ANNUAL REPORT 2018

Raine Medical Research Foundation

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RAINE MEDICAL RESEARCH FOUNDATION

“The net income of the Fund shall be applied towards seeking, diagnosing and investigating the nature, origin and causes of diseases in human beings, with the initial emphasis on arteriosclerosis and allied diseases, and the prevention, cure, alleviation and combating of such diseases.”

Clause 3(b) of the Deed of Trust

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ABOUT THE FOUNDATION


Mary Raine
(1877-1960)

For more than 60 years, the Raine Medical Research Foundation has been supporting medical researchers to answer questions that save and improve lives. The Raine Foundation was established by a generous bequest from Mary Raine, an astute businesswoman who owned a large portfolio of properties and hotels in WA, including the Wentworth and Windsor Hotels. Mary was devastated when her husband, Joe, died prematurely from a sudden and severe stroke at the age of 67. She couldn't understand why doctors couldn't save him and wanted to do more to help others avoid the terrible loss of their loved ones to diseases such as arteriosclerosis. In August 1957, Mary Raine signed the Deed of Trust bequeathing her property empire to the University of Western Australia for the purpose of funding medical research. The Raine Medical Research Foundation represents the largest bequest received by the University for medical research.

Through the generosity and vision of this remarkable woman, the Raine Medical Research Foundation has been able to support cutting-edge research that has investigated some of the most challenging diseases and disorders facing the world today – including cancer, osteoporosis, diabetes, renal failure and cardiovascular disease. The Foundation has allocated close to $50mill towards medical research to-date in support of two Centres of Excellence, major research grants, fellowships, scholarships, collaboration awards, publication prizes, and the visits of international scholars. Our funding programs have been further enhanced through many productive partnerships and joint ventures, and generous bequests and donations from the community.

The Raine Foundation has a strong reputation for ensuring thorough and equitable grant review processes and prides itself on supporting medical research excellence. Importantly, our funding strategy recognises the need to support the next generation of WA medical research leaders. The achievements of our previous awardees are testament to the rigour of our grant review processes and reinforce the critical need for early-career support.

OUR FUNDING STRATEGY FOR 2018

Mary's Vision
The Raine Foundation's strategic objectives are based on Mary's vision of "seeking, diagnosing and investigating the nature, origin and causes of diseases in human beings, and the prevention, cure, alleviation and combating of such diseases".

Research Excellence
We strive to ensure research excellence, by continuously reviewing and improving our grant review processes, which are renowned in the research community as being robust, transparent and equitable.

The Next Generation
Our funding strategy for 2018 recognises the need to support the next generation of WA medical researchers to become our future research leaders.

OUR FUNDING PROGRAMS

Priming Grants
For early-career researchers to develop research independence and leadership, while building their skills and track record so that they are competitive for national and international funding.

Clinician Research Fellowships
For clinicians, nurses and allied health professionals to establish a research career while still maintaining their clinical role, to increase their impact on WA health outcomes.

Research Collaboration Awards & Publication Prizes
To facilitate the development of new collaborations and projects with national and international partners, and the dissemination of research findings.

Visiting Professor Awards
To facilitate the visits of national and international distinguished research scholars to Western Australia to disseminate their knowledge and skills through collaborative research projects, workshops, lectures, training and mentoring.

$1,105,788.85
Priming Grants

$1,569,383
Clinician Research Fellowships

$120,325.05
Research Collaboration Awards & Publication Prizes

$38,404
Visiting Professor Awards

$66,500
Raine Study

Total $2,900,400.90

CHAIR'S REPORT

It is with great pleasure that I present to you the 2018 Annual Report of the Raine Medical Research Foundation, including the activities of the Healy Medical Research Foundation.

2018 was a significant year for the Raine Foundation as we welcomed a new Director, Dr Amanda Cleaver, to the Raine Management Office. I would like to take this opportunity to thank Lyn Ellis, who was Raine Director for 23 years and retired at the end of 2017. She has done a wonderful job in handing over the reins to Amanda, which made for a seamless transition in the operations of the Raine Foundation.

The Raine Foundation has continued to provide programs that support research excellence in WA, and particularly in support of early-career researchers. The Foundation has strengthened its partnerships and funding programs throughout 2018, with a total funding distribution that has grown to over $2.9mill. This includes $38,856 distributed towards Research Collaboration Awards by the Healy Medical Research Foundation. Our sincerest thanks go to our generous partners and donors who share the Foundation's vision of achieving better health outcomes for WA. Our major partners and supporters for 2018 include the WA Department of Health, the University of Western Australia, the BrightSpark Foundation, the Jon and Caro Stewart Family Foundation, Charter Hall and the Rigby family. This continued support has allowed us to expand the number of research projects supported in 2018.

The Raine Priming Grant program is one of our most prestigious programs and offers project and salary support for early-career researchers to work towards developing an independent research career. The top applicant, Dr Chris Brennan-Jones from the Wesfarmers Centre for Vaccines and Infectious Diseases, was named the Raine/Robson Fellow. Dr Naomi Scott from the Telethon Kids Institute was named the Stewart/BrightSpark Fellow for her research in the area of child health looking at maternal inflammation and its effects on the neuro-immune development in offspring. This was the first year that we have also awarded the title of Raine/Cockell Fellow, which went to Dr Lisa Martin from UWA, for her research in the area of mental illness, specifically investigating coping mechanisms and resources for burn injury patients.

One of our most successful and long-standing partnership programs, the Clinician Research Fellowships, continued in 2018 for round 7. This program was established by the WA Department of Health in partnership with the Raine Foundation. The quality of applications, the research outcomes produced, and the feedback we receive from successful applicants are testament to the importance of this program in facilitating clinicians to conduct meaningful research that impacts on WA health outcomes. This program has been a great success, with a total distribution of over $7.8mill to 30 clinician researchers in WA.

Another strong focus of the Foundation is the facilitation of collaborative research. In 2018 we offered Research Collaboration Awards for early-career researchers, and Awards in the areas of child health and mental illness that were supported by the Healy Foundation, the BrightSpark Foundation and UWA (Cockell Bequest). Publication Prizes were also offered for top publications, to facilitate conference travel and research collaboration. Lastly, our longest standing program, the Raine Visiting Professor Awards, supported distinguished and internationally acclaimed Professors to visit WA. During their stay, these Professors work collaboratively with WA researchers and disseminate knowledge and skills that benefit all in the research community. In 2018 we were honoured to welcome Professors from leading Universities and Institutions, such as Boston University (USA), the University of Ottawa (Canada), and The University of Melbourne (Australia). We also welcomed our first Charter Hall Visiting Postdoctoral Scholar from Politecnico di Milano (Italy), thanks to the generous support of the Charter Hall Group.

