular, personalised medicine can play in the health of all Australians. In 2016 Garvan will begin to launch reports on each of the national health priorities.

Developing ‘DreamLab’ – Australia’s first smartphone supercomputer for cancer research

In early November 2015 Garvan, in partnership with the Vodafone Foundation, developed and launched ‘DreamLab’, an Android smartphone app that gives Australians the power to help fast track a cure for cancer while they sleep. DreamLab works by pooling the processing power of mobile devices to create the nation’s first smartphone supercomputer for cancer research. For our researchers, DreamLab not only provides free access to a crucial computing resource, it also speeds up the research. We estimate that with 100,000 users, researchers will be able to crunch data approximately 3,000 times faster than the current rate, and we are well on our way to achieving that target.

These national initiatives were funded by our community and corporate supporters, enabling Garvan to raise issues of national significance, provide comment on key issues and to suggest priority areas for action, while not taking away from our core fundamental research.

In many ways, 2015 was, thanks to your support, a watershed year for Garvan and 2016 is already shaping up as another key year. Thank you for your ongoing support of Garvan’s vision and mission.
GARVAN AT A GLANCE

TOTAL INCOME
$A106,873,000

1. NHMRC grants $18,140,000
2. Other peer-reviewed grants $13,556,000
3. NHMRC and UNSW infrastructure $3,871,000
4. NSW Government support $5,844,000
5. Donations and bequests $49,359,000
6. Sequencing and facility charges $10,472,000
7. Other income $5,630,000

See more about Garvan’s FINANCES IN 2015 ON P67

TOTAL EXPENDITURE
$A87,400,000

1. Research laboratories $43,236,000
2. Research facilities $14,741,000
3. Building operations $6,384,000
4. Business development $1,400,000
5. Administration $6,130,000
6. Fundraising $2,914,000
7. Depreciation and amortisation $12,594,000

PUBLIC AND COMMUNITY ENGAGEMENT
2,383 people were engaged through:

1. 990 108 private tours and presentations
2. 780 6 seminars
3. 433 19 free public tours and presentations
4. 180 9 external presentations

11
PHILANTHROPIC INCOME

1. Philanthropic income without bequests
   - 2010 - $12,573,000
   - 2011 - $18,107,000
   - 2012 - $20,338,000
   - 2013 - $15,377,000
   - 2014 - $18,067,000
   - 2015 - $24,245,000

2. Philanthropic income with bequests
   - 2010 - $15,554,000
   - 2011 - $24,463,000
   - 2012 - $21,050,000
   - 2013 - $23,000,000
   - 2014 - $21,622,000
   - 2015 - $49,359,000

STAFF AND STUDENT PROFILE

632 STAFF ♂ 336 ♂ 296

22
Undergraduate students
Honours and UROP
♀️ W 14 ♂ M 8

22
Fundraising and marketing staff
♀️ W 18 ♂ M 4

83
Postgraduate students
PhD and Masters
♀️ W 51 ♂ M 32

120
Visiting scientists
♀️ W 56 ♂ M 64

160
Administrative and support staff FTE
♀️ W 78 ♂ M 82

225
Research staff
♀️ W 119 ♂ M 106

OUR STAFF ARE FROM AROUND THE GLOBE
Our staff hail from 71 different countries.
Working together has always been important in medical research – but never more so than it is today. Garvan’s researchers collaborate actively with others, both within Australia and beyond.

As we enter an age of big data and ever more sophisticated research technologies, researchers can ask – and answer – complex questions that would have been unthinkable a few years ago:

How do the brain, the skeleton and the pancreas communicate to regulate glucose in the blood? How can the genomes of pancreatic cancer cells from one individual shed light on how best to treat that person’s cancer? Which sequences within our genomes determine our risk of osteoporotic fracture? How do immune cells travel through our bodies in response to infection?

And as the questions we ask become more ambitious and far-reaching, the answers are more and more likely to come from collaborative studies that bring together expertise from several institutes, within Australia and worldwide.

**NATIONAL AND INTERNATIONAL COLLABORATION**

85%

of Garvan’s publications in 2015 (265 of 310) were authored in collaboration with researchers from other institutes – in Australia and beyond.

**AUSTRALIAN COLLABORATION**

Garvan researchers collaborated widely with researchers in other Australian institutes.

**PEER-REVIEWED FUNDING**

16 successful Garvan-led research grants (46%) were written in collaboration with one or more partner institutions.
World Collaboration

International collaborations were a feature of Garvan’s research output in 2015.

See more about Garvan’s KEY PARTNERSHIPS IN 2015

The Bone Alliance p16
The Pancreatic Cancer Alliance p30
Partnership with Genomics England p39
Partnership with Liverpool Hospital p40

Scientific Publications

Garvan’s Publications in 2015

310 Total publications, including:
Journal articles, reports, reviews and book chapters.

74 Papers in journals: With an ‘impact factor’ greater than 8.

242 Original research papers

Papers in Key Journals

1 Nature papers
2 Cell papers
3 Journal of Experimental Medicine papers
4 Lancet Oncology papers
2 Immunity papers
2 Cell Metabolism papers
1 PLOS Biology paper
9 Nature Communications papers

Cover Issues


List of publications
FROM THE DIVISION HEAD

Research in the Bone Biology Division is focused on having an impact in two major disease areas. The first is in osteoporosis, and the second is in cancers that spread to the skeleton (such as breast and prostate cancer) or grow only in bone (such as multiple myeloma).

This year has seen important steps forward in both areas. We have identified new genes that are important in osteoporosis and some rare genetic diseases, and we have developed a new understanding of the importance of dormant cancer cells that hibernate and grow in bone.

In osteoporosis, we have focused on ensuring that our research leads to real changes in bone health in the community. To this end in 2015 we partnered with Osteoporosis Australia to create the Bone Alliance to translate our discoveries directly to health practice, particularly the health of individuals who are not aware of their risk of osteoporotic fracture.

A particular highlight for me this year has been to see the personal development of so many of our students and young researchers. We have seen them develop exciting new technologies, make important new discoveries and communicate those discoveries, both to the scientific community and the public. They do this with a confidence beyond their years. Without exception they are a talented group.

Finally, none of this would be possible without the generous funding from our supporters. In particular, the Division continues to benefit from very generous funding from Mrs Janice Gibson and the Ernest Heine Family Foundation. This support is vital if we are to bring about real change in osteoporosis care for Australians.

– Professor Peter Croucher

RESEARCH HIGHLIGHTS

1 Watching as cancer cells wake in bone

Treating cancers after they have metastatised, or spread, to secondary sites in the body is much more difficult than treating a primary tumour, dramatically worsening the prognosis of cancer patients. Several cancers (including breast and prostate) can spread into bone where they can lie dormant – sometimes for years – before they ‘wake up’ and begin dividing, forming secondary cancers in bone.

Dr Michelle McDonald, Dr Tri Phan and Professor Peter Croucher are working to understand what triggers dormant cells to start growing a new tumour. They injected cancer cells into the leg bone of living mice and tracked the fate of these cells over several months by using a ground-breaking technique called intravital two-photon microscopy. They discovered that resorption of bone close to the cancer cells led them to reactivate.

These important findings suggest two possible approaches to treating metastatic bone cancer. One way is to block bone resorption with drugs such as bisphosphonates. The other is to deliberately ‘wake’ cancer cells by driving the resorption of bone and then treating them with existing anticancer therapeutics.

Lawson et al., Nature Commun 2015;6:8983
doi:10.1038/ncomms9983
A new genetic variant that affects fracture risk

Low bone mineral density is a strong risk factor for fracture. Differences in bone mineral density are known to run in families, but only a small number of the genes responsible have been identified so far.

An international team of investigators, including Professors John Eisman, Tuan Nguyen and Jacqueline Center of the Bone Biology Division, used whole genome sequencing and meta-analysis to link a variant within the EN1 gene (which has not previously been associated with osteoporosis) to bone mineral density.

The newly discovered EN1 variant exerts a strong effect on fracture risk in Australian men and women: in those with the less common variant, fracture risk is reduced by 15%.

Members of the Division are now working to introduce this new discovery into personalised risk assessment for osteoporotic fracture.


A link between bone loss and mortality

Osteoporotic fractures are associated with a high risk of premature mortality in the elderly population but there is currently no clear explanation for this increased risk.

Dr Dana Bliuc and Professor Jacqueline Center investigated whether bone loss – a known risk factor for fracture – could also be important in increased mortality risk after fracture. Drawing on data from Garvan’s Dubbo Osteoporosis Epidemiology Study, they studied the rate of bone loss in a large cohort of elderly women and men with osteoporotic fractures over more than 20 years.

The researchers showed that mortality rate was highest amongst those who experienced the most rapid rate of bone loss. Importantly, this association of bone loss with mortality was maintained even after taking into account other factors that could contribute to mortality risk.

These findings suggest that the prevention of high bone loss using anti-osteoporotic medication could also improve survival following osteoporotic fracture, and this forms the basis of ongoing studies.

Bliuc et al., Osteoporos Int 2015;26:1331-9 doi:10.1007/s00198-014-3014-9

NEWS HIGHLIGHTS

Generous ongoing support for osteoporosis research

Mrs Janice Gibson and the Ernest Heine Family Foundation subsequently funded The Janice Gibson and Ernest Heine Family Foundation Chair in Osteoporosis Research. Currently held by Professor Peter Croucher, the Chair was established in 2011 and this ongoing generous support has enabled the Bone Division to grow considerably over the last few years through the recruitment of gifted Australian and international researchers. The Bone program is continuing to undertake world-class research not only into osteoporosis but other bone diseases such as bone metastasis.

In 2015, through a further significant donation, Mrs Gibson and the Ernest Heine Family Foundation extended its funding beyond the Chair to support Garvan’s entire Bone Biology Division. As well as funding research, this new grant focuses on educating the general community as well as the medical profession about osteoporosis and other bone diseases.

Garvan extends its grateful thanks to Mrs Gibson and the Foundation.

The Bone Alliance: strengthening knowledge and driving change

Garvan has partnered with Osteoporosis Australia, the national patient advocacy group, to form the Bone Alliance. The Alliance seeks to deepen the understanding of osteoporosis within the community, utilising innovation and education to achieve positive change for bone health of all Australians.
Greg Lyubomirsky, Osteoporosis Australia CEO, says that the challenge for the Bone Alliance is to deepen the understanding of osteoporosis across the Australian community as a whole.

"While the older generations will always be the key targets for communication about osteoporosis, it’s crucial that information about the disease and its prevention also reaches younger generations, setting them on a pathway to make health choices that minimise the chances of developing osteoporosis themselves."

**Repurposing existing osteoporosis data**

Garvan’s Dubbo Osteoporosis Epidemiology Study (DOES) began in 1989 and is the longest running, large scale study of osteoporotic fractures in men and women. As part of the study, almost 4,000 blood samples have been taken from participants to provide a greater understanding of the factors that contribute to improvement or deterioration of bones, and the impact of those changes on quality of life and survival.

With support from the Ake Ake Fund, Professor John Eisman and his team are performing detailed bioinformatic analysis on the genomes of individuals from a series of extended families. Their aim is to identify genes responsible for controlling bone mass and osteoporosis.

Studies like this are powerful, using existing data and samples to gain greater understanding of osteoporosis and the genes driving its development.

Ultimately, Garvan’s researchers hope to carry out genomic studies on all DOES blood samples – but it’s an enormously expensive process.

The support of the Ake Ake Fund and others allows us to apply cutting-edge genomic technology to the bank of data collected by DOES in an effort to understand more about osteoporosis.

**Long-serving Nurse Manager of Dubbo study retires**

Janet Watters, who served as Nurse Manager of Garvan’s DOES study for 24 years, retired in December 2015. Janet joined the study in 1992, and was a driving force of the study since then, looking after the study’s participants, managing the running of the clinic and actively seeking new study participants.

Professor Peter Croucher says, “Janet has been the linchpin of DOES, and much of its success can be attributed to her outstanding professionalism as a nurse and clinic manager, and to her real care for the project and the individual participants. We will certainly miss her here at Garvan, and I am in no doubt that she will be missed by the wonderful volunteers who participate in DOES.”

In osteoporosis, we have focused on ensuring that our research leads to real changes in bone health in the community.

**OUR RESEARCH LABORATORIES**

- **Bone Biology Lab Head:** Prof Peter Croucher
- **Bone Therapeutics Lab Head:** Prof Mike Rogers
- **Clinical Studies and Epidemiology Lab Head:** Prof Jacqueline Center
- **Genetic Epidemiology of Osteoporosis Lab Head:** Prof Tuan Nguyen
- **Osteoporosis and Translational Research Lab Head:** Prof John Eisman
- **Skeletal Metabolism Lab Head:** Dr Paul Baldock

The ‘road map’ between bone and pancreas p35
Scott Youlten wins UNSW’s 3MT comp p51
Best poster presentation at EMBL p51
Prof John Eisman inducted as Fellow of AAHMS p53
The first of its kind Medical Research and Rural Health – Garvan Report 2015, published by the Garvan Research Foundation, brought together evidence-based data to better understand the health issues facing rural and regional populations across Australia.

The report grew from Garvan’s partnership with the Ridley Corporation, focused on building healthy and sustainable rural communities.