The Raine Foundation prides itself on its robust and equitable grant review processes to ensure that the very best research is supported. However, none of this would be possible without the many people who volunteer their time and expertise on our local Committees and for external review. Thanks go to our Finance and Strategic Review Committee members and the UWA Treasury and Investments team who have ensured the ongoing growth of the Foundation. I also extend thanks to the many researchers, clinicians, and partners who generously volunteer their time on our Research Committees, Scientific Advisory Panels, and for external review. Special mention goes to Professor Alice Vrielink, who finished up in her role on the Raine and Healy Research Committees and the Raine Priming Grant Advisory Panel at the end of 2018. We are thankful for the wealth of expert guidance and leadership provided by our committee members in ensuring that the Foundation continues to support research excellence and the next generation of research leaders in WA.

PROFESSOR ROBYN OWENS
Chair, Raine Medical Research Foundation

GOVERNANCE

RESEARCH COMMITTEE

The Raine Medical Research Foundation and the Healy Medical Research Foundation are governed in accordance with the requirements of their respective Deeds of Trust. This includes the composition of the Research Committee.

The 2018 Research Committee consisted of the following members:

PROFESSOR ROBYN OWENS *(Chair)*
Deputy Vice Chancellor (Research) The University of Western Australia

PROFESSOR ARON CHAKERA
Fellow, Royal Australasian College of Physicians

PROFESSOR DAVID JOYCE
Professor of Medicine The University of Western Australia

MR PETER SMITH
Fellow, Royal Australasian College of Surgeons

PROFESSOR JEFF HAMDORF
Professor of Surgery The University of Western Australia

DR RICHARD CHOONG
General Practitioner, Australian Medical Association WA branch

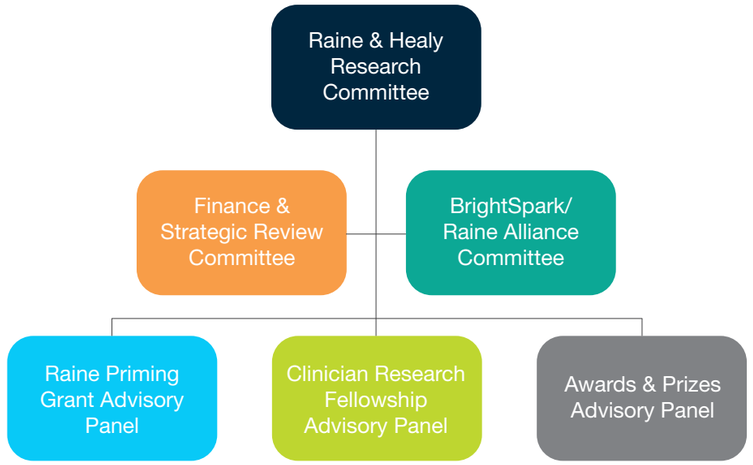
PROFESSOR ALICE VRIELINK
Professor of Biochemistry The University of Western Australia

MR GARRY PRENDIVILLE
Financial Consultant, Research Committee nominee

RAINE MANAGEMENT OFFICE

DR AMANDA CLEAVER
Director

GOVERNANCE STRUCTURE



MEMBERS

Professor Garry Allison Curtin University	**Professor Lindy Fitzgerald** Curtin University	**Professor Robyn Owens** The University of Western Australia Chair, Raine & Healy Research Committee Chair, Awards & Prizes Advisory Panel
Mr Geoff Anderson BrightSpark Foundation	**Dr Archa Fox** The University of Western Australia	**Professor Andrew Page** The University of Western Australia
Mr Tony Barber BrightSpark Foundation	**Professor Jeff Hamdorf** The University of Western Australia	**Mr Garry Prendiville** Financial Advisor Chair, Finance & Strategic Review Committee
Professor Hugh Barrett The University of Western Australia	**Ms Jodie Hegarty** WA Department of Health	**Mr Peter Smith** Royal Australian College of Surgeons
A/Professor Aron Chakera Royal Australian College of Physicians	**Professor Gerard Hoyne** The University of Notre Dame	**Dr Phil Stumbles** Murdoch University
Dr Richard Choong Australian Medical Association	**Ms Anita John** WA Department of Health Chair, Clinician Research Fellowship Advisory Panel	**Mr Andrew Thompson** BrightSpark Foundation
Dr Amanda Cleaver Raine Medical Research Foundation Director	**Professor David Joyce** The University of Western Australia	**Professor Alice Vrielink** The University of Western Australia
Dr Andrew Currie Murdoch University	**Professor Brendan McQuillan** The University of Western Australia	**Professor Anne Williams** Murdoch University
Professor Elizabeth Davis BrightSpark Foundation	**A/Professor Steven Mutsaers** The University of Western Australia Chair, Raine Priming Grant Advisory Panel	**A/Professor Lisa Wood** The University of Western Australia
Mr Graham Dowland BrightSpark Foundation. Chair, BrightSpark/Raine Alliance	**Professor Anna Nowak** The University of Western Australia	

OUR DONORS AND PARTNERS

The BrightSpark Foundation has a proud history of supporting child health research in WA. In June 2015, they formed a strategic alliance with the Raine Foundation in order to enhance opportunities for emerging WA scientists to undertake research that improves health outcomes for children.

The Charter Hall Group, one of Australia's leading property developers, led the Raine Square redevelopment project which concluded in 2019. During the redevelopment, they have generously focused their fundraising activities on fundraising for the Raine Foundation to support child health research.

The late Edith Elaine Cockell bequeathed a sum of money to the University of Western Australia for the purpose of facilitating research into the cause and treatment of mental illness.

The Healy Foundation was established in 1970 through a generous bequest to the University of Western Australia by the late Patrick Burselum and Mary Estelle Healy, and has a proud history of supporting medical research.

The Stewart Family Foundation has generously donated funds to the BrightSpark Foundation to support early career researcher priming grants in the area of child health.

The Forrest Research Foundation Visiting Fellowship Program provides accommodation at Forrest Hall for distinguished Professors visiting WA. This program has supported the visits of our Raine Visiting Professors since 2018.

The WA Department of Health partnered with the Raine Foundation in 2011 to establish the Clinician Research Fellowship program, to provide support to clinicians who wish to develop their research capability and improve health care outcomes.

RIGBY FAMILY

The Rigby family generously donated funds to support conference travel, networking and research collaboration.

STRACHAN BEQUEST

The late Mary Strachan bequeathed a sum of money for the purpose of funding medical research.

PRIMING GRANTS

Building the next generation of research leaders

The Raine Foundation has a proud history of supporting early-career researchers in Western Australia. The Raine Grants program was first developed in 1989 (30 years ago!), and has now distributed more than $27mill towards medical research. This program has supported the early careers of many of the state's leading researchers, including Professor Fiona Stanley AC (former Director and Patron, Telethon Kids Institute), Professor Peter Klinken AC (Chief Scientist of WA), Professor Fiona Wood AM (Director, Fiona Wood Foundation), Professor John Newnham (Director, Women and Infants Research Foundation), and Professor Peter Leedman (Director, Harry Perkins Institute of Medical Research).

These grants are available to medical scientists and clinicians at an early stage in their research career, particularly those who are progressing towards an independent research career to assist them in becoming more competitive for national and international funding.

Sixteen research projects were in progress in 2018. Seven grants and one travel award were newly awarded to commence in 2019, with a total funding pool of $1,105,788.85. Thank you to our partners the Jon and Caro Stewart Family Foundation, the BrightSpark Foundation, and The University of Western Australia (Cockell Bequest) for their support towards this grant program.

THE JON & CARO STEWART FAMILY FOUNDATION

THE UNIVERSITY OF WESTERN AUSTRALIA

COCKELL BEQUEST

BrightSpark FOUNDATION WESTERN AUSTRALIA

Supporting Research into Child Health

ONGOING PROJECTS

2016 RAINE PRIMING GRANTS

DR GEMMA CADBY
Centre for Genetic Origins of Health and Disease, The University of Western Australia
The association of sleep apnoea and long-term health outcomes in Western Australian adults

DR TRISTAN CLEMONS
School of Molecular Sciences, The University of Western Australia
Nanoparticle aided delivery of lysyl oxidase (LOX) inhibitors for the treatment of scarring

ASSOCIATE PROFESSOR ELIN GRAY
School of Medical and Health Sciences, Edith Cowan University
Genetic analysis of circulating tumour cells and circulating tumour DNA for prognosis of uveal melanoma

DR GRAND ROMAN JOLDES
School of Mechanical Engineering, The University of Western Australia
Towards translating the benefits of patient specific biomechanics into clinical practice

DR ALISON MCDONNELL
School of Biomedical Sciences, The University of Western Australia
Identifying immune biomarkers of response to chemotherapy in thoracic cancers

2017 RAINE PRIMING GRANTS

DR MARK AGOSTINO
School of Pharmacy and Biomedical Science, Curtin University
Structural characterisation of the Wnt signalling pathway

DR KATRINA ELLIS
School of Biomedical Science, The University of Western Australia
Novel aspects of the role of lipoprotein(a) in premature heart disease

DR ASHLEIGH LIN
Telethon Kids Institute, The University of Western Australia
The GENTLE Project (GENder identiTy Longitudinal Experience)

DR MELISSA O'DONNELL
(Stewart/BrightSpark/Raine Project)
Telethon Kids Institute, The University of Western Australia
Alcohol related harm in young people: developing a longitudinal evidence base

DR HELENA VIOLA
School of Human Sciences, The University of Western Australia
A novel approach for the prevention of hypertrophic cardiomyopathy

2018 RAINE PRIMING GRANTS

DR GAIL ALVARES
Telethon Kids Institute, The University of Western Australia
Childhood indicators of adult outcomes: A longitudinal follow-up of the WA Autism Register

DR CHANDRAKUMAR BALARATNASINGAM
Lions Eye Institute, The University of Western Australia
Diabetic retinopathy management through early detection of microvascular changes

DR JONATHAN CHEE
National Centre of Asbestos Related Diseases, School of Biomedical Science, The University of Western Australia
Analysis of T cell receptor diversity in animal models of cancer

DR RACHEL FOONG
School of Physiotherapy and Exercise Science, Curtin University
Examining environmental risk factors for asthma in Western Australia

DR TARA RICHMAN
(BrightSpark/Raine Fellow)
Harry Perkins Institute of Medical Research, The University of Western Australia
Modelling mitochondrial dysfunction in disease

DR YU YU
(Raine/Robson Fellow)
School of Pharmacy and Biomedical Science, Curtin University
Enhancing recurrent ovarian cancer response by inhibiting SYK

RAINE PRIMING GRANTS AWARDED IN 2018

NUMBER OF APPLICATIONS:

37

APPLICANT INSTITUTIONS:
The University of Western Australia
Murdoch University

FIELDS OF RESEARCH:

- Aboriginal and Torres Strait Islander Health
- Bacteriology
- Biomaterials
- Cancer Cell Biology
- Cancer Diagnosis
- Cancer Therapy
- Clinical Nursing
- Emergency Medicine
- Haematological Tumours
- Health, Clinical and Counselling Psychology
- Immunology
- Infectious Agents
- Infectious Diseases
- Intensive Care
- Microbial Genetics
- Otorhinolaryngology
- Paediatrics and Reproductive Medicine
- Rehabilitation and Therapy
- Respiratory Diseases

Number shortlisted for external review:

14

SUCCESSFUL:
(18.9% success rate)

7

AMOUNT AWARDED:

$1,105,788.85

RAINE PRIMING GRANTS AWARDED IN 2018

Dr Chris Brennan-Jones was awarded the Raine/Robson Fellow title for the best project in the round. Dr Brennan-Jones relinquished his grant as he was awarded another grant for the same research project, and was subsequently awarded a $10,000 travel award to facilitate research collaboration and conference attendance.

DR CHRIS BRENNAN-JONES
(Raine/Robson Fellow)
Telethon Kids Institute, The University of Western Australia
Ear Portal: An ear health telehealth portal for Aboriginal children in metropolitan areas
$10,000 travel award

DR STEPHEN MACDONALD
Centre for Clinical Research in Emergency Medicine, The University of Western Australia
Effect of intravenous fluid volume on the pathobiology of sepsis
$150,000

DR EDWARD FYSH
Institute of Respiratory Health, The University of Western Australia
Improving management of pleural effusions in intensive care patients - the ESO-DICE Trial
$115,838

DR LISA MARTIN
(Raine/Cockell Fellow)
Burn Injury Research Unit, The University of Western Australia
Postburn growth and coping: Resources to reframe
$170,000

DR BELINDA GUO
School of Biomedical Sciences, The University of Western Australia
Platelets as a novel blood biomarker for bone marrow fibrosis
$150,000

DR NAOMI SCOTT
(Stewart/BrightSpark Fellow)
Telethon Kids Institute, The University of Western Australia
Attenuation of maternal inflammation to promote normal offspring neuro-immune development
$150,000

DR DANIEL KNIGHT
School of Veterinary and Life Sciences, Murdoch University
One Health: A new paradigm for studying evolution & transmission in Clostridium difficile
$199,950.85

DR ANABEL SOROLLA
Harry Perkins Institute of Medical Research, The University of Western Australia
A novel therapeutic approach to treat triple negative breast cancers
$160,000

RAINE PRIMING GRANT

Centre for Genetic Origins of Health and Disease, The University of Western Australia

2016 - 2018

$168,000

DR GEMMA CADBY

How does obstructive sleep apnoea affect your health?

(The association of sleep apnoea and long-term health outcomes in Western Australian adults)

Dr Cadby is a Research Fellow in the Division of Genetics within the Faculty of Health and Medical Sciences at The University of Western Australia. She received her PhD in Genetic Epidemiology in 2010 from The University of Western Australia and was awarded a Raine Priming Grant to investigate obstructive sleep apnoea (OSA) and its association with poor health outcomes, such as cardiovascular diseases, cancers, diabetes, motor vehicle accidents, and mental health disorders.

The study has found that more women are being diagnosed with OSA, increasing from 10% of patients in 1989 to over 40% in 2013.