The Medical Research and Rural Health – Garvan Report 2015, was the first in a series of Garvan health reports. It examined health in line with the National Health Priority Areas: asthma, arthritis, cancer control, cardiovascular health, diabetes, mental health, obesity and dementia. It provided context, where available, with the wider Australian population and these conditions.
FROM THE DIVISION HEAD

Despite major research efforts worldwide, cancer is still the leading disease-related cause of death in Western society. However, the future looks much more promising, as we develop new approaches and strategies to detect, classify and treat cancer based largely on genomic technologies.

2015 has seen The Kinghorn Cancer Centre make great strides towards achieving its vision of precision medicine for individuals with cancer. We have forged closer links between Garvan and St Vincent’s Hospital through the appointment of a number of high-profile clinician researchers, including Associate Professor Elgene Lim and Professor David Bowtell, and we welcome the recent appointment of Dr Anthony Joshua, a leading clinician researcher in prostate cancer, as Head of Medical Oncology at St Vincent’s Hospital.

I am particularly proud of the Division’s contributions to our understanding of pancreatic cancer. The groundbreaking work of Garvan’s pancreatic cancer research has been at the forefront of global efforts to better understand what drives this devastating disease.

In addition to its focus on breast, pancreatic, prostate, ovarian, lung and colon cancer, the Division is now developing an additional strategic focus on rare and neglected cancers, including sarcomas. The Garvan-led Molecular Screening and Therapeutics trial, which aims to enable those with so-called rare cancers (20% of all those with cancer) to access the latest experimental therapies based on the cancer’s underlying genetic alterations, will begin in 2016. It represents a key step forward in realising our goal of improved patient outcomes through precision medicine.

Finally, the Cancer Division is fortunate to have phenomenal support from many donors and supporters of cancer research. Several of these are mentioned below, but there are a great many others. We thank you all for the immense contribution that you make to the Division’s research.

– Professor David Thomas

RESEARCH HIGHLIGHTS

Milk-producing protein drives breast cancer metastasis

Dr David Gallego-Ortega and Professor Chris Ormandy have shown that a protein called ELF5, which controls the production of milk in the breast after pregnancy, can also drive the spread of breast cancer cells to the lungs.

The researchers showed that, in mice, ELF5 drives metastasis by attracting cells from the immune system to breast tumours. In a mouse model of breast cancer, this encouraged the formation of new blood vessels around the tumour. These vessels then became ‘leaky’, creating a gateway for cancer cells to escape from breast tumours.

This is a previously undescribed mechanism by which cancer cells can influence immune cells. It points to new directions for developing anticancer therapies that regulate the immune system.

The switch that might tame the most aggressive of breast cancers

Triple-negative breast cancers lack the hormone receptors that are targeted in the treatment of receptor-positive breast cancers. The survival prospects for many, but not all women with this diagnosis tend to be poorer than other types of breast cancer.

Dr Alex Swarbrick and Dr Simon Junankar spearheaded a large interdisciplinary study that showed that triple-negative breast cancer can be classified into two distinct diseases based on their molecular signatures. They identified a gene – called ID4 – that is associated with the more aggressive disease. When ID4 was blocked in a mouse model of breast cancer, the tumour cells stopped dividing, indicating that ID4 plays a role in driving tumour growth.

The researchers will look next at how to ‘block’ ID4’s action in cells – with the aim of developing new therapeutic approaches for triple-negative breast cancer.


For more Garvan research in triple-negative breast cancer p28

The landscape of the pancreatic cancer genome comes into view

Pancreatic cancer has a very low 5-year survival rate (6%), so there is an urgent need for more effective therapeutic strategies, and for therapies that target individual tumours with greater precision.

The Garvan based Australian Pancreatic Cancer Genome Initiative, with their global collaborators, analysed 100 genomes from pancreatic cancers in unprecedented detail. They showed that these cancers can be assigned to one of four subtypes – ‘stable’, ‘locally rearranged’, ‘scattered’ and ‘unstable’ – based on their genomic profile.

Crucially, the results indicated that the cancer subtype could help guide treatment strategy – in particular, patients with ‘unstable’ genomes responded well to therapies that damage DNA.

The research underscores how whole genome sequencing can advance the classification and treatment of individual cancers.

Waddell et al., Nature 2015;518:495-501 doi:10.1038/nature14169

Garvan scientist selected to set ovarian cancer research priorities in US

Dr Goli Samimi was appointed as Program Director of Ovarian Cancer Prevention for The National Institutes of Health in the United States, which sees her setting the priorities and direction of ovarian cancer prevention research and funding for the United States.

Originally from the US, Dr Samimi led Garvan’s ovarian cancer research group from 2011, holding a Cancer Institute NSW Career Development Fellowship and the Margaret Rose AM Fellowship in Ovarian Cancer Research. Dr Samimi is working to develop a blood-based, early detection test for ovarian cancer.

News highlights

The Len Ainsworth Fellowship in pancreatic cancer

Dr Paul Timpson has been awarded the inaugural Pancreatic Cancer Research Fellowship. The Fellowship, announced by The Hon. Sussan Ley MP, Minister for Health, was established following a $1.5 million donation from Mr Len Ainsworth.

The Fellowship will support Dr Timpson to use cutting edge in vitro and vivo imaging technology to pinpoint the drivers of pancreatic cancer progression and better understand the factors that influence treatment of the disease.

Waddell et al., Nature 2015;518:495-501 doi:10.1038/nature14169

Garvan welcomes Professor David Bowtell

Professor David Bowtell was welcomed to Garvan as the new Head of ovarian cancer research. Professor Bowtell holds a joint appointment with the Peter MacCallum Cancer Centre (Melbourne) and is a Visiting Professor at Dana Farber Cancer Institute (Boston). He also leads the Australian Ovarian Cancer Study, one of the largest and most sophisticated studies of ovarian cancer in the world.

Professor Bowtell’s work has fundamentally changed the way we think about ovarian cancer, and continues to provide substantial insight into its diversity and biology. His work at Garvan will take advantage of the Institute’s powerful genomic capabilities to explore new approaches to the understanding of ovarian cancer.
Love Your Sister’s Connie Johnson Breast Cancer Research laboratory

Associate Professor Elgene Lim, Head of the Connie Johnson Breast Cancer Research laboratory, was welcomed to Garvan in early 2015.

Associate Professor Lim is an internationally renowned breast cancer oncologist and researcher. His work focuses on new approaches to the treatment of breast cancer, and in particular on strategies to overcome resistance to hormonal therapies in breast cancer.

The Connie Johnson Breast Cancer Research laboratory was established at Garvan in recognition of support from siblings Samuel and Connie Johnson and the whole Love Your Sister community.

Garvan’s pancreatic cancer program has been at the forefront of global efforts to better understand the weaknesses of this devastating disease.

The Philip Hemstritch Fellowship in Pancreatic Cancer supports Dr Marina Pajic who leads the Personalised Cancer Therapeutics Group at Garvan. Thank you, Mrs Hemstritch, for your vision and ongoing contribution to Garvan’s pancreatic cancer research.

Tour de Cure supports Garvan’s cancer research

Garvan clinician scientists Professor Neil Watkins and Professor David Thomas were both supported by generous funding from Tour de Cure in 2015. Professor Watkins’ project is focused on the genetic basis of lung cancer and Professor Thomas is studying the genomes of patients with sarcoma, a cancer of connective tissues such as bone, cartilage and muscle that generally affects young people.

Tour de Cure is a charity that runs cycling tours to raise awareness and funds to support cancer research across Australia.

Tour de Cure supports Garvan’s cancer research

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Tour de Cure is a charity that runs cycling tours to raise awareness and funds to support cancer research across Australia.

DreamLab app helps solve cancer while you sleep

Garvan and the Vodafone Foundation launched DreamLab, an Android smartphone app that gives Australians the power to help fast-track cancer research while they sleep at night. DreamLab is the first Australian smartphone supercomputer. It helps speed up Garvan’s breast, ovarian, prostate and pancreatic cancer research by pooling the processing power of Australian mobile devices.

When a smartphone is plugged in and fully charged, the DreamLab app automatically downloads and solves a small cancer research problem. It then sends the result back to Garvan researchers. Following the launch, DreamLab achieved over 50,000 downloads, allowing our researchers to crunch data approximately 1,500 times faster.
### OUR RESEARCH LABORATORIES AND GROUPS

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### TRANSLATIONAL CANCER RESEARCH

- **Colorectal and Lung Cancer Research Lab Head**
  - A/Prof Maja Kohonen-Corish
- **Tumour Progression Lab Head**
  - Dr Alex Swarbrick
- **Translational Breast Cancer Research Group Leader**
  - Prof Sandra O’Toole

### CANCER BIOLOGY RESEARCH

- **Cell Survival Group Leader**
  - Dr Samantha Oakes
- **Tumour Development Group Leader**
  - Dr David Gallego-Ortega
- **Cancer Developmental Biology Lab Head**
  - Prof Neil Watkins
- **Network Biology Group Leader**
  - Dr David Croucher

### CANCER DIVISION IN 2015

- **Pancreatic Cancer Alliance**
  - Provides a new voice to pancreatic cancer

- **Dr David Croucher wins Young Garvan Award**

- **Eureka Prize for Dr Georgina Hollway**

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*Garvan launched the iconic Fashion Targets Breast Cancer campaign in 2015 with the support of fashion heavyweights, designer Karen Walker and online retailer THE ICONIC.*

*The FashionLab fundraising night was held at Paspaley and supported by fashion elite Neale Whitaker, Eleanor Pendleton, Sara Donaldson, Richard Heid, Alix Sadad of Bobbi Brown, Chris Paspaley and Paspaley, Carla Zampatti, IMG and Aveda.*

*Garvan Annual Report 2015*

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“This is a previously undescribed mechanism by which cancer cells can influence immune cells.”
Type 2 diabetes affects an astounding 7% of the Australian population, and with more than 200 million people worldwide with this disease, it is fast reaching epidemic proportions.

Our Division is working actively to address this urgent health issue – to understand the causes of diabetes, both genetic and environmental, and the interplay between diabetes, obesity and other chronic diseases such as fatty liver disease which can lead to cancer. 2015 has been a time of change in the Division, with the departure of Professor Gregory Cooney – a key Faculty member of the Division for many years and a recent Acting Division Head – before my arrival as Division Head last April.

I am proud to join a Division that has been successfully carrying out translational research – spanning the laboratory and the clinic – for half a century with clinicians leading much of the Division’s research efforts. As Division Head I will continue to actively foster the already close ties between the Division and St Vincent’s Hospital. In this context, it is particularly pleasing that the longstanding high-calibre translational work of Professor Don Chisholm has been recognised by the conferral of a Doctor of Science from UNSW Australia. Since my arrival, I have been struck by the commitment of the Division’s researchers and support staff, and by the positive and supportive environment within the Division and in Garvan as a whole. Garvan’s environment fosters collaboration, accelerates research and leads to outcomes that will change patients’ lives for the better. 

I look forward to a productive year in 2016.

– Professor Mark Febbraio

**RESEARCH HIGHLIGHTS**

The paradox of metabolically healthy obesity

For most obese individuals, excess weight is associated with the development of Type 2 diabetes and other health problems – but that is not always the case. Associate Professor Jerry Greenfield and Dr Dorit Samocha-Bonet have worked with a group of obese individuals who buck the trend, to explore why they remained free from diabetes and other metabolic disorders.

Individuals with Type 2 diabetes have a compromised response to the hormone insulin, and it has been thought that all insulin-responsive tissues, particularly muscle and liver, are equally compromised and insulin-resistant. However, the researchers uncovered unexpected complexity in the response of study participants to insulin. They found that some obese individuals are resistant to insulin in muscle only and others in liver only, and that these individuals are metabolically healthier in many respects than the group that is insulin-resistant in both tissues.

Chen et al., J Clin Endocrinol Metab 2015;100:4082-91 doi:10.2010/jc.2015-2712
How insulin-producing cells adapt to a fatty diet

Cells use a recycling process called ‘autophagy’, in which they break down components that have been damaged or are no longer needed and reuse them in other ways. Research led by Professor Trevor Biden is unravelling how this process contributes to the function of pancreatic beta cells (which produce insulin) and ultimately to the onset of Type 2 diabetes.

Autophagy is a dynamic process that has proven difficult to measure. The research team was able to develop a novel method to measure this cellular recycling precisely in mice. They showed that mice fed a high-fat diet adapt by increasing recycling in pancreatic beta cells.

The researchers are now able to use these techniques to study whether this process is defective in diabetes.

Chu et al., Diabetologia 2015;58:2074-28 doi: 10.1007/s00125-015-3665-x

Diet, acid and diabetes – what are the links?

It is known that the food we eat affects our predisposition to diabetes, but many of the mechanisms involved are unknown. Intriguingly, Western diets that are high in animal protein and poor in fruit and vegetables increase the body’s overall acidity. Dr Dorit Samocha-Bonet and her colleagues are exploring whether this increased ‘acid load’ contributes to the development of insulin resistance, and eventually to Type 2 diabetes.

By studying lean healthy individuals and overweight or obese individuals, the research team were able to show that a mildly increased acidity in the body was associated with insulin resistance, whether or not the individuals were overweight. The researchers next overfed healthy participants for 28 days, showing this was sufficient to increase body acidity.

The researchers are now planning to see whether interventions that lower acid load will improve insulin resistance and reduce the risk of diabetes.