The average body mass index has also increased over time, from approximately 32 in 1989 to 34 in 2013. The researchers of the study have also seen a link between the severity of OSA and cancer diagnosis, however this link can be explained by risk factors that are linked to both OSA and cancer, such as age, sex and body mass index.

The findings from this study have led to a publication on the association of OSA with cancer and a report for the Road Safety Commission on the association between OSA and motor vehicle crash-related injury. The study team will continue to research the association between OSA and other complex health issues including psychosis, mortality and cardiovascular disease.

The findings from this study will help to tell us whether the presence and severity of OSA, and its treatment, predicts future risk of problems such as heart attacks, strokes, and cancers, independent of known risk factors.

RAINE PRIMING GRANT

Faculty of Engineering and Mathematical Sciences, The University of Western Australia

2016 - 2018

$200,000

DR GRAND ROMAN JOLDES

Improved imaging to help surgeons perform complicated procedures

(Towards translating the benefits of patient specific biomechanics into clinical practice)

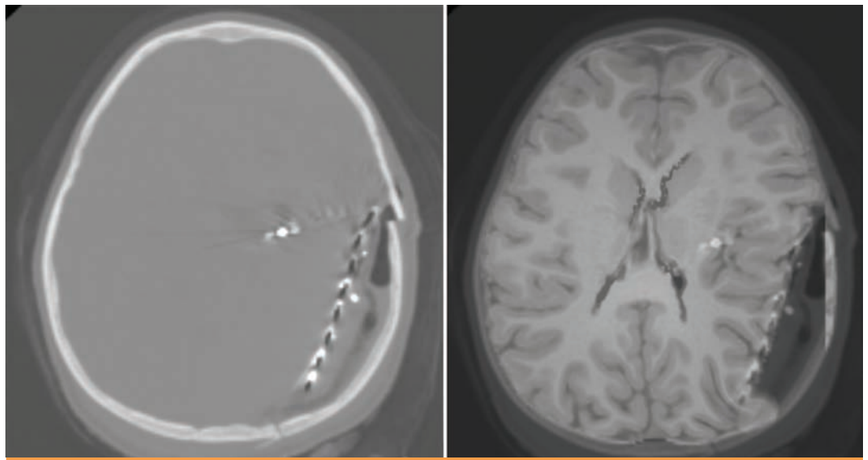
Dr Joldes is a Senior Research Fellow in the Department of Mechanical Engineering within the Faculty of Engineering and Mathematical Sciences at The University of Western Australia. He completed his PhD with Distinction in 2010 and was awarded a Raine Priming Grant to develop algorithms that allow generation of computational models for medical images, as well as robust, fast and accurate solution methods.

There is widespread international concern about the cost of meeting rising expectations for healthcare, particularly if large numbers of people require currently expensive procedures such as brain surgery. The costs can be reduced by using improved machinery to help surgeons perform these procedures quickly and accurately with minimal adverse effects.

A novel partnership between surgeons and machines, made possible by advances in computing and engineering technology, could overcome many of the limitations of traditional surgery. The development of computational algorithms for patient-specific biomechanical modelling has continued during the last 12 months, where these algorithms have been used to solve clinically relevant problems such as brain deformation during electrode implantation for epilepsy treatment and blood flow within abdominal aortic aneurysms.

This study has led to four publications in 2018, supported two successful NHMRC grant applications, and Dr Joldes receiving a UWA Research Collaboration Award that will facilitate continued collaborations with Harvard Medical School.

The findings from this project have the potential to transform current methods and result in great improvements into tools that deliver real outcomes for patients.



Left panel: CT brain image after implantation of electrodes for epilepsy treatment. No details regarding brain structures can be distinguished from this image. MRI imaging is not possible due to the presence of metal electrodes.

Right panel: Preoperative MRI image deformed using a biomechanical model using the displacement introduced by electrodes as input. Computations performed using the algorithms developed by Dr Joldes. The medical data was provided by Harvard Medical School.

CLINICAL RESEARCH FELLOWSHIPS

Enabling clinicians to improve health care outcomes in WA

The Clinician Research Fellowship program was founded in 2012 by the WA Department of Health in partnership with the Raine Medical Research Foundation. The program aims to support talented clinicians and allied health professionals to establish and develop their research careers. The program has now supported 30 Clinician Research Fellowships with a funding commitment of $7.5mill.

Round 7 of the program was opened in 2018, for funding to commence in 2019. Fellowships are only offered to applicants demonstrating excellence in their research field, using highly rigorous and equitable assessment processes. Supported projects aim to bridge the gap between research and clinical translation for improved clinical practice and better health care delivery that will benefit all in the WA community.

There were 11 Clinician Research Fellowships ongoing throughout 2018 from Rounds 3 – 6. In 2018, five Fellowships were awarded for round 7 to commence in 2019, with a total funding allocation of $1,569,383.

Government of **Western Australia**
Department of **Health**

RAINE MEDICAL RESEARCH FOUNDATION

ONGOING PROJECTS

2015 Clinician Research Fellowships (Round 3)

DR EDWARD FYSH
St John of God Midland Public Hospital
Pleural effusions in intensive care patients: The physiological changes and clinical effects of drainage procedure

CLINICAL ASSOCIATE PROFESSOR KWOK-MING HO
Royal Perth Hospital
Detailed assessment of risks and benefits of inferior vena cava filters on patients with complicated injuries (the da Vinci Trial)

ASSOCIATE PROFESSOR THOMAS SNELLING
Princess Margaret Hospital for Children
Improving the West Australian immunisation program

2016 Clinician Research Fellowships (Round 4)

DR MARTIN DE BOCK
Princess Margaret Hospital for Children
Closed loop insulin delivery for patients with type 1 diabetes in free living conditions

DR ANNETTE LIM
Sir Charles Gairdner Hospital
Mechanisms that facilitate the metastatic potential of oral cancer

2017 Clinician Research Fellowships (Round 5)

DR DIMITAR AZMANOV
PathWest
Diagnostic genomics applications for short stature

CLINICAL PROFESSOR WAI LIM
Sir Charles Gairdner Hospital
Improving health outcomes of kidney transplant recipients

CLINICAL PROFESSOR TOBIAS STRUNK
King Edward Memorial Hospital for Women
Can Pentoxifylline improve survival without disability in preterm infants with late-onset sepsis or necrotizing enterocolitis – a pragmatic randomised controlled trial?

2018 Clinician Research Fellowships (Round 6)

DR OYEKOYA AYONRINDE
Fiona Stanley Hospital
The epidemiology, origins and associations of irritable bowel syndrome in adolescents

DR ANDREW MARTIN
Princess Margaret Hospital for Children
Feasibility and acceptability of screening children for inherited hypercholesterolaemia

DR WARREN PAVEY
Fiona Stanley Hospital
Supercooled storage for extended preservation of hearts – a pilot study in a rodent model

CLINICIAN RESEARCH FELLOWSHIPS (ROUND 7) AWARDED IN 2018

NUMBER OF APPLICANT:

17

APPLICANT INSTITUTIONS:
Fiona Stanley Hospital
Child and Adolescent Health Service
Royal Perth Hospital
Sir Charles Gairdner Hospital

FIELDS OF RESEARCH:

- Anaesthesiology
- Cancer Cell Biology
- Cancer Therapy
- Cardiovascular Medicine and Haematology
- Dermatology
- Epidemiology
- Immunology
- Metabolic Medicine
- Nephrology and Urology
- Oncology and Carcinogenesis
- Otorhinolaryngology
- Surgery
- Transplantation Immunology

Number shortlisted for external review:

8

SUCCESSFUL:
29.4% success rate)

5

AMOUNT AWARDED:

$1,569,383

CLINICIAN RESEARCH FELLOWSHIPS (ROUND 7) AWARDED IN 2018

DR NICHOLAS LARKINS
Nephrology, Child and Adolescent Health Service
Optimising paediatric kidney transplantation by better HLA matching
$401,802

A/PROF MUHAMMAD ADNAN KHATTAK
Medical Oncology, Fiona Stanley Hospital
Predictive biomarkers of response and resistance to immunotherapy in cancer
$391,108

DR ANDREW TONER
Anaesthesia, Royal Perth Hospital
Long-term outcomes after lidocaine infusions for postoperative pain
$342,625

A/PROF NIGEL MCARDLE
Pulmonary Physiology and Sleep Medicine, Sir Charles Gairdner Hospital
Relationship between obstructive sleep apnoea and the development of cardiovascular disease
$156,574

DR EDWARD RABY
State Adult Burns Unit, Fiona Stanley Hospital
The CABIN Fever trial
$277,274

CLINICIAN RESEARCH FELLOWSHIP

Sir Charles Gairdner Hospital | 2016 - 2018 | $179,390

DR ANNETTE LIM

Identification of biomarkers associated with cancer spread

(Mechanisms that facilitate the metastatic potential of oral cancer)

Dr Lim is a consultant medical oncologist based at Sir Charles Gairdner Hospital who was awarded a Clinician Research Fellowship to support a laboratory-based research program investigating the use of liquid biopsies in head and neck cancer patients, and the roles of the immune system in the development of more advanced cancers.

Head and neck cancer is the sixth most common cancer worldwide and despite treatment advances, less than 50% of patients are cured. The incidence of oral cavity squamous cell carcinoma (OCSCC) is increasing and predominantly affects young patients (<40 years) who develop tongue cancers without any known risk factors.

Current staging criteria are not consistently able to identify patients with cancers at risk of treatment failure, nodal involvement or metastases. Current methods are also unable to identify premalignant lesions at risk of transformation.

The research project has successfully partnered with ~100 participants, to collect more than 1,200 blood specimens, and 200 tumour specimens over three years with recruitment completed mid-2018.

The outcomes from the project include a publication in The New England Journal of Medicine, conference presentations, a successful Fellowship award, the submission of three additional grants and two fellowship applications, and further healthcare and university collaborations. This research will facilitate the identification of biomarkers that can predict a high risk of developing OCSCC and will significantly revolutionise patient care from a primary to tertiary setting.

Dr Lim is grateful to the WA Department of Health and the Raine Medical Research Foundation for their support through this Fellowship, which has allowed her to perform research that ultimately leads to improvements in patient outcome and utilisation of healthcare resources.

CLINICIAN RESEARCH FELLOWSHIP

Royal Perth Hospital | 2015 - 2018 | $419,013

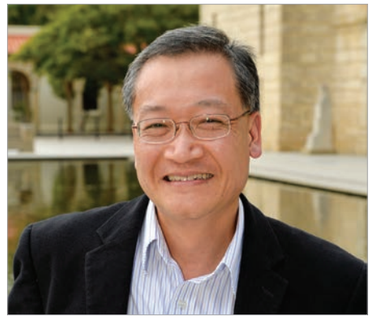
“During Joe’s illness Mary became aware of how dependent medical research was on funding. There was still so much to be learned, but without funding, progress was slow towards solving medical questions that remained unanswered.”

Excerpt from The Mary Raine Story: From Putney to Perth, Meg Sangster

CLINICAL ASSOCIATE PROFESSOR KWOK-MING HO

Preventing migration of blood clots after major injury

(Detailed assessment of risks and benefits of inferior vena cava filters on patients with complicated injuries (the da Vinci Trial)



Clinical Associate Professor Ho is an intensive care specialist at Royal Perth Hospital who was awarded a Clinician Research Fellowship to support the first clinical trial in the world attempting to find out whether putting a filter, made of titanium-nickel alloy, in the great vein of the body can prevent migration of blood clots from the legs to the lungs in patients after major trauma who are at high-risk of bleeding.

The prevention of unwanted blood clots from forming, such as during deep vein thrombosis, in patients after major injury remains one of the most contentious problems in trauma care in past decades. This landmark study showed that having such a filter implanted soon after major trauma can substantially reduce the risk of having blood clots in the lungs of patients who cannot receive blood-thinners within a week from major injury.

The results from this study provide good evidence to guide clinicians on the best way to reduce the harmful effects of having unwanted blood clots and has potential to improve outcomes of many patients with major injury as well as reduce unnecessary health expenditure. The results from this study are expected to be incorporated into the venous thromboembolic prophylaxis guidelines of different medical professional bodies that lead to clinical practice changes in this area worldwide. This study was presented in the ‘Best of the Best’ plenary session at the Shock Society Annual Scientific Meeting in Arizona in June 2018 and in the Gilbert Troup Prize session at the Australian Society of Anaesthetists National Scientific Congress in Adelaide in October 2018. The main manuscript for this project was recently accepted in the highly prestigious New England Journal of Medicine.

Clinical Associate Professor Ho acknowledges the WA Department of Health and the Raine Medical Research Foundation for enabling him to initiate this multicentre study with many other like-minded trauma clinicians and researchers in Australia.
This fellowship has made an enormous difference to his overall research capacity and productivity, extending beyond this specific project to include the opportunity to mentor many research students.

RESEARCH COLLABORATION AWARDS

Facilitating collaborative opportunities to advance research outcomes

The purpose of these Awards is to encourage medical researchers in Western Australia to establish and develop research collaborations, both nationally and internationally, to seek a better understanding of the nature, origin, and cause of human diseases, and their prevention and treatment. They aim to facilitate cross-institutional or organisational ties with increased opportunities for collaborative publications, joint grant submissions, sharing and advancement of research and clinical skills, and industry linkages.

Seven collaborative projects were in progress in 2018. Six Research Collaboration Awards were newly awarded to commence in 2019, with a total funding allocation of $110,325.05.

Thank you to our partners the Healy Medical Research Foundation, the BrightSpark Foundation (supporting child health research), and The University of Western Australia (Cockell Bequest; supporting mental illness research) for their support towards this Awards program.