Williams et al., Clin Nutr 2015 doi: 10.1016/j.clnu.2015.08.002

“ I am proud to join a Division that has successfully been carrying out translational research ... for half a century. ”

News Highlights

Professor Don Chisholm awarded DSc

Professor Don Chisholm was awarded a Doctor of Science (DSc) by UNSW Australia, in recognition of his significant contribution to diabetes and obesity research and particularly to our understanding of insulin resistance and how it relates to obesity.

Professor Chisholm’s career spans almost five decades, much of it at Garvan. A clinician scientist, he has long worked to ensure strong links between basic diabetes research and clinical care of diabetes patients. He was the founding director of the St Vincent’s Diabetes Centre in Sydney (1980–91), which brings together diabetes research at Garvan with the clinical care of diabetes patients.

New horizons for Professor Gregory Cooney

After 18 years in Garvan’s Diabetes and Metabolism Division, Professor Gregory Cooney has moved to the Charles Perkins Centre at the University of Sydney, where he has taken a Professorial Research Fellowship within the Sydney Medical School. Former Acting Head of the Division, Professor Cooney first joined Garvan in 1997. His work at Garvan has focused on uncovering how obesity induces insulin resistance.

Continued over…
Professor Katherine Samaras fronts Make Healthy Normal campaign

Professor Katherine Samaras worked with NSW Health on ‘Make Healthy Normal’, a major public awareness campaign that emphasised the importance of diet and exercise in avoiding chronic disease.

Professor Samaras acted as the campaign’s clinical spokesperson, and appeared in two ‘Make Healthy Normal’ television commercials to support the campaign.

The continuing legacy of the GP Harris Foundation

Established by Emmanuel and Kathleen Harris, the GP Harris Foundation has been working with Garvan since 2008. Amongst other things, the Foundation has been generously supporting Professor Katherine Samaras’ diabetes and obesity research for more than five years.

In 2015, following the passing of Emmanuel, Kathleen inspired her sons, George and Peter Harris and their wives, to engage in the family’s relationship with Garvan. Garvan is delighted to have the continued support of Kathleen, George, Peter and their families in Emmanuel’s memory.

Our research laboratories and groups

Adipose Tissue Biology in Diabetes and Obesity Lab Head: Prof Katherine Samaras

Beta Cell Regeneration Lab Head: Dr Daniel Hesselson

Beta Cell Signalling Lab Head: Prof Trevor Biden

Cellular and Molecular Metabolism Lab Head: Prof Mark Febbraio

Myokine Biology Group Leader: Dr Martin Whitham

Clinical Diabetes, Appetite and Metabolism Lab Heads: Prof Lesley Campbell and A/Prof Jerry Greenfield

Brown Fat Physiology Group Leader: Dr Paul Lee

Clinical Insulin Resistance Group Leader: Dr Dorit Samocha-Bonet

Prader-Willi Syndrome and Genetic Forms of Diabetes Group Leader: Dr Alexander Viardot

Insulin Signalling Lab Head: A/Prof Carsten Schmitz-Pfieffer

Islet Biology Lab Head: A/Prof Ross Laybutt

Molecular Metabolism Lab Head: Prof Gregory Cooney

The findings pave the way for individualised treatment of those at risk of developing diabetes.
The Genomics and Epigenetics Division – Garvan’s sixth and newest Division – was established in 2015.

In creating the Division, we have brought together key scientists at Garvan with expertise in the analysis of genomes (genomics), of genome expression (transcriptomics) and of the secondary code that organises the genome (epigenetics). In addition, researchers in the Division have expertise in big data analysis and visualisation, key aspects to making complex genomic information accessible and meaningful.

I see the Division’s establishment as a visionary reconfiguring of Garvan’s core research strengths. Already, Garvan researchers are playing a leading role in the transformation of science and clinical practice through next-generation genome sequencing and big data analysis. By creating the Genomics and Epigenetics Division, we aim to facilitate collaboration and foster innovation among the Division’s researchers, helping to ensure that Garvan remains a major player in the genomic/epigenomic revolution.

Our vision is to interpret the information encoded within and above the genome; to uncover how epigenetic and transcriptomic changes in space and time control human development; to understand how disruption of these changes contributes to cancer and other diseases (including diabetes and neurological and immune disorders); and to translate our knowledge to improve health outcomes through the development of biomarkers and potential therapeutic targets.

I am proud to be leading this new and exciting Division, and I look forward to working with the team to help our research efforts go from strength to strength.

– Professor Susan Clark FAA

New sequencing technology ‘like a high-powered microscope’

Garvan researchers, led by Dr Tim Mercer, have developed a powerful new sequencing technology that is able to detect the many genes that are expressed in minutely small amounts of a biological sample.

The technology, called CaptureSeq, works by ‘zeroing in’ on just a small section of the genome and makes it possible to measure gene transcripts (or ‘readouts’) that are so rare they have never previously been detected. Existing technologies detect abundant gene transcripts, but CaptureSeq outperforms these in the measurement of low-abundance transcripts.

As CaptureSeq allows the ‘high-resolution’ exploration of gene expression, it is likely to become important for diagnosis of cancers and other diseases in the future.

Epigenetic signatures that differentiate triple-negative breast cancers

Triple-negative breast tumours are unresponsive to any of the drugs that currently target ‘hormone receptor’ proteins in breast cancers. For many women with this diagnosis, prognosis is very poor – but it has been difficult to determine from the outset which cancers are of high-risk and which are low-risk.

For the first time, researchers led by Professor Susan Clark identified epigenetic ‘signatures’ – patterns of chemical ‘decoration’ of DNA – that can distinguish between highly aggressive and more benign forms of triple-negative breast cancer. The team looked at archived biopsy samples from triple-negative breast cancer patients with known outcomes, and observed that the pattern of methylation differed between more and less-aggressive cancers.

These epigenetic patterns are a promising prognostic tool for breast cancer, and will next be tested on larger cohorts.

Aquaria is built upon the Protein Data Bank (PDB), an extensive – but underused – online database that contains over 100,000 protein structures. The researchers layered in considerable additional information – including, for instance, half a million protein sequences that do not yet have a structure – and introduced visualisation tools and an easy-to-use interface.

The result? A resource that will be a powerful tool for medical researchers and life scientists alike, speeding research and taking it in new directions.

In recognition of its innovative approach, Aquaria won first prize in the Research and Development category of the 2015 NSW iAwards.

For more Garvan research in triple-negative breast cancer p20

Powerful tool to transform how researchers view proteins

Dr Seán O’Donoghue, from Garvan and CSIRO, led the development of a publicly available web resource, called Aquaria, that streamlines and simplifies the process of gleaning insight from 3D protein structures.

Great Xpectations for prostate cancer research

Rod Wills and his crew took on the 2015 Rolex Sydney to Hobart Yacht Race, under a ‘Prostate Cancer Research’ banner, raising funds and awareness for Garvan’s research into prostate cancer. Professor Vanessa Hayes, who leads the Human Comparative and Prostate Cancer Genomics laboratory, is the recipient of Great Xpectations funding.

NEWS HIGHLIGHTS

Prof Clark honoured for contributions to research

In 2015, Division Head Professor Susan Clark received considerable recognition for her contributions to research. In May, she was elected Fellow of the Australian Academy of Science. She went on to receive the Professor Rob Sutherland AO Make a Difference Award. The Award, which is bestowed by the Cancer Institute NSW, recognises a researcher who has contributed a novel and lateral insight that has led to a significant shift in cancer care or research direction.

Professor Clark is highly acclaimed internationally for her work in human epigenetics, and is best known for her pivotal contribution to the advancement of new sequencing technologies that detect modifications to DNA and its associated proteins.
The Paramor Family Fellowship

Greg and Kerry Paramor were first introduced to Garvan almost 20 years ago and were immediately impressed by the calibre of the science and scientists. According to Greg, ‘That was just the start of the journey’.

Fast forward 20 years (15 of which Greg was a Director on the Garvan Institute’s Board) and Greg, Kerry and their children Niki, Lachie and Toby continue to be inspired by Garvan’s work.

‘In the history of research advancement, this is perhaps a tipping point where we can accelerate the impact of medical research. That really excites us as a family. In terms of giving, if you can give in whatever capacity, now is a better time than ever before,’ said Greg.

In 2014 The Paramor Family Fellowship was established to support research advancement and to continue the family’s support following Greg’s retirement from the Board. The fellowship is currently awarded to Dr Tim Mercer, Head of Garvan’s Transcriptomic Research Laboratory whose research focuses on genome and RNA biology and bioinformatic and sequencing innovations.

OUR RESEARCH LABORATORIES AND GROUPS

Epigenetics Research Lab Head: Prof Susan Clark

  - Epigenetic Deregulation Group Leader: Dr Clare Stirzaker
  - Histone Variants Group Leader: Dr Fatima Valdes-Mora
  - Chromatin Dynamics Group Leader: Dr Phillippa Taberlay

Genome Informatics Lab Head: A/Prof Marcel Dinger

Human Comparative and Prostate Cancer Genomics Lab Head: Prof Vanessa Hayes

Transcriptomic Research Lab Head: Dr Tim Mercer

Biodata Visualisation Group Leader: Dr Seán O’Donoghue

Garvan researchers are playing a leading role in the transformation of science and clinical practice through next-generation genome sequencing and big data analysis.
NEW ALLIANCE GIVES A UNITED VOICE TO PANCREATIC CANCER

A unique collaboration of organisations and individuals have come together to form the Pancreatic Cancer Alliance – a collaborative voice driven to raise awareness of pancreatic cancer in Australia.

The Alliance is united by the need for greater awareness of pancreatic cancer across the Australian community, and coupled with a long-term view of supporting much needed medical research into the disease. It was formally announced by The Hon. Jillian Skinner, NSW Minister for Health at NSW Parliament House.

Members of the Pancreatic Cancer Alliance are Avner Pancreatic Cancer Foundation; Cancer Australia; Garvan Institute of Medical Research; GI Cancer Institute; Karen Livingstone; Pancare Foundation; Patron – Tracey Spicer and #PurpleOurWorld.
FROM THE DIVISION HEAD

A properly functioning immune system protects the body from dangerous attacks, whether they come from outside as infections, or inside as cancer. Our overarching goal in the Immunology Division is to determine how the immune system functions to protect the body – and how this goes wrong when disease occurs.

2015 has been a standout year for the Division. It started with the appointment of Professor Christopher Goodnow FAA FRS (a member of the National Academy of Sciences (USA)) as the Deputy Director of Garvan and the establishment of his Immunogenomics lab within the Division. This was a huge coup for Garvan, and we are privileged to have been able to recruit such a transformational scientist.

I am proud of the Division’s researchers, who in 2015 published numerous research papers, presented at conferences and successfully attracted considerable research funding. It was particularly pleasing to see two emerging research leaders – Dr Tri Phan and Dr Elissa Deenick – be promoted to Garvan Faculty.

It’s a very exciting time to be an immunologist. We are witnessing a paradigm shift in cancer treatment in which novel therapeutics (cancer immunotherapies) target cells of the immune system instead of the cancer cells themselves. In addition, we can now sequence an individual’s entire genome rapidly and economically, making it feasible to identify disease-causing DNA changes in individuals with immune disorders.

In 2016, we aim to capitalise on these advances, extending our research into immuno-oncology and formalising a pipeline for the detailed genetic, molecular, cellular and biochemical analyses of individuals affected by immunodeficiency and autoimmunity. These initiatives will be highly complementary to the research currently being undertaken by the Division’s many excellent laboratories.

– Professor Stuart Tangye

RESEARCH HIGHLIGHTS

A new class of damaging immune cells revealed

A team of Garvan researchers, led by Professor Robert Brink, uncovered an entirely new type of immune cell: a ‘renegade’ B cell that could trigger autoimmune diseases such as systemic lupus erythematosus (SLE).

The team observed the unusual B cells (called ‘rogue germinal centre B cells’) in mice that are genetically modified to be deficient in FAS, a protein that helps avoid the production of autoantibodies (which attack the body’s own structures). They found that the rogue B cells make large numbers of damaging antibodies, including autoantibodies, quite unlike normal B cells which produce protective antibodies.

The development of autoimmunity is not well understood and this new finding suggests a mechanism by which autoantibodies are formed in humans, opening up new avenues for research into autoimmune diseases.

Butt et al., Immunity 2015;42:890-902
doi:10.1016/j.immuni.2015.04.010
Frontline immune cells can travel for help

PhD student Henry Hampton and his supervisor Dr Tatyana Chtanova uncovered an important new role for neutrophils—the ‘first responder’ immune cells that gather rapidly at sites of injury.

Using a mouse model in which neutrophils were visualised by fluorescent molecules, for the first time, researchers were able to watch where the neutrophils went after gathering at a wound site. Intriguingly, they showed that neutrophils relocate a second time if the injury becomes infected: they move to the nearest lymph node, sometimes carrying with them a sample of the bacteria infecting the wound.

The researchers went on to show that neutrophils ‘call for reinforcements’ at lymph nodes, helping to prime other immune cells to attack. Their work redefines a key early step in the body’s response to the threat of infection.


An enzyme that enables the pathway to diabetes

Associate Professor Shane Grey and Dr Elisabeth Malle have identified an enzyme, called NIK kinase, that appears to undermine the body’s efforts to regulate blood glucose and is thus likely to be important on the path to Type 2 diabetes.