BrightSpark FOUNDATION WESTERN AUSTRALIA Supporting Research into Child Health

HEALY MEDICAL RESEARCH FOUNDATION

THE UNIVERSITY OF WESTERN AUSTRALIA

COCKELL BEQUEST

ONGOING PROJECTS

2017 Research Collaboration Awards

DR LAURENCE CHEUNG

(BrightSpark Research Collaboration Award)

Telethon Kids Institute in collaboration with the Children's Cancer Institute and The University of New South Wales, Australia

Identification of novel drug combinations to cure high-risk infant leukaemia

DR BENJAMIN MILBOURN

(Cockell Research Collaboration Award)

School of Occupational Therapy and Social Work, Curtin University in collaboration with Vanderbilt University, USA

Mental health outcomes of adolescents with ASD as they transition into adulthood

2018 Research Collaboration Awards

DR DIANE DENNIS

(Cockell Research Collaboration Award)

Intensive Care and Physiotherapy Department, Sir Charles Gairdner Hospital in collaboration with Hadassah University Hospital, Israel and Austin Hospital, Australia

Lessons learned following an episode of intensive care unit crisis: what experienced Intensivists can teach their peers

DR BELINDA GUO

(Healy Research Collaboration Award)

School of Biomedical Sciences, The University of Western Australia in collaboration with Northwestern University, USA

Establishing cell culture models for fibrotic progression in patients with myeloproliferative neoplasms

DR HAIBO JIANG

(Healy Research Collaboration Award)

Centre for Microscopy, Characterisation and Analysis, The University of Western Australia in collaboration with the University of California and the National Physical Laboratory, USA

Development of multimodal mass spectrometry imaging platform for lipid analyses

DR SAMANTHA LEE

(Healy Research Collaboration Award)

Lions Eye Institute in collaboration with the Centre for Eye Research, Dublin Institute of Technology, Ireland

Western Australia Atropine for the Treatment Of Myopia (WA ATOM) study

DR ANNETTE REGAN

(BrightSpark Research Collaboration Award)

School of Public Health, Curtin University in collaboration with the Children's Hospital of Eastern Ontario Research Institute, University of Ottawa, Canada

An international cohort study measuring child health following maternal immunisation

RESEARCH COLLABORATION AWARDS ALLOCATED IN 2018

NUMBER OF APPLICANT INSTITUTIONS:

11

APPLICANT INSTITUTIONS:

Harry Perkins Institute of Medical Research
Telethon Kids Institute
The University of Western Australia

SUCCESSFUL:

(54.5% success rate)

6

FIELDS OF RESEARCH:

- Biological Psychology
- Biomaterials
- Cancer Therapy
- Cardiology
- Developmental Psychology and Ageing
- Endocrinology
- Epidemiology
- Intensive Care
- Mental Health
- Psychiatry

AMOUNT AWARDED:

$110,325.05

RESEARCH COLLABORATION AWARDS ALLOCATED IN 2018

DR KEELY BEBBINGTON

(Cockell Research Collaboration Award)

Telethon Kids Institute in collaboration with The Interdisciplinary Center Psychopathology and Emotion Regulation in the Department of Psychiatry, University Medical Centre of Groningen, Netherlands

Characterising moment-to-moment fluctuation in stress, anxiety and blood glucose levels in children and adolescents with type 1 diabetes
$14,911.80

PROFESSOR VERA MORGAN

(Cockell Research Collaboration Award)

School of Population and Global Health, The University of Western Australia in collaboration with Aarhus University, Denmark

Why is the impact of urban birth on the risk for schizophrenia reversed in Western Australia compared to Denmark? A proof-of-concept collaboration utilising both sites' record-linkage capabilities
$15,972

DR LEE NEDKOFF

(Healy Research Collaboration Award)

School of Population and Global Health, The University of Western Australia in collaboration with The University of Auckland, New Zealand

Extending the potential of linked health data for international studies of cardiovascular disease: an Australia/New Zealand collaboration
$22,884

DR YAEL PERRY

(Cockell Research Collaboration Award)

Youth Mental Health, Telethon Kids Institute in collaboration with Orygen, The National Centre of Excellence in Youth Mental Health, Vic, Australia

Targeted suicide prevention for LGBTIQ young people
$27,855.55

DR ANABEL SOROLLA BARDAJI

(Healy Research Collaboration Award)

Harry Perkins Institute of Medical Research in collaboration with the Spanish National Research Council, Spain

Synthesis and characterisation of cutting-edge magnetic nanoparticles for anti-cancer treatment
$21,101.70

DR DIANA TAN

(BrightSpark Research Collaboration Award)

School of Psychological Science, The University of Western Australia in collaboration with the University of Cambridge, UK

Investigating biological markers of autism using longitudinal cohort studies in the UK and Australia
$7,600

BRIGHTSPARK RESEARCH COLLABORATION AWARD

School of Public Health, Curtin University
in collaboration with the Children's Hospital of Eastern Ontario Research Institute, University of Ottawa, Canada

2018

$5,000

DR ANNETTE REGAN

How does maternal immunisation affect childhood health?

(An international cohort study measuring child health following maternal immunisation)

Dr Regan is a Research Fellow in the School of Public Health at Curtin University who specialises in the disciplines of epidemiology of communicable diseases, health promotion, infectious diseases, pregnancy, and perinatal and maternal health.

Maternal antibodies have been shown to protect infants against infection in the first six months of life. For this reason, influenza and pertussis vaccines are routinely recommended for pregnant women in several high-income countries, and the World Health Organization lists pregnant women as the highest priority group for seasonal influenza vaccination.

Despite evidence supporting the efficacy of maternal vaccination in infants, the impacts of maternal vaccination beyond six months of age have not been well studied. To date, just five studies have investigated the impact on childhood health. In addition to vaccine safety concerns, there is reason to believe antenatal vaccination may result in health benefits later in childhood. This study aimed to conduct a series of longitudinal cohort studies in countries with current maternal vaccination programs.

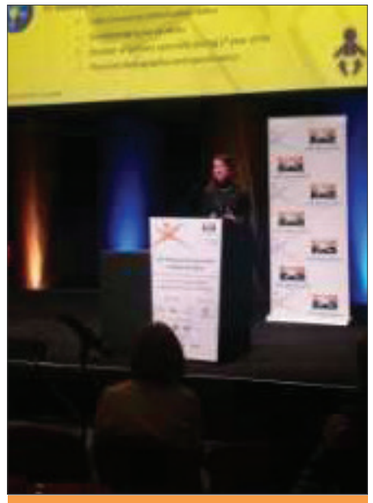
Dr Annette Regan and Dr Deshayne Fell.

As a result of the BrightSpark Research Collaboration Award, Dr Regan and Dr Deshayne Fell from the University of Ottawa have developed a common protocol for performing similar analyses across countries that will support future meta-analyses, developed a protocol for systemic review in the field, planned future activities including an international workshop in September 2019 and have at least four collaborative publications currently underway.