The researchers investigated the role of NIK in a range of biological models—from zebrafish to human cells, and mice with diet-induced obesity. They focused their studies on pancreatic beta cells (which produce insulin, the key hormone in blood glucose regulation). Collectively, their results suggest that when NIK kinase is activated beta cells are less effective at producing insulin.

Excitingly, genetic studies of human diabetic patients also point to the involvement of NIK kinase in this disease, making this enzyme (and others in the same pathway) a promising target for diabetes therapies.


Towards a cure for Type 1 diabetes

Associate Professor Shane Grey, along with collaborators at Westmead Hospital, was awarded a $3.3 million grant from the Juvenile Diabetes Research Foundation (JDRF) to extend their innovative research towards a cure for Type 1 diabetes.

As Scientific Director of the program Associate Professor Grey’s goal is to make islet transplantation a clinically realistic and attractive therapeutic option for individuals with Type 1 diabetes, including children. The researchers’ approach focuses on subduing the patient’s immune response to islet transplantation. They hope that this strategy will make it possible for treated individuals to live drug-free in the long term.

Associate Professor Grey’s islet transplantation research was initially supported by seed funding from The Ross Trust, enabling him to develop the program and go on to achieve significant peer reviewed funding from JDRF.
Passionate support for immunology research

Mr and Mrs John and Megan Wade have long been passionate about medical research, believing that each finding is a vital contribution to improving quality of life.

John and Megan have supported immunology research for more than 20 years, feeling that it didn’t seem to have the same support as more publicised areas of research.

Over the years they have worked closely with Professor Robert Brink, whose research focuses on the regulation of B cell survival and antibody production.

'We are continually impressed by Professor Brink’s vision and dedication to his research. His team has made great progress in solving the many mysteries of autoimmune disease; hopefully the rapid advancement of genomics can further unravel these puzzles.

'Ultimately, by partnering with Garvan, we are contributing to the greater good of our community,’ said Megan and John.

OUR RESEARCH LABORATORIES AND GROUPS

Antibody Therapeutics Lab Head: A/Prof Daniel Christ
B Cell Biology Lab Head: Prof Robert Brink
Cellular Immunity Lab Head: Prof Jonathan Sprent
   Immune Tolerance Group Leader: Dr Kylie Webster
Diabetes and Transcription Factors Lab Head: A/Prof Jenny Gunton
Immunobiology of Cytokines Lab Head: Dr Marcel Batten
Immunogenomics Lab Head: Prof Christopher Goodnow
Immunology and Immunodeficiency Lab Head: Prof Stuart Tangye
   Human Immune Disorders Group Leader: Dr Cindy Ma
Innate and Tumour Immunology Lab Head: Dr Tatyana Chtanova

Intravital Microscopy Lab Head: Dr Tri Phan
Lymphocyte Signalling and Activation Lab Head: Dr Elissa Deenick
Mucosal Autoimmunity Lab Head: A/Prof Cecile King
Transplantation Immunology Lab Head: A/Prof Shane Grey
Genomic Engineering Group Leader: Dr David Zahra
Immunopathology Group Leader: A/Prof William Sewell

UNSW Research Excellence Awards p51
Student success at ASI-DGII conference p51
Elisabeth Malle wins Best PhD Thesis Award p51
Prof Jonathan Sprent receives Lifetime Achievement Award p53

We are witnessing a paradigm shift in cancer treatment in which novel therapeutics (cancer immunotherapies) target cells of the immune system instead of the cancer cells themselves.
In January 2015, Garvan announced the launch of the spin-off company Solvanix Pty Ltd. The company—which secured a $2 million commitment from the Medical Research Commercialisation Fund—was set up to commercialise a novel technology to improve the stability of therapeutic monoclonal antibodies.

Developed by researchers Associate Professor Daniel Christ, Dr Kip Dudgeon and Dr Romain Rouet, the new technology vastly improves the stability of fully human antibodies by reducing their tendency to stick together and come out of solution.

The formation of Solvanix was facilitated by Christina Hardy and the Partnerships and Legal Affairs team, who consistently do excellent work behind the scenes in negotiating ventures, partnerships and spin-offs on behalf of Garvan.
The Neuroscience Division seeks to understand the molecular mechanisms that underpin the capacity of the human brain to learn, think and function. We also aim to identify how these mechanisms are perturbed in disorders including Parkinson’s and Alzheimer’s disease, schizophrenia, eating disorders, hearing loss and pain. Our ultimate goal is to translate our research findings to the clinic, to enhance diagnosis and provide effective therapies.

2015 has seen a significant expansion in the Division’s research focus, as we work to enhance our capabilities in neurogenomics – an intersectional discipline that draws on genomics and neurobiology to investigate the causes of brain disorders and uncover potential strategies for treatment.

Our objective is to establish Garvan as Australia’s neurogenomics hub. We aim to do this through the application of Garvan’s considerable capability in genomics, including single-cell technologies, as well as through active recruitment of researchers with strengths in genomics and neuroscience.

2016 will see this new focus come to maturity. We have already established new projects to identify genetic components of bipolar disorder and cerebral palsy, and Garvan’s 2016 International Fellow Symposium will focus on neurogenomics.

It has been a pleasure to work with researchers across the Division in this, my first year as Division Head. I look forward to a productive and successful year in 2016.

– Associate Professor Antony Cooper

Our objective is to establish Garvan as Australia’s neurogenomics hub.
Novel approaches to slow Parkinson’s disease?

Current therapies for Parkinson’s disease are effective only by providing symptomatic treatment in the short term, and do not halt the ongoing neurodegeneration that is a Parkinson’s disease hallmark. Growth factors that promote survival of neurons are potential candidates for treating neurodegeneration in individuals with Parkinson’s disease. Dr Bryce Vissel’s team and colleagues have investigated the effects of the growth factor called Activin-A on neurodegeneration in a mouse model of Parkinson’s disease. They showed that administration of Activin-A for seven days protected the substantia nigra from loss of neurons; however, it did not improve dopamine levels in the adjacent striatum in the short term. The investigators are now studying dopamine level recovery at later time points.

This study supports a role for Activin-A in neuroprotection, and further exploration is now warranted to determine how Activin-A may be applied in the development of a Parkinson’s disease treatment. The work raises questions of how axons may be differentially affected in Parkinson’s disease and how these could be regenerated once neurons were preserved.

Hamlet dictates the perception of pain

Chronic and acute pain affects millions of people worldwide, and can significantly diminish quality of life for sufferers. To have any hope of changing this, it is crucial to understand, on a molecular level, how our brains perceive pain.

Dr Greg Neely, together with collaborators in Austria, Belgium and Sydney, advanced our understanding significantly by showing that the protein PRDM12 (also known as Hamlet) plays a critical role in controlling the development of the nerve cells that sense pain in the fruit fly Drosophila. The researchers were then able to introduce key PRDM12 mutations (which lead to insensitivity to pain in humans) into frogs, and to observe in detail how each mutation affected the development of sensory neurons.

This work demonstrates that PRDM12 is an evolutionarily conserved gene that plays a critical role in pain perception, and opens new avenues of research into PRDM12 as a potential target for new pain therapeutics.

News highlights

The chance encounter that led to generous funding for hearing research

The story of Mr and Mrs Alan and Lynne Rydge’s support of Professor David Ryugo at the Garvan Institute began with a chance encounter with St Vincent’s Professor Paul Fagan on a skiing trip.

Professor Fagan, an internationally renowned otologist/skull base surgeon, bumped into Mr and Mrs Rydge at Thredbo more than 20 years ago. On a chairlift, he shared the story of an Aboriginal lady in remote central Australia who was the sole English teacher in her community. She had suddenly lost all hearing and was in dire need of a cochlear implant, for which there was no remaining public funding. The teacher, who spoke both her native indigenous language and English, was devastated to have lost her ability to communicate with her students. Mr and Mrs Rydge immediately agreed to fund the cost of the implant, which was not inconsiderable.

This was just the beginning of a long term friendship with a shared love for philanthropic endeavours, which has seen support for a number of Professor Fagan’s initiatives both in Australia and overseas, together with the love of skiing.

More recently, Professor Fagan introduced Mr and Mrs Rydge to the hearing research of Professor Ryugo. Professor Ryugo’s team are pioneering research into the complex mechanisms that underpin hearing loss and its consequent changes to the brain, thanks to the continuing support of Mr and Mrs Rydge.


Working together to improve mental health outcomes

Bipolar disorder, characterised by episodes of mania and depression, is a debilitating disease that requires lifelong treatment. It is well known that bipolar disorder can run in families, so researchers know that genetics must contribute to the disease – but it has been very challenging to identify the specific genetic signatures involved.

With the support of the NAB Foundation (previously MLC Community Foundation), Associate Professor Antony Cooper is working with a team of researchers from Neuroscience Research Australia (NeuRA) and UNSW Australia to sequence the genomes of individuals in families living with bipolar disorder. In doing so, they anticipate identifying some of the complex genetic factors that underlie the disease.

The NAB Foundation supports organisations working to deliver positive social change, including those focused on the mental health and wellbeing of Australians. Garvan is proud to have worked with the NAB Foundation for many years to improve the health of our community.

OUR RESEARCH LABORATORIES AND GROUPS

Eating Disorders Lab Head: Prof Herbert Herzog

Hypothalamic Function Research Group Leader: Dr Shu Lin

Energy Expenditure Group Leader: Dr Lei Zhang

Neuroendocrinology Group Leader: Dr Yanchuan Shi

Functional Genomics Lab Head: Dr Greg Neely

Hearing Research Lab Head: Prof David Ryugo

Neurodegenerative Diseases Lab Head: Dr Bryce Vissel

Neuronal Stem Cells Lab Head: Prof John Shine

Parkinson’s Disease and Neurogenomics Lab Head: A/Prof Antony Cooper

RNA Biology and Plasticity Lab Head: Prof John Mattick

Human Brain Transcriptomics Group Leader: Dr Guy Barry

See more about the NEUROSCIENCE DIVISION IN 2015

Brigitte Phillips places in UNSW’s 3MT competition p51

Prof John Shine named Honorary Fellow p53

Dr Shu Lin receives distinguished appointment in China p53

This study expands the bone-pancreas road map and, in doing so, points to pathways that may be of value in treating metabolic disease.
The structure and direction of the Kinghorn Centre for Clinical Genomics (KCCG) has undergone dramatic advances this year. At our inception in October 2012, we had just six staff and two DNA sequencing instruments, and we were generating up to 750 GB of genomic data per week. We have now grown into an interdisciplinary Centre of more than 40 staff and 12 instruments, and our weekly genomic data output is up to 50,000 GB.

Several areas of KCCG’s development in 2015 were particularly exciting.

First, we successfully integrated a number of clinical team members. We established a Rare Disease Genomics group – led by Dr Tony Roscioli, a researcher and clinical geneticist – and consulted with pathologists from NSW Health to help us prepare our processes for accreditation. Once complete, this will allow us to report medically significant genomic findings to clinicians.

Second, we developed tools that consistently capture observable traits in individuals to relate them to their genome sequence. Our growing Phenomics team – led by Dr Tudor Groza – is helping to improve our ability to diagnose disease, as well as to discover new relationships between the information in the genome and the characteristics of an individual.

And third, we actively developed local and global relationships and collaborations. Through our education programs, events and conference presence, we have engaged with different communities and stakeholders in genomic medicine. This engagement is vital to realise the potential of clinical genomics in Australia.

We are grateful for the continued support from The Kinghorn Foundation and look forward to building on our exciting portfolio of activities in 2016.

– Associate Professor Marcel Dinger

**KCCG HIGHLIGHTS**

**Partnership with Genomics England to share resources and expertise**

In September 2015, Garvan signed a Memorandum of Understanding with Genomics England, the organisation established by the UK’s Department of Health to deliver the world-first 100,000 Genomes Project.

Garvan and Genomics England have agreed to share resources and expertise to advance genomic medicine in Australia and the UK. We will work together to make genomic information more accessible, meaningful and usable, particularly by developing better ways to capture clinical information and integrate it with genomic data.

In addition, we will collaborate to develop next-generation genomics databases, to establish clear ethical and legal frameworks around the use of genomic information, and to design educational resources about clinical genomics for health professionals and the wider public.
The Medical Genome Reference Bank: genomics of the ‘wellderly’

KCCG is embarking on a collaborative project to build a database of genome sequences from 4,000 healthy elderly Australians, over the age of 70. By sequencing the genomes of individuals who have avoided major disease into later life, the Medical Genome Reference Bank (MGRB) will act as a powerful filter to distinguish between genetic variation and variation that causes or predisposes to disease. It will provide a resource of lasting value for medical researchers undertaking research into the genetic basis of many types of diseases and disorders.

Funded by the NSW State Government as part of the Sydney Genomics Collaborative, the MGRB will use KCCG’s Illumina HiSeq X Ten sequencing platform to sequence participants of two existing studies: the Sax Institute’s 45 and Up study and the Aspirin in Reducing Events in the Elderly Study.

Accelerating diagnosis of rare disease through genomics

Every year in Australia, several thousand children are born with disorders that result from damaging mutations in their genes. Currently, diagnosis of the underlying mutation in these children is time-consuming, expensive and very often inconclusive.

To address these issues, with support received from the Garvan Research Foundation, KCCG has partnered with Liverpool Hospital to rapidly sequence and analyse the genomes of up to 60 babies and children in NSW with severe intellectual or developmental disability, along with their mothers and fathers. The focus of this endeavour is on children for whom previous genetic testing has not provided a diagnosis.

The project aims to speed up and simplify the journey towards diagnosis for the families involved, and to demonstrate a powerful new way forward in genetic diagnosis of young children. More than $300,000 has been raised by philanthropic donations to fund this project.

Linking genetics and clinical presentation in rare and common disease

The Human Phenotype Ontology is a set of over 11,000 terms used to annotate abnormal traits associated with human disease in a consistent manner. Widely used in the rare disease community, it is a crucial tool when researchers are trying to link disease traits to genetic variants. However, a comparable resource has not previously been available for common diseases such as osteoporosis, common variable immunodeficiency or coeliac disease.

Phenomics Team Leader, Dr Tudor Groza, with collaborators from other institutions, has developed a methodology to extend the Human Phenotype Ontology to annotate traits associated with common diseases. The goal is, ultimately, to provide a comprehensive resource for linking genomic and clinical/phenotypic traits across the entire spectrum of human disease. The extended Ontology is already proving to be a valuable resource for KCCG’s researchers, underpinning their efforts to explain how genetic variation impacts on disease.


Sydney Genomics Collaborative Symposium

KCCG hosted a Scientific Symposium on the NSW Health-funded Sydney Genomics Collaborative in December 2015. This one-day event brought together more than 80 clinicians, researchers and stakeholders in the NSW genomics community to learn about the Collaborative’s programs and its progress since 2014. They discussed current health-focused research projects using whole human genome sequencing; and connected with members of the research and clinical community to establish or enhance strategic collaborations.

A focus on education and outreach

During 2015, KCCG welcomed hundreds of professionals and members of the public to education and outreach events. KCCG ran its inaugural five-day practical course in Clinical Genomic Data Analysis for genetic specialists, with support from Bioplatforms Australia, the NSW Office of Health and Medical Research and Intersect Australia. The Centre also hosted events for public and professional audiences, featuring international speakers Dr Serena Nik-Zainal of the Wellcome Trust Sanger Institute (UK) and Professor...
Kelly Ormond of Stanford University. KCCG’s Sydney Science Festival event drew more than 100 participants to hear from Professor Ormond – an ethicist, genetic counsellor and educator – who used publicly available genomes to explore the promise and consequences of genomic information.

**Philanthropy reignites research into dystonia**

Dystonia is a neurological disorder where involuntary muscle contractions cause abnormal and often repetitive movements or postures. Garvan received vital seed funding to reignite research into the disorder.

Long supporters of medical research, Paul Ainsworth and his wife Valeria decided to facilitate Dr Kishore Kumar’s dystonia research after learning more about Garvan’s leading genetic research capabilities.

Dystonia has few treatments and no cure. Dr Kumar and his team will now be able to use Garvan’s cutting-edge genome sequencing platform to investigate the genetic basis of dystonia.

KCCG is Australia’s first, purpose-built facility for undertaking affordable large-scale genomic research projects and clinical-grade genome sequencing. Through visionary support, most notably from The Kinghorn Foundation, KCCG has sequenced 4,117 genomes, collaborated on 49 research projects within Garvan and 104 research projects externally throughout 2015.

**OUR TEAMS**

- **Genome Sequencing Team Leader**: David Miller
- **Information Architecture Team Leader**: Dr Warren Kaplan
- **Clinical and Production Informatics Team Leader**: Aaron Statham
- **Rare Disease Genomics Team Leader**: Dr Tony Roscioli
- **Phenomics Team Leader**: Dr Tudor Groza
- **Translational Genomics Team Leader**: Dr Mark Cowley
- **Commercial Strategy Team Leader**: Dr Russell Howard
- **Market Development Team Leader**: Dr Stephan Brennan
- **Engagement and Education Team Leader**: Bronwyn Terrill
- **Project Management Team Leader**: Dr Andrew Stone
Genome sequencing technology at Garvan.
JOHN SCHUBERT AO  
Chair  
Dr Schubert is a Non-Executive Director of BHP Billiton Limited, BHP Billiton Plc, Chairman of the Great Barrier Reef Foundation and member of the Garvan Research Foundation Board. Previously, he was CEO of the Commonwealth Bank of Australia and Pioneer International Limited, Chairman of WorleyParsons Limited and G2 Therapies Ltd, Chairman and MD of Esso Australia Ltd, and non-executive director of Hanson Plc.

ANNETTE CUNLIFFE RSC  
Sister Annette was the Sisters of Charity Congregational Leader. She has been President of the Conference of Leaders of Religious Institutes, President of Catholic Religious Australia, Inaugural Chair of the Stewardship Board of Catholic Health Australia, and a senior lecturer at the Australian Catholic University. She is one of two executive officers of the National Committee for Professional Standards of the Catholic Church in Australia.

GEOFF DIXON  
Mr Dixon, Chairman of the Garvan Research Foundation, also sits on the boards of Crown Resorts Limited, Adslot Limited and the Museum of Contemporary Art Australia, and is an Ambassador to the Australian Indigenous Education Foundation. He has worked in the media, mining and aviation industries, and was Chief Executive of Qantas Airways from 2001 to 2008 and Chairman of Tourism Australia from 2009 to 2015.
JOHN MATTICK AO FAA

Professor Mattick is the Garvan Institute Executive Director and Conjoint Professor at UNSW / St Vincent’s Hospital Clinical School. Previously he was Foundation Professor of Molecular Biology and Director of the Institute for Molecular Bioscience, University of Queensland. His many awards include the Australian Government Centenary Medal and the Human Genome Organisation’s Chen Award for Distinguished Contributions to Human Genomic and Genetic Research.

STEPHEN JOHNS
(from May)

Mr Johns is Chairman of Brambles Limited and a former Chairman and Non-Executive director of Leighton Holdings Limited and Spark Infrastructure Group, and former Non-Executive Director of Westfield Group. He has a Bachelor of Economics degree from the University of Sydney and is a Fellow of the Institute of Chartered Accountants in Australia and the Institute of Company Directors.

ANNE KEATING

Ms Keating is a Director of Goodman Group Ltd, Reva medical Inc and GI Dynamics Inc. She is also Chairman of Houlihan Lokey, Australia, an investment bank and is a governor of the Gerebral Palsy Research Foundation. She has served on many public company boards and was an inaugural Director of the Victor Chang Cardiac Research Institute.

HELEN NUGENT AO

Dr Nugent is Chairman of Australian Rail Track Corporation and a Non-Executive Director of Origin Energy. She has been Chairman of Veda Group, Funds SA, Swiss Re (Australia), and Sydney Airport and a Non-Executive Director of Macquarie Group, Mercantile Mutual, and the State Bank of NSW, among others. She is an Officer of the Order of Australia and a recipient of the Australian Government Centenary Medal.

THOMAS JOHN (JACK) MARTIN AO FAA FRs
(from August)

Emeritus Professor Martin is a John Holt Fellow, St Vincent’s Institute of Medical Research and Emeritus Professor of Medicine, University of Melbourne. He was previously a Director of St Vincent’s Institute of Medical Research and the Chairman of the University of Melbourne Department of Medicine. A Fellow of the Royal Society and of the Australian Academy of Science, he was also President of the International Bone and Mineral Society.

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GREG PARAMOR AO  
Mr Paramor is the Managing Director of Folkestone Limited. He is a past President of the Property Council of Australia and of the Investment Funds Association. He is a Director of a number of not-for-profit organisations including as past Chair of the National Breast Cancer Foundation. He is also a board member of the Sydney Swans.

DANIEL PETRE AO  
Mr Petre is the founding partner at AirTree Ventures. Previously he was Chairman of Netus and Founder of Ecorp. He was the Managing Director of Microsoft in Australia, the Development Group Vice President of Microsoft in the US and ran the Asia-Pacific region for Microsoft. He serves on the Sydney Theatre Company Board, UNSW Australia Business School and University of Sydney Medical School advisory boards.

RODNEY PHILLIPS  
Professor Phillips, Dean of UNSW Medicine, is an immunologist whose research impacted the world’s understanding of HIV/AIDS and other infectious diseases. He described, for the first time, how the HIV virus evades the body’s immune defences. Previously, Professor Phillips was Vice-Dean of Medical Sciences at Oxford University and Director of the Peter Medawar Building for Pathogen Research.

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Ms Segal is currently a Director of NAB, Deputy Chancellor UNSW, Chairman of AICC (NSW) and the General Sir John Monash Foundation, a member of the Australian War Memorial Council and Trustee of the Sydney Opera House. She has been a senior regulator, lawyer and a director of other listed and Government organisations.

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PETER SMITH
(unti June)
Professor Smith was the Dean of
Medicine at UNSW Australia and
President, Medical Deans ANZ.
He has held senior hospital management
posts in Brisbane and Melbourne and
senior academic appointments at the
universities of Queensland, Melbourne
and Auckland and as a board director of
St Vincent’s Health Australia,
Neuroscience Research Australia,
Ingham Medical Research Institute,
and the Sax Institute for Health Research.

BERNADETTE TOBIN
Dr Tobin is Director of the Plunkett Centre
for Ethics at St Vincent’s Hospital, and
Reader in Philosophy at Australian Catholic
University. Dr Tobin is an Honorary Ethicist
at the Children’s Hospital at Westmead,
an Honorary Associate Professor in the
Faculty of Medicine at University of Sydney
and Conjoint Associate Professor in the
School of Medicine at UNSW Australia.
Ms Allen runs a Governance Advisory business. Previously she was a managing partner at Egon Zehnder, where she also held a leadership role across Asia Pacific. A member of Chief Executive Women, Ms Allen has an MBA from Harvard Business School and a Bachelor of Arts from Smith College. She has also worked for Procter & Gamble in the US and Australia.

The Hon Bruce Baird was a member of the Australian Trade Commission and parliaments of NSW and the Commonwealth from 1998–2007. Mr Baird is Chairman of the National Heavy Vehicle Regulator and sits on the boards of Sydney Theatre Company and Cubic International. He is also a patron of the Asylum Seeker Centre.

Mr Dixon is a Director of the Garvan Institute Board and also sits on the boards of Crown Resorts Limited, Adslot Limited and the Museum of Contemporary Art Australia, and is an Ambassador to the Australian Indigenous Education Foundation. He has worked in the media, mining and aviation industries, and was Chief Executive of Qantas Airways from 2001 to 2008 and Chairman of Tourism Australia from 2009 to 2015.
JOHN LANDERER CBE AM
Mr Landerer, CBE, AM, LLB (Syd), LLD, is a solicitor and Director of a number of private companies. He is a Fellow of the University of Sydney, Honorary Doctor at Macquarie University, Fellow of Tel Aviv University, Member of the Order of Australia, Commander of the British Empire and Commander in the Order of the Star of Italian Solidarity.

MELINDA CONRAD
(until November)
Ms Conrad is a Director of OFX Group Limited, the Reject Shop Limited and the Australian Brandenburg Orchestra. She has previously held directorships with David Jones Limited, APN News & Media Limited, and executive roles at Harvard Business School, Colgate-Palmolive and several retail businesses. Ms Conrad is also a Fellow of the Australian Institute of Company Directors.

GABRIEL FARAGO
Mr Farago practised as a solicitor and barrister for over 30 years, specialising in commercial disputes in Australia and overseas, before becoming a full-time international thriller writer. His books – The Empress Holds the Key and The Disappearance of Anna Popov – were released in 2013/14. In 1984, Mr Farago became a member of the Knightly Order of Vitez.

LOFTUS HARRIS AM
Mr Harris is a professional Non-Executive Director and an advisor to industry and government. He has been Chair and member of numerous national, state and industry bodies concerned with issues of economic development, international trade and investment, infrastructure, innovation and technology. He previously held various executive positions in the NSW, Queensland and Commonwealth public sectors.

JOHN MATTICK AO FAA
Professor Mattick is the Garvan Institute Executive Director and Conjoint Professor at UNSW / St Vincent's Hospital Clinical School. Previously he was foundation Professor of Molecular Biology and Director of the Institute for Molecular Bioscience, University of Queensland. His many awards include the Australian Government Centenary Medal and the Human Genome Organisation’s Chen Award for Distinguished Contributions to Human Genomic and Genetic Research.

SIMON MORDANT AM
Mr Mordant is Executive Co-Chairman of Luminis Partners. He is also the Chair of the Museum of Contemporary Art Australia, a board member of the Australian Broadcasting Corporation, MOMA PS1 in New York, Wharton Executive Board in Asia and a member of the Executive Committee of Tate International Council and a member of the International Council of the Museum of Modern Art in New York.
BRAD REES
Mr Rees is involved in a number of charitable, arts and educational interests and is a director of a private investment company. He was a Managing Director and equity partner of Goldman Sachs JBWere. Mr Rees was with the firm for 23 years and provided financial and investment banking advice to corporations and governments in Australia and overseas.

JOHN SCHUBERT AO
Dr Schubert is a Non-Executive Director of BHP Billiton Limited, BHP Billiton Plc, chairman of the Great Barrier Reef Foundation and Chairman of the Garvan Institute of Medical Research Board. Previously, he was CEO of the Commonwealth Bank of Australia and Pioneer International Limited, Chairman of WorleyParsons Limited and G2 Therapies Ltd, Chairman and MD of Esso Australia Ltd, and Non-Executive Director of Hanson Plc.