The completion of activities supported by this Award has also led to securing additional funding, access to available Canadian data which will be used to support the study, and additional collaborations with Dr Siri Håberg from the Norwegian Public Health Institute and Dr Laura Oakley from the London School of Tropical Medicine and Hygiene.

The findings from this collaborative study will provide knowledge on the impacts of maternal vaccination in infants above six months of age.

Dr Fell delivering a plenary presentation at the National Immunisation Conference in 2018.



Dr Fell, Dr Regan and Dr Haberg.

COCKELL RESEARCH COLLABORATION AWARD

Sir Charles Gairdner Hospital, Physiotherapy Dept
in collaboration with Hadassah University Hospital, Israel and Austin Hospital, Australia

2018

$13,650

DR DIANE DENNIS

Mental health issues affecting doctors working in intensive care units

(Lessons learned following an episode of intensive care unit crisis: what experienced Intensivists can teach their peers)

Dr Dennis is a Senior Physiotherapist at Sir Charles Gairdner Hospital and Simulation Co-Lead in the Faculty of Health Sciences at Curtin University.

There is a growing body of evidence supporting the increasing prevalence of mental health issues among doctors, particularly in the highly complex area of intensive care medicine.

The primary aim of this study was to explore the psychological responses of senior doctors who were experienced in the intensive care unit (ICU) setting and how they mitigated these reactions on both a personal and professional level.

Between October and December 2018, the investigators interviewed 19 Intensivists in four ICUs in three hospitals across two countries. Over 20 hours of interviews were transcribed, and data is currently undergoing qualitative analysis.

Preliminary findings indicate that a range of factors contribute to the challenges of working as a doctor in the ICU including repeated exposure to stressful situations, the unpredictability of the environment and the inevitability of errors. A variety of personal and professional attributes were described, along with numerous coping strategies that appeared to align with longevity of positive mental health outcomes in this population. The early outcomes from this study were presented at a key international simulation conference in January 2019.

Dr Diane Dennis presenting the project and preliminary data to the International Network for Simulation-based Paediatric Innovation, Research and Education (INSPIRE) at the International Meeting of Simulation in Healthcare (IMSH) in Texas, USA.

Several groups have indicated their interest in future collaboration around extending data collection for the project as well as developing and piloting simulation-based activities; including Dr Steve Costa, Emergency Physician from Ballarat Base Hospital, Victoria, and Nick Argall, Founder and CEO of Hybrid Simulations, Victoria.

The International Network for Simulation-based Paediatric Innovation, Research and Education (INSPIRE) group has also expressed interest in the project, as did the President of the Society for Simulation in Europe (SESAM) to involve European and United Kingdom sites.

The findings from this project will improve the understanding of mental health issues in doctors working in intensive care medicine.

Professor Vernon Van Heerden, Dr Cameron Knott and Dr Diane Dennis about to get underway on Day 2 in the interview office at Hadassah Hospital, Jerusalem, Israel.

HEALY RESEARCH COLLABORATION AWARD

Lions Eye Institute
in collaboration with the Centre for Eye Research, Dublin Institute of Technology, Ireland

2018

$5,000

DR SAMANTHA LEE

Reducing the rate of myopia progression in school-aged children

(Western Australia Atropine for the Treatment Of Myopia (WA ATOM) study)

Dr Lee is a Postdoctoral Research Fellow with the Genetics and Epidemiology Group at Lions Eye Institute (LEI) and the Chief Investigator for the Western Australian Atropine for Treatment of Myopia (WA ATOM) Study.

In myopia (short-sightedness), elongation of the eyeball (axial length) affects the integrity of the posterior ocular structures, placing myopic individuals at higher risk of developing potentially blinding eye diseases. Slowing myopia progression is therefore critical to minimise its associated risks, and myopia control is best implemented during childhood when the axial length increases most rapidly.

This study was to test the hypothesis that daily instillation of 0.01% atropine eye drops reduces the rate of myopia progression and axial length growth in Australian school-aged children.

The Healy Research Collaboration Award has enabled researchers at the LEI and Centre for Eye Research Ireland (CERI, Dublin Institute of Technology) to sync study protocols from the two centres, allowing the pooling of clinical data, and forming the largest study on the effectiveness of atropine in controlling myopia in Caucasian children. The collaboration has allowed Dr Lee to help the CERI team to set up their access database to facilitate the management of clinical data and has resulted in a presentation at the Lions Eye Institute's Research Group Meeting as well as the submission of two grants arising from the Australian Registry of Children Myopia Treatment (ARCMT) project.

The proposed ARCMT project comes from the realisation that a myopia treatment registry does not yet exist in the world, despite the condition being the most common eye problem.

Using Dr Lee's database designing experience that she obtained from her collaboration with CERI, together with successful grant funding, the LEI team plans to establish the first Registry in the world that records the outcomes of myopia treatment in children.

PUBLICATION PRIZES

Rewarding research excellence and the dissemination of research knowledge

The purpose of these Prizes is to reward the best scientific paper arising from research undertaken by an early-career medical research scientist in Western Australia.

A Prize of $5,000 (and a medallion) is awarded to facilitate conference travel and collaborative research.

Travel activities for three Prizes were ongoing throughout 2018, with two new Prizes awarded to commence in 2019.

These Prizes are supported by the Raine Foundation and the Mary Strachan Bequest. Additional Prizes for 2017/2018 have been made possible by a generous donation from the Rigby family.

ONGOING ACTIVITIES

2017 Publication Prizes

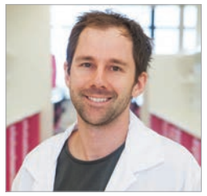
DR TARA RICHMAN
(Rigby Research Prize)
Harry Perkins Institute of Medical Research
The University of Western Australia
Loss of the RNA-binding protein TACO1 causes late-onset mitochondrial dysfunction in mice
Published in *Nature Communications*

2018 Publication Prizes

DR EDWARD LITTON
(Rigby Research Prize)
Fiona Stanley Hospital and the School of Medicine and Pharmacology
The University of Western Australia
Intravenous iron or placebo for anaemia in intensive care: the IRONMAN multicentre randomized blinded trial: A randomized trial of IV iron in critical illness
Published in *Intensive Care Medicine*

DR SAMUEL TAYLOR
(Raine Research Prize)
School of School of Pathology and Laboratory Medicine
The University of Western Australia
Preventing chemotherapy-induced myelosuppression by repurposing the FLT3 inhibitor quizarinib
Published in Nature Genetics

PUBLICATION PRIZES AWARDED IN 2018



DR SAM BUCKBERRY
(Raine Research Prize)
The Harry Perkins Institute of Medical Research
The University of Western Australia
Transient and permanent reconfiguration of chromatin and transcription factor occupancy drive reprogramming
Published in Cell Stem Cell
$5,000

DR RAJESH THOMAS
(Strachan Memorial Prize)
Department of Respiratory Medicine, Sir Charles Gairdner Hospital
Effect of an Indwelling Pleural Catheter vs Talc Pleurodesis on Hospitalization Days in Patients with Malignant Pleural Effusion: The AMPLE Randomized Clinical Trial
Published in the Journal of the American Medical Association
$5,000