JEANNE-CLAUDE STRONG
Dr Strong is a qualified medical practitioner. Dr Strong established and ran three medical clinics in Melbourne and Sydney, focusing on occupational, sports and preventative medicine and stressing the importance of lifestyle management. She was a member of the Advisory Board of Bluearth and has a passion for yacht racing with an occasional foray in international regattas.

HELGA NEIDHART RSC
Dr Neidhart is an Australian Catholic University Senior Lecturer, Educational Leadership and a Director of the Catholic Education Commission of Victoria and the Catholic Ladies’ College, Eltham. She is a member of the Australian Bishops’ Council for Pastoral Research, and the governing councils of Guildford Young College, Mount Carmel College and the Association of Catholic Colleges, Hobart. Dr Neidhart was the Principal of St Columba’s College for approximately 20 years.
Congratulations to the students who received PhDs in 2015

Garvan has almost 100 PhD students across the entire Institute, enrolled predominantly through UNSW Australia and the University of Sydney. Students at Garvan are encouraged to use initiative and think independently to become the next generation of great medical researchers.

In 2015, 22 of our students were awarded PhDs.

Malgorzata Brzozowska
Supervised by Dr Paul Baldock and Prof Jacqueline Center
“The association between neuropeptides, gut hormones, skeletal and metabolic health.”

Barbara Diakanastasis
Supervised by A/Prof Carsten Schmitz-Peiffer
“The effect of ceramide synthases and protein kinase C epsilon on glucose homeostasis and lipid metabolism.”

Tala Kaplinovsky
Supervised by Prof John Shine
“The glial cell line-derived neurotrophic factor family in the olfactory system and brain.”

Charmaine Lang
Supervised by A/Prof Antony Cooper
“The pathogenic relationship of Alpha Synuclein and mitochondrial dysfunction in sporadic Parkinson’s disease.”

Mana Bing Liao
Supervised by A/Prof Carsten Schmitz-Peiffer
“The modulation of hepatic insulin action and lipid metabolism by protein kinase C isoforms.”

Elisabeth Malle
Supervised by A/Prof Shane Grey
“The non-canonical NFkappaB pathway as a novel player in beta cell dysfunction in diabetes.”

Brendan Roome
Supervised by A/Prof Daniel Christ
“Improving expression of paired antibody fragments in Escherichia coli.”

Nathan Zammit
Supervised by A/Prof Shane Grey
“The role of A20 in islet homeostasis: A novel graft-targeted therapy for islet transplantation.”

Danyal Butt
Supervised by Prof Robert Brink
“Novel functions for FAS in the regulation of germinal centre and antibody responses.”

Lorraine Chantrill
Supervised by Prof Andrew Biankin
“The path to personalised medicine for pancreas cancer.”

Christian Girgis
Supervised by Prof Jenny Gunton
“Vitamin D and skeletal muscle: novel effects on morphology and morphogenesis.”

Henry Hampton
Supervised by Dr Tatyana Chtanova
“Migration of neutrophils from inflamed skin occurs following microbial but not sterile inflammation and contributes to lymphocyte proliferation.”

Mary Iconomou
Supervised by Dr Darren Saunders
“Defining the role of UBR5 in cancer: identifying E3 ligase substrates.”

Dongbin Jin
Supervised by Prof Jonathan Sprent
“Stimulation of CD8 T cells with membrane vesicles prepared from antigen presenting cells.”

Zena Kassir
Supervised by Prof Susan Clark and Dr Peter Molloy
“CRNDE—a long non-coding RNA activated in colorectal cancer.”

Christopher Meoli
Supervised by Prof David James
“Metabolic responses to high-fat diet-induced obesity: the long and short of it.”

Sing Nguyen
Supervised by Prof Tuan Nguyen
“Family based genetic analysis of osteoporosis.”

Brenna Osborne
Supervised by Prof Gregory Cooney
“An investigation of the mitochondrial sirtuin enzyme SIRT3 and its influence on the response of skeletal muscle and liver to lipid oversupply.”

Sandy Stayte
Supervised by Dr Bryce Vissel
“Preclinical investigations of inflammation and excitotoxicity in mouse models of Parkinson’s disease.”

Daniel Suan
Supervised by Prof Robert Brink
“An inquiry into the regulation of positive selection and differentiation in the germinal centre response.”

Sophie Trefely
Supervised by Prof David James
“Regulation of akt signal transduction by glucose metabolism.”

Rushika Wirasinha
Supervised by Dr Marcel Batten
“The role of GPR65 in T cell function and demyelinating autoimmune disease.”
A 2015 Sydney Catalyst ‘Top-up Research Scholar’

Mun Ngah Hui, a PhD student in Garvan’s Cancer Division, was awarded one of four 2015 Sydney Catalyst Top-up scholarships. Mun received the scholarship for finding a biochemical pathway that may be important in the treatment of triple-negative breast cancer. Congratulations, Mun!

UNSW Research Excellence Awards

Congratulations to Deborah Burnett and Bethany Pillay, two of Garvan’s Immunology PhD students, who were recipients of the prestigious UNSW Research Excellence Awards scholarship. The scholarship is offered to students of outstanding research potential that have received a University Medal, or placed first in their undergraduate cohort.

Student success at ASI-DGfI conference

The 2015 Australian Society for Immunology–German Society for Immunology (ASI-DGfI) conference saw three PhD students in Garvan’s Immunology Division awarded prizes. Angelica Lau won the BD Communications Prize and Tom Torcellan and Deborah Burnett won ASI-DGfI Travel Awards. Congratulations also to Simon Pelham, who was runner up in one of the poster prize sessions and Dr Christopher Sundling, who won a travel award to attend the conference.

Best poster and presentation awards at EMBL Australia Symposium

Amanda Khoury and Scott Youlten took home prizes for the best poster and best presentation (respectively) at the European Molecular Biology Laboratory (EMBL) Australia PhD Symposium. Amanda’s winning poster, entitled “Untangling novel mechanisms of the architectural protein CTCF”, described her research into the three-dimensional organisation of DNA in the nucleus. Scott’s successful presentation, “Exploring the osteocyte transcriptome”, looked at the genes that are expressed in osteocytes, a class of bone cell.

2015 Lorne Genome Conference

Ksenia Skvortsova, Amanda Khoury and Qian Du, PhD students in Professor Susan Clark’s Epigenetics Research laboratory, all won awards at the 2015 Lorne Genome Conference. Ksenia Skvortsova won a Promega Student Travel Award which acknowledges “research excellence in the field of gene expression and organisation”. Amanda Khoury and Qian Du were awarded Student Poster Prizes. Congratulations!

The Three Minute Thesis Competition

The annual Three Minute Thesis Competition (3MT) challenges Postgraduate Research students from the St Vincent’s Precinct to explain their research in three minutes in lay terms with a single PowerPoint slide. First place in the 2015 3MT was awarded to Jacob Cao from the Cardiac Transplantation Division at the Victor Chang Cardiac Research Institute for his presentation “Reviving the dead and saving lives”. Second place was awarded to Sam Rogers from Garvan’s Cancer Division for his presentations, “The great wall to cancer”. Third place was shared between Anton Kalsbeek, of Garvan’s Cancer Division, and Brigitte Phillips, of Garvan’s Neuroscience Division. Their presentations were titled “Illuminating prostate cancer treatment decisions,” and “The biography of Parkinson’s disease”, respectively. Congratulations to all 11 Postgraduate Research students who took part.

Garvan Student wins UNSW Faculty of Medicine 3MT

Scott Youlten, a PhD student in Garvan’s Bone Biology Division, won first prize at the UNSW Faculty of Medicine Three Minute Thesis Competition (3MT). Scott’s presentation was titled “Skeletal marriage counselling”. Scott went on to win the People’s Choice and ASPIRE award at the UNSW Interfaculty Final.

Australian Diabetes Society’s Young Investigator Award

Congratulations to Dr Katherine Tonks who won the Australian Diabetes Society’s (ADS) Young Investigator Award in recognition of her outstanding presentation at the ADS Scientific Meeting.

Dr Tonks is in the final stages of her PhD and is an endocrinologist at St Vincent’s Hospital and a clinical researcher in Garvan’s Diabetes and Metabolism Division.

Best PhD Thesis Award 2015

Congratulations to Dr Elisabeth Malle, winner of Garvan’s Best PhD Thesis Award in 2015. Elisabeth completed her PhD in Associate Professor Shane Grey’s Transplantation Immunology Laboratory, researching “The non-canonical NFκB pathway as a novel player in beta cell dysfunction in diabetes.”
Mun Hui.

Amanda Khoury and Scott Youlten.

A/Prof Shane Grey and Dr Elisabeth Maile.

Deborah Burnett and Bethany Pillay.

3MT winners.

3MT competitors.

Dr Katherine Tonks.
AWARDS

Dr Fatima Valdes Mora, Mr Scott Edmonds and Dr Amanda Brandon.

Mr Darren Simpson and Dr Liz Caldon.

Dr David Croucher and Prof John Mattick.

Mr Andrew Giles, Mr Malcolm Palmer and Prof John Mattick.

2015 Champion recipients.

Dr Georgina Hollway, Prof Peter Currie and Dr Phong Nguyen.

Qian Du, Robert Shearer and the Furler and Hennessy families.

Recognition

• Professor Don Chisholm awarded Doctor of Science by UNSW Australia.
• Dr Shu Lin was appointed as a Distinguished Professor and Executive Director at the South-West Metabolism and Cardiovascular Research Centre in China.
• Professor John Shine AO FAA was named an Honorary Fellow of the Australian Academy of Health and Medical Sciences.
• Professor Jonathan Sprent received a Lifetime Achievement Award from the American Association of Immunologists.
• Professor Susan Clark FAA was elected as a Fellow of the Australian Academy of Science.
• Executive Director, Professor John Mattick AO FAA was inducted as a Fellow of the Australian Academy of Health and Medical Sciences.
• Professor John Eisman AO was inducted as Fellow of the Australian Academy of Health and Medical Sciences.
1 **The 2015 recipients of the Heliflite Young Explorer Awards**

Dr Amanda Brandon from the Diabetes and Metabolism Division and Dr Fatima Valdes Mora from the Genomics and Epigenetics Division were awarded the Heliflite Young Explorer Awards for 2015. The award provides a $5,000 grant to two outstanding early career researchers and enables them to attend international conferences, or engage in international collaborations. Dr Brandon used the award to present her data at the Annual American Diabetes Association Meeting in Boston where she met with some collaborators at Boston University. Dr Valdes Mora used her award to present her research at the European Molecular Biology Organisation meeting in Birmingham, UK.

2 **Dr Liz Caldon wins the 2015 CHAMP Private Equity Young Pioneer Award**

The Young Pioneer Award is provided by CHAMP Private Equity. It provides a $10,000 grant as seed funding for an innovative project to one stand-out early career researcher at Garvan. Dr Liz Caldon, recipient of the Young Pioneer Award, is the Leader of the Replication and Genome Stability Group in the Cancer Division. Dr Caldon will use the CHAMP Young Pioneer Award to investigate her novel hypothesis that hormone signalling is instrumental in the development of chemotherapy resistance.

3 **The 2015 Young Garvan Award**

The 2015 Young Garvan Award and Special Travel Awards were announced at Young Garvan’s annual fundraising event, the All Ribbons Ball.

Dr David Croucher, Leader of the Network Biology group in Garvan’s Cancer Division received the $50,000 Young Garvan Award. He will use the award to continue his work using targeted genomic sequencing to identify mutations associated with chemoresistance in breast cancer.

Dr Simon Junankar (Cancer Division) and Dr Elena Zotenko (Genomics and Epigenetics Division) were each awarded a Special Travel Award of $5,000.

Dr Junankar’s research aims to understand how the body’s immune system can be activated to destroy cancer cells. Dr Zotenko analyses, integrates and visualises large datasets that are created by genome sequencing technology.

Young Garvan is a volunteer group of young professionals that aims to inform and inspire the younger generation about, and raise funds for Garvan’s medical research.

4 **2015 Champion Awards celebrate corporate and community support**

The inaugural Community Champion Awards were established to celebrate the achievements of Garvan’s community and corporate supporters. The awards recognise those who demonstrate exceptional commitment towards medical research through tireless fundraising, volunteering, and helping to raise awareness of Garvan’s work.

Recipients of the 2015 Community Champion Awards were Ridley Corporation, CBP Lawyers, the NAB Foundation, King & Wood Mallesons, Simon Oaten from the Young Garvan Committee and Love Your Sister.

5 **The launch of the Joseph Palmer Foundation**

Joseph Palmer & Sons, Australia’s oldest brokerage firm, recently launched the Joseph Palmer Foundation at the Garvan Institute. The Foundation will facilitate their client’s support for a variety of charitable causes.

They announced an annual ‘Palmer Innovation Prize’ to be awarded for the first time in 2016. This prize will acknowledge a Garvan developed innovative technology or product that has or will significantly benefit scientific research.

Dr Hollway was awarded the prize with her collaborators Professor Peter Currie and Dr Phong Nguyen of the Australian Regenerative Medicine Institute at Monash University, in recognition of their groundbreaking work on how haematopoietic stem cells – which generate all the body’s immune and blood cells – are made.

The researchers’ discovery brings us a step closer to making haematopoietic stem cells in the laboratory, which would be of enormous therapeutic benefit in cancer and other diseases.

6 **The UNSW 2015 Eureka Prize for Scientific Research**

Dr Georgina Hollway, who leads the Breast Cancer Biology research group, was awarded the prestigious UNSW Eureka Prize for Scientific Research.

Dr Qian Du and Robert Shearer, winners of the 2015 Stuart Furler Travel Awards.

Congratulations to Qian Du and Robert Shearer, winners of the 2015 Stuart Furler Travel Awards. Qian will use her award to attend the ‘Epigenetics & Chromatin’ meeting in New York to present and discuss her epigenetics research with colleagues actively working in the same research areas.

Robert will use his award to attend the ‘Cilia, Cytoskeleton and Cancer Meeting’ in Edinburgh to present his research. He will then travel to Denmark and England to visit laboratories at the Centre for Protein Research and University of Cambridge respectively.

Established by Mr and Mrs Paul and Judy Hennessy, the Stuart Furler Travel Award supports early career researchers in memory of Dr Stuart Furler. Stuart, a long-serving, respected diabetes researcher at Garvan, sadly passed away from pancreatic cancer in 2007.

7 **The 2015 NSW iAwards**

Dr Seán O’Donoghue and a team of Garvan and CSIRO scientists won first prize in the 2015 NSW iAwards for Aquaria. The iAward recognises the achievements of home-grown Australian innovators at the cutting edge of technology innovation. A new web application, Aquaria is designed to provide biologists with a simplified process for using 3D structures to obtain insight into the molecular mechanisms underlying protein function.

8 **2015 Stuart Furler Travel Award**

Congratulations to Qian Du and Robert Shearer, winners of the 2015 Stuart Furler Travel Awards.

Qian will use her award to attend the ‘Epigenetics & Chromatin’ meeting in New York to present and discuss her epigenetics research with colleagues actively working in the same research areas.

Robert will use his award to attend the ‘Cilia, Cytoskeleton and Cancer Meeting’ in Edinburgh to present his research. He will then travel to Denmark and England to visit laboratories at the Centre for Protein Research and University of Cambridge respectively.

Established by Mr and Mrs Paul and Judy Hennessy, the Stuart Furler Travel Award supports early career researchers in memory of Dr Stuart Furler. Stuart, a long-serving, respected diabetes researcher at Garvan, sadly passed away from pancreatic cancer in 2007.
Leaders in Science and Society Seminars are hosted at Garvan on a regular basis and aim to engage, educate and inspire our staff and students. Seminars feature renowned specialists from all over the world, and a variety of organisations.

The 2015 Leaders in Science and Society Seminars featured:

**FEBRUARY**

**Professor Mark Caulfield**  
Chief Scientist, Genomics England  
“The 100,000 Genomes Project.”

**MARCH**

**Professor Christopher Goodnow**  
Deputy Director, Garvan Institute of Medical Research  
“Surfing between whole body systems, cells and genes: if you’re not falling off, you’re not getting better.”

**Professor David Ryugo**  
Hearing Research, Garvan Institute of Medical Research  
“Hearing and the brain: making sense of sound, hearing loss and brain plasticity.”

**Professor Olivier Pourquié**  
Professor at Harvard Medical School and the Brigham and Women’s Hospital  
“Development of the musculo-skeletal axis.”

**Associate Professor Geoff Faulkner**  
University of Queensland  
“Jumping genes in the brain: a hidden layer dictating neuronal phenotype.”

**Professor Juris J Meier MD**  
Head, Division of Diabetology and GI Endocrinology St. Josef-Hospital of the Ruhr-Universität Bochum (RUB), Germany  
“Pancreatic and extra-pancreatic effects of GLP-1.”

**APRIL**

**Associate Professor Daniel Christ**  
Head, Antibody Therapeutics, Garvan Institute of Medical Research  
“Engineering of the human antibody repertoire.”

**Daniel Petre**  
Garvan Institute Board Member  
“The impact of Technology on Everything.”

**Professor Matthias von Herrath**  
Vice President and Head Diabetes R&D Center, Novo Nordisk  
“New and unexpected insights into the histopathology of Type 1 and 2 diabetes and therapeutic considerations.”

**MAY**

**Dr Alex Swarbrick**  
Head, Tumour Progression, Garvan Institute of Medical Research  
“Tumours as ecosystems.”

**JUNE**

**Professor Nicholas Hayward**  
Senior Scientist QIMR Berghofer  
“The Australian melanoma genome project.”

**Professor Ian Jacobs**  
President and Vice-Chancellor of UNSW Australia  
“The good, the bad and the ovary: UNSW strategy, challenges for higher education and ovarian cancer screening.”
Professor Stephen Nutt  
Division Head, Molecular Immunology, Walter and Eliza Hall Institute  
“Cell fate decisions in the immune system.”

JULY

Professor Alain Fischer  
Hospital Necker (Paris)  
“A reductionist view of T cell immunology based on the study of primary immunodeficiencies.”

AUGUST

Professor Sally Dunwoodie  
Head, Embryology Lab, Victor Chang Cardiac Research Institute  
“Identifying genetic and environmental factors causing developmental defects in humans and mice.”

The Hon Michael Kirby AC CMG  
Former Justice of the High Court of Australia  
“After the bench!”

Dr John Schubert AO  
Chair of the Garvan Institute Board  
“The Chinese curse: “may you live in interesting times”.”

Professor Joe Trapani  
Director, Cancer Research Division and Head, Cancer Immunology Program, Peter MacCallum Cancer Centre  
“Perforin, immunoregulatory functions and structure/function relations.”

SEPTEMBER

Professor Paul Griffiths  
Associate Academic Director (Arts and Social Sciences), Charles Perkins Centre, University of Sydney  
“The concept of information in molecular bioscience: from Crick’s central dogma to systems biology.”

Professor Jonathan Sprent  
Head, Cellular Immunity, Garvan Institute of Medical Research  
“Cell membrane exchange: from immunoglobulin on T cells to immunotherapy.”

Professor Vanessa Hayes  
Head, Human Comparative and Prostate Cancer Genomics, Garvan Institute of Medical Research  
“Next generation mapping.”

OCTOBER

Professor Carolyn Sue  
Professor, University of Sydney / Director, Department of Neurogenetics, Royal North Shore Hospital  
“Mitochondria in health and disease.”

Professor Samuel Klein  
Director, Center for Human Nutrition, Washington University  
“Obesity and nonalcoholic fatty liver disease.”

Professor Rodney Phillips  
Dean of Medicine, UNSW Australia  
“Darwin’s legacy.”

NOVEMBER

Professor Jane Visvader  
Joint Division Head, Stem Cells and Cancer, Walter and Eliza Hall Institute  
“Unravelling breast cancer using the mammary epithelial hierarchy.”

Professor Peter Vogt  
Executive VP and Chief Scientific Officer, Scripps Research Institute  
“MYC and the non-coding transcriptome.”

Professor Rob Parton  
Group Leader, Cell Biology and Molecular Medicine Division, Institute for Molecular Bioscience, University of Queensland  
“Cave exploration at the nanoscale; new insights into the structure and function of caveolae.”

Dr Keith McLean  
Manufacturing Flagship Director, CSIRO  
“Implantable materials for medical devices, tissue engineering and drug delivery.”

Professor David Bowtell  
Head, Ovarian Cancer Research, Garvan Institute of Medical Research  
“Insights into the molecular biology of primary, recurrent and end-stage high grade serous ovarian cancer from the Australian Ovarian Cancer Study.”
Partners for the Future are a group of special people who have let us know of their decision to include Garvan in their Will.

The foresight, generosity and commitment of Partners for the Future allows us to plan the future of the Institute with confidence and security.

Thank you to all our valued Partners for the Future for your support. It’s a significant factor in allowing Garvan’s researchers to continue their study into some of the most widespread diseases affecting our community today.

2015 Partners for the Future

Mrs Margaret Adams
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Ms Heather Adie
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Mr Peter Askew
Miss Margaret Atkinson
Dr W Michael Baker
Mr Peter Bolton and
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In Memory of Patricia
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and Mrs Deborah Johnston
Mrs Barbara Jones
Mrs Florence Jones
Mr & Mrs Terry and
Helen Jones
Mr & Mrs Patrick and
Beryl Keane
Warwick & Carole Kendall
Mrs Isabel (Rae) Kennedy
Ms Wendy Keys
Mrs Kate Khan
Mr Frank Killion
I think the greatest gift anyone can give is the gift of good health. If you don’t have good health, you really don’t have anything. You realise this as you get older, when you’re young you don’t think about it. When you leave a bequest in your Will to the Garvan Institute, you facilitate the gift of good health, whether it is a gift to ‘somebody’ or society generally.

Garvan is doing some wonderful work trying to both prevent diseases and manage diseases. I wish that everybody would think about leaving a bequest to Garvan - you don’t have to leave everything you have to Garvan, but at least give something. This would be a wonderful legacy you can give to your loved ones and mankind.

Ms Claire Greaves, Partner for the Future and Volunteer.

How the Garvan Research Foundation and I found each other ...

In early 2013, I attended a remembrance service for an old friend who had recently died from pancreatic cancer. My friend’s family offered to attendees at the service Garvan donation envelopes. At that time I was not aware of the extent of Garvan’s cancer research work. However, my sending to Garvan of the donation envelope caused the sending to me of much valuable information concerning Garvan and it’s cancer research activities.

Around mid-2013 when I was reviewing my Will I thought that although I live in Cairns, that I should make the effort and accept the invitation from Carol O’Carroll, Garvan’s Bequest Relationship Manager, to visit the Garvan research facilities in Sydney to actually see the research work I had been reading so much about. In due course, Carol arranged for me a tour of Garvan’s most extensive cancer research buildings situated in Darlinghurst close to St Vincent’s Hospital.

I was completely overwhelmed by what I saw of Garvan’s cancer research facilities. I immediately decided to include a significant bequest to Garvan in my Will. I also decided that I would make contributions during my lifetime towards Garvan’s cancer research efforts with the establishment of the Patricia Helen Guest Fellowship, in memory of my beloved wife.

Mr Trevor Guest,
Partner for the Future and Donor.
The Bill and Patricia
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Mr Graeme Roache
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Mros Gloria Rolfe
Romanian-Australian
Cultural Society
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Mr William Alan Walker
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Niall Byrne
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Gordon Eckel
Georgina Hanrowell
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Tom Morgan
Christopher Nasser
Lucia Rosbon
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O Bar and Dining
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Orozon
Greg Paramor
Paspaley
Perpetual
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Beryl Menaya Hayhow
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Mabs Melville
In Memory of Mr & Mrs
Mary and Herbert Morris
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Cheryl Anne Rose
Hilma Ann Simon
Lillian Ethel Thomas
Vera Zukerman
Partners for the Future
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<td>Ashley Buckle (Monash University, Vic)</td>
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<td>Avner Pancreatic Cancer Foundation Ltd</td>
<td>Accelerator Grant</td>
<td>Anthony Gill</td>
<td>Lorraine Chantrill (Campbelltown Hospital, NSW), Nic Waddell (QIMR Berghofer, Qld), Nik Zeps (St John of God Healthcare, WA), Marina Pajic, Amber Johns</td>
<td>The Australian Pancreatic Cancer Genome Project</td>
<td>$890,093</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Innovation Grant</td>
<td>Marina Pajic</td>
<td>-</td>
<td>Immunology and anti-invasive treatments for pancreatic cancer: A new therapeutic partnership</td>
<td>$100,000</td>
<td>1</td>
</tr>
<tr>
<td>Cancer Australia</td>
<td>Project Grant</td>
<td>Marina Pajic, Paul Timpson, Anthony Gill, Stephen Clarke (University of Sydney), Andrew Burgess, Jas Samra (Royal North Shore Hospital, NSW)</td>
<td>-</td>
<td>From mice to men: biomarker-driven classification of pancreatic cancer to define the gemcitabine/nab-paclitaxel responsive molecular subtype</td>
<td>$600,000</td>
<td>3</td>
</tr>
<tr>
<td>Cancer Council NSW</td>
<td>Project Grant</td>
<td>Elgene Lim, Wayne Tilley (University of Adelaide, SAI), Teresa Hickey (University of Adelaide, SAI), Jason Carroll (Cambridge University, UK)</td>
<td>-</td>
<td>A novel approach to overcome treatment resistance in breast cancer</td>
<td>$600,000</td>
<td>3</td>
</tr>
<tr>
<td>Diabetes Australia Research Trust</td>
<td>Research Grant</td>
<td>Dorit Samocha-Bonet, Jerry Greenfield</td>
<td>-</td>
<td>Body acid/base balance and insulin resistance in obesity</td>
<td>$60,000</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Research Grant</td>
<td>Nikki Lee, Herbert Herzog</td>
<td>-</td>
<td>Osteoglycin, a novel regulator of glucose homeostasis</td>
<td>$60,000</td>
<td>1</td>
</tr>
</tbody>
</table>
Below is a list of the peer reviewed grants, collaborative grants and equipment grants awarded to Garvan researchers or their collaborators in 2015.

<table>
<thead>
<tr>
<th>Funding Body</th>
<th>Type of Grant</th>
<th>Principal Investigator</th>
<th>Co-investigators</th>
<th>Project Title</th>
<th>Amount Awarded</th>
<th>Years Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Trustees</td>
<td>Research grant</td>
<td>Phillippa Taberlay</td>
<td>Adele Woodhouse (University of Tasmania), Timothy Mercer</td>
<td>Charting epigenetic reprogramming in Alzheimer's disease mice</td>
<td>$50,020</td>
<td>1</td>
</tr>
<tr>
<td>Department of Health, WA</td>
<td>Research grant</td>
<td>Marcel Dinger</td>
<td>Tudor Groza, Andreas Zankl, Craig McNamara</td>
<td>The Patient Archive</td>
<td>$75,000</td>
<td>1</td>
</tr>
<tr>
<td>National Breast Cancer Foundation</td>
<td>Innovator Grant</td>
<td>Els Meuwen (Monash University, Vic), Suresh Mathivanan (La Trobe University)</td>
<td></td>
<td>Identification of breast cancer subtype-specific tumour antigens using the local immune response</td>
<td>$200,000</td>
<td>1</td>
</tr>
<tr>
<td>National Health and Medical Research Council</td>
<td>Project Grant</td>
<td>Robert Brink</td>
<td>Tri Phan, Daniel Christ</td>
<td>Positive and negative selection in the germinal centre reaction</td>
<td>$1,289,965</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Christopher Goodnow</td>
<td>Maria Craig (UNSW Australia), Tony Roscioli, Thomas Andrews (ANU, ACT), Jenny Gunton (University of Sydney), Elissa Deenick, Melanie Wong (Sydney Children's Hospital, Westmead NSW), Stephen Daley (Monash University, Vic), Paul Grey (UNSW Australia), Juliana Teo (Sydney Children's Hospital, Westmead NSW)</td>
<td>De novo mutations and the pathogenesis of childhood-onset autoimmune disease</td>
<td>$1,496,510</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Herbert Herzog</td>
<td>Paul Baldock</td>
<td>RANKL, a critical new player in the coordination of whole body energy homeostasis</td>
<td>$842,946</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Jacqueline Center</td>
<td>Lyn March (University of Sydney), Judy Simpson (University of Sydney)</td>
<td>Premature mortality post fracture: A NSW linked data study</td>
<td>$391,012</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Timothy Mercer</td>
<td>Devinder Gill (University of Queensland), Jim Blackburn</td>
<td>A universal clinical test for gene fusions in blood cancer</td>
<td>$628,001</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Alex Swarbrick</td>
<td>Jason Carroll (Cambridge University, UK), Mark Cowley, Sandra O'Toole</td>
<td>Mechanistic and functional analysis of the Id4 proto-oncogene in breast and ovarian cancer</td>
<td>$693,983</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Paul Timpson</td>
<td>Jennifer Morton (Beacon Institute, UK), Yingxiao Wang (University of California San Diego, USA), Marina Pajc</td>
<td>Single-cell optical window imaging in CDK1-FRET biosensor mice to assess tissue stiffness and optimise delivery and therapeutic response to Gemcitabine/Abraxane in pancreatic cancer</td>
<td>$676,979</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Project Grant</td>
<td>Tatyana Chitanova</td>
<td></td>
<td>The role of tumour-egressing T cells in anti-tumour immune responses</td>
<td>$603,333</td>
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Continued over…
### Garvan-led grants (continued)

<table>
<thead>
<tr>
<th>Funding Body</th>
<th>Type of Grant</th>
<th>Principal Investigator</th>
<th>Co-investigators</th>
<th>Project Title</th>
<th>Amount Awarded</th>
<th>Years Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Health and Medical Research Council (cont.)</td>
<td>Development Grant</td>
<td>Daniel Christ</td>
<td>-</td>
<td>Development of stable human antibody phage display libraries</td>
<td>$539,644</td>
<td>2</td>
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<tr>
<td></td>
<td>Development Grant</td>
<td>Timothy Mercer</td>
<td>David Thomas</td>
<td>Diagnosing chromosomes translocations in solid tumours</td>
<td>$410,997</td>
<td>2</td>
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<tr>
<td></td>
<td>Program Grant</td>
<td>Christopher Goodnow</td>
<td>Stuart Tangye, Robert Brink, Daniel Christ</td>
<td>Pathological and therapeutic antibody production</td>
<td>$9,184,165</td>
<td>5</td>
</tr>
<tr>
<td>Novartis Pharmaceuticals Australia Pty Ltd</td>
<td>Research Grant</td>
<td>Elgene Lim</td>
<td>-</td>
<td>Sensitizing ER+ breast cancer to hormonal therapy</td>
<td>$51,000</td>
<td>2</td>
</tr>
<tr>
<td>Parkinson’s NSW Research Grant</td>
<td>Research Grant</td>
<td>Bryce Vissel</td>
<td>Sandy Stayte</td>
<td>The neuroprotective action of UBP310 in the MPTP mouse model of Parkinson’s Disease</td>
<td>$50,000</td>
<td>1</td>
</tr>
<tr>
<td>Prostate Cancer Foundation of Australia</td>
<td>Project grant</td>
<td>Kate Mahon</td>
<td>-</td>
<td>Docetaxel resistance in advanced metastatic prostate cancer</td>
<td>$450,000</td>
<td>3</td>
</tr>
<tr>
<td>St Vincent’s Clinic Foundation Research Grant</td>
<td>Research Grant</td>
<td>Jerry Greenfield</td>
<td>Jacqueline Center</td>
<td>Insulin resistance and fracture risk in the Dubbo Osteoporosis Epidemiology Study</td>
<td>$50,000</td>
<td>1</td>
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<tr>
<td>Sydney Catalyst</td>
<td>Seed Funding</td>
<td>David Croucher</td>
<td>Neil Watkins, Sandra O’Toole, Dr Vinod Ganju</td>
<td>Identifying mutations that drive chemoresistance in luminal-type breast cancer</td>
<td>$45,000</td>
<td>1</td>
</tr>
<tr>
<td>The Leona M and Harry B Helmsley Charitable Trust</td>
<td>Research grant</td>
<td>Christopher Goodnow</td>
<td>Maria Craig (UNSW Australia)</td>
<td>De novo mutations as drivers of Type 1 diabetes</td>
<td>US$122,348</td>
<td>1</td>
</tr>
</tbody>
</table>
# Collaborative grants led by other institutions

<table>
<thead>
<tr>
<th>Funding Body</th>
<th>Type of Grant</th>
<th>Administering Institution</th>
<th>Garvan Investigator(s)</th>
<th>Co-investigators</th>
<th>Project Title</th>
<th>Amount Awarded</th>
<th>Years Funded</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Juvenile Diabetes Research Foundation</strong></td>
<td>Project Grant</td>
<td>Westmead Hospital, University of Sydney</td>
<td>Shane Grey</td>
<td>Phil O’Connell (Principal Investigator), Jenny Gunton</td>
<td>Expanding the criteria for human islet transplantation by the development of a drug-free immunosuppressive protocol</td>
<td>$3,300,000</td>
<td>1</td>
</tr>
<tr>
<td><strong>Liddy Shriver Sarcoma Initiative</strong></td>
<td>Project Grant</td>
<td>University of British Columbia, Canada</td>
<td>David Thomas</td>
<td>Torsten Nielsen (Principal investigator), Jean-Yves Blay (Centre Léon Bérard, France), Elizabeth Demicco (Icahn School of Medicine at Mount Sinai, USA), Robert Maki (Icahn School of Medicine at Mount Sinai, USA)</td>
<td>ImmunoSarc</td>
<td>$80,000</td>
<td>2</td>
</tr>
<tr>
<td><strong>National Health and Medical Research Council</strong></td>
<td>Project Grant</td>
<td>UNSW Australia</td>
<td>Marcel Dinger</td>
<td>Tao Liu (Principal investigator)</td>
<td>Functional characterization and therapeutic targeting of the novel long noncoding RNA MYCN-AS</td>
<td>$646,979</td>
<td>3</td>
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<tr>
<td></td>
<td>Project Grant</td>
<td>Walter and Eliza Hall Institute</td>
<td>David Thomas, Tim Mercer</td>
<td>Tony Papenfuss (Principal investigator)</td>
<td>Mechanistic and functional drivers of neochromosome evolution</td>
<td>$445,262</td>
<td>3</td>
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</table>

# Equipment grants

<table>
<thead>
<tr>
<th>Funding Body</th>
<th>Investigators</th>
<th>Project Title</th>
<th>Amount Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cancer Institute NSW</strong></td>
<td>David Croucher, Neil Watkins, Peter Croucher, Mike Rogers, Paul Timpson, Marina Pajic, Nigel Turner (UNSW Australia), Darren Saunders (UNSW Australia)</td>
<td>Harnessing multiplexing technology to advance personalised medicine (Bio-Plex MAGPIX System)</td>
<td>$51,983</td>
</tr>
<tr>
<td>Christopher Goodnow</td>
<td>Christopher Goodnow, David Thomas, Murray Norris (Children’s Cancer Institute, NSW), Chris Ormandy, Susan Clark, Peter Croucher, Stuart Tangye, Marcel Dinger, Alexander Swarbrick, David Gallego-Ortega</td>
<td>Single cell genomics for cancer research (Milenyi Tyto, Fluidigm C1, NextSeq 500)</td>
<td>$500,000</td>
</tr>
<tr>
<td>Warren Kaplan</td>
<td>Warren Kaplan, Marcel Dinger, Glenn Marshall (Sydney Children’s Hospital), Kerrie McDonald (UNSW Australia), Pablo Moscato (University of Newcastle), David Thomas, Anna deFazio (University of Sydney)</td>
<td>Standardised genome analyses for every cancer researcher in NSW (Intel computer server)</td>
<td>$495,000</td>
</tr>
</tbody>
</table>
## Profit and Loss Statement

### REVENUE 2015 ($'000) | 2014 ($'000)

<table>
<thead>
<tr>
<th>Research grants</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>NHMRC research grants</td>
<td>18,140</td>
<td>15,393</td>
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<tr>
<td>Other peer-reviewed research grants</td>
<td>10,485</td>
<td>13,319</td>
</tr>
<tr>
<td>Other grants</td>
<td>2,476</td>
<td>1,577</td>
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<tr>
<td>Commercial partnerships</td>
<td>595</td>
<td>495</td>
</tr>
<tr>
<td><strong>Total research income</strong></td>
<td><strong>31,696</strong></td>
<td><strong>30,784</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>NHMRC and UNSW Infrastructure grants</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NHMRC IRIISS grant</td>
<td>3,320</td>
<td>2,897</td>
</tr>
<tr>
<td>UNSW contribution</td>
<td>551</td>
<td>615</td>
</tr>
<tr>
<td><strong>Total infrastructure support</strong></td>
<td><strong>3,871</strong></td>
<td><strong>3,512</strong></td>
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</table>

<table>
<thead>
<tr>
<th>NSW Government support</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5,844</td>
<td>9,105</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Donations and bequests</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>49,359</td>
<td>21,622</td>
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</table>

<table>
<thead>
<tr>
<th>Other income</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility charges</td>
<td>10,472</td>
<td>7,053</td>
</tr>
<tr>
<td>Investment/interest income</td>
<td>4,888</td>
<td>2,847</td>
</tr>
<tr>
<td>Net gain on disposal of property, plant and equipment</td>
<td>0</td>
<td>266</td>
</tr>
<tr>
<td>Net gain on interest swap derivative not qualifying as hedges</td>
<td>153</td>
<td>53</td>
</tr>
<tr>
<td>Share of gain of associates accounted for using the equity method</td>
<td>589</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total other income</strong></td>
<td><strong>16,103</strong></td>
<td><strong>10,220</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPENDITURE 2015 ($'000)</th>
<th>2014 ($'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment expenses</td>
<td>46,315</td>
</tr>
<tr>
<td>Direct research costs</td>
<td>14,175</td>
</tr>
<tr>
<td>Depreciation and amortisation</td>
<td>12,594</td>
</tr>
<tr>
<td>Administration</td>
<td>4,787</td>
</tr>
<tr>
<td>Fundraising*</td>
<td>2,914</td>
</tr>
<tr>
<td>Building operations</td>
<td>5,528</td>
</tr>
<tr>
<td>Net loss on disposal of property, plant and equipment</td>
<td>4</td>
</tr>
<tr>
<td>Share of losses of associates accounted for using the equity method</td>
<td>0</td>
</tr>
<tr>
<td>Finance costs</td>
<td>1,083</td>
</tr>
</tbody>
</table>

| **TOTAL EXPENDITURE** | 87,400 | 79,961 |

| TOTAL COMPREHENSIVE INCOME FOR THE YEAR | 19,473 | (4,717) |

* Fundraising costs exclude employment expenses.
The Statement of Financial Position provided above, together with the attached Income Statement, have been extracted from the audited general purpose financial statements of Garvan Institute of Medical Research and its controlled entities. The summary financial information does not include all the information and notes normally included in a statutory financial report. The audited general purpose financial report can be obtained upon request to the Chief Operating Officer.

The statutory financial report (from which the summary financial information has been extracted) has been prepared in accordance with the requirements of the Corporations Act 2001, Australian Charities and Non-for-profits Commission Act 2012 and Regulations 2013, Australian Accounting Standards and other authoritative pronouncements of the Australian Accounting Standards Board.
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Garvan Institute of Medical Research -
ABN: 62 330 391 937

Garvan Research Foundation -
ABN: 91 042 722 738

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Australian Academy of Science and
Kevin Hogan.

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Copies of the Annual Report
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