PUBLICATION PRIZES AWARDED IN 2018

NUMBER OF APPLICANT INSTITUTIONS:
2

Harry Perkins Institute of Medical Research
Sir Charles Gairdner Hospital
The University of Western Australia

NUMBER OF APPLICATIONS:
12

SUCCESSFUL:
(16.6% success rate)
2

FIELDS OF RESEARCH:

Medical Biochemistry and Metabolomics
Genetics
Clinical Sciences
Oncology and Carcinogenesis

AMOUNT AWARDED: **$10,000**

RIGBY RESEARCH PRIZE

The Harry Perkins Institute of Medical Research
The University of Western Australia

2017 - 2018

$5,000

DR TARA RICHMAN

Modelling mitochondrial dysfunction in disease

(Loss of the RNA-binding protein TACO1 causes late-onset mitochondrial dysfunction in mice)

The 2017 recipient of the Rigby Research Prize was Dr Tara Richman from The Harry Perkins Institute of Medical Research for her article entitled “Loss of RNA-binding TACO1 causes late-onset mitochondrial dysfunction in mice” published in Nature Communications (Richman et al., Nat Commun. 2016; 7: 11884).

Dr Richman’s research aims to model mitochondria dysfunction in disease, which can cause physical, developmental and cognitive disorders with no known cure.

The Rigby Research Prize allowed Dr Richman to attend a national and international conference. In August 2018, she attended Queenstown Research Week, New Zealand’s biggest annual scientific meeting, as an invited speaker.

The ability to present internationally is a rare opportunity and the Rigby Research Prize travel funding allowed Dr Richman to accept the invitation. During the conference, Dr Richman was able to meet international scientists and share her research.

In November 2018, Dr Richman attended the Aussiemit conference held in Melbourne. This is Australia’s only mitochondrial science meeting and was a great opportunity for her to meet with her collaborators from Professor David Thorburn’s laboratory with whom she published with in 2017 and with her current collaborators from Dr Ben Kile’s laboratory.

Since receiving the Rigby Research Prize, Dr Richman has co-authored four further publications in the field.

RAINE RESEARCH PRIZE

School of Pathology and Laboratory Medicine
The University of Western Australia

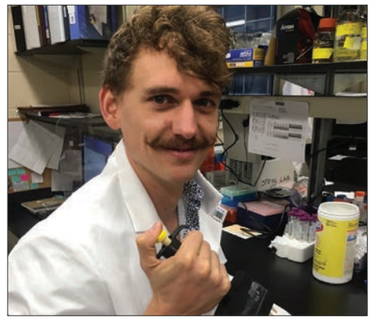
2018

$5,000

DR SAMUEL TAYLOR

New treatments to improve cancer patient survival

(Preventing chemotherapy-induced myelosuppression by repurposing the FLT3 inhibitor quizarinib)



The 2018 recipient of the Raine Research Prize was Dr Samuel Taylor, previously from The University of Western Australia, for his article entitled “Preventing chemotherapy-induced myelosuppression by repurposing the FLT3 inhibitor quizartinib” published in Science Translational Medicine (Taylor et al., Sci Transl Med. 2017; 9: eaam8060).

Dr Taylor’s research aims to characterise novel treatments to prevent myelosuppression during cancer therapy (particularly leukemia), using chemistry sequencing approaches. This approach aims to improve cancer patient survival and quality of life. The Raine Research Prize provided Dr Taylor with the opportunity to attend two conferences during the first year of his postdoctoral position at the Albert Einstein College of Medicine (AECOM), New York. The first conference was the American Society for Haematology (ASH) conference held in Atlanta, USA in December 2017, where Dr Taylor networked with many research leaders in the fields of leukaemia and haematology research as well as met with collaborators from Georgia State University (GSU) to establish the outline of his postdoctoral project.

The travel funds provided by the Raine Foundation enabled Dr Taylor to meet face-to-face and build a good working relationship with his collaborators from GSU including Dr Poon, Dr Boykin and Dr Wilson, who are all highly experienced chemists and biochemists, and who will be synthesising the compounds that Dr Taylor will be examining throughout his project. This collaboration has also led to Dr Taylor successfully receiving a postdoctoral fellowship for the remainder of his postdoctoral tenure at AECOM.

Dr Taylor also attended the New Directions in Leukaemia Research Conference held in Brisbane in 2018, which brings together both national and international scientists and clinicians in haematology and leukaemia research. Dr Taylor had the opportunity to meet with Dr Mark Dawson, from the Peter MacCallum Cancer Centre, who is now a collaborator on his postdoctoral project. The meeting with Dr Mark Dawson also led to him being a co-supervisor for a fellowship application by Dr Taylor, which was awarded in 2018. These connections were essential for Dr Taylor to be successfully awarded three fellowships, of which he accepted only the NYSCF Druckenmiller Postdoctoral Fellowship.

Dr Samuel Taylor and Dr Luis Carvajal at the American Society for Haematology Conference in Atlanta.

VISITING PROFESSOR AWARDS

Bringing world-class medical research expertise to WA

The Raine Visiting Professor Award program was introduced in 1971 to facilitate the visits of distinguished scientists to Western Australia.

Visiting scientists bring many benefits to the WA scientific community including advances in health and medicine, cross-fertilisation of skills and ideas, networking and collaboration, as well as important reciprocal exchange programs.

Visiting scientists also make a significant contribution to teaching and research programs in their specialist field of medical research.

Nine Raine Visiting Professors were supported to visit WA institutions in 2018. A further seven Visiting Professors were awarded for visits in 2019, with a total funding pool of $38,404.

The Visiting Professor Awards are funded by the Raine Foundation, and a generous donation from Charter Hall has enabled the visit of a postdocttoral researcher in the area of child health.

The Forrest Research Foundation has also provided accommodation for many of our Visiting Professors at Forrest Hall, through their Visiting Professor support program.

RAINE MEDICAL RESEARCH FOUNDATION

Charter Hall

FORREST RESEARCH FOUNDATION

VISITING PROFESSOR AWARDS - VISITS IN 2018

2018 Raine Visiting Professor Awards

PROFESSOR BENJAMIN CHOW

University of Ottawa Heart Institute, Canada
Host: Professor Girish Dwivedi
Harry Perkins Institute of Medical Research
Raine Lecture: Cardiac Imaging: Where are we and where do we need to go?

PROFESSOR JOHN CRISPINO

Northwestern University, USA
Host: Professor Wendy Erber
The University of Western Australia
Raine Lecture: Myeloproliferative neoplasms: from bench to bedside

PROFESSOR FREDDIE FU

University of Pittsburgh, USA
Host: Professor Minghao Zheng
The University of Western Australia
Raine Lecture: Innovation in Sports Medicine: Is the Latest Always the Greatest?

PROFESSOR NICHOLAS TOPLEY

Cardiff University, UK
Host: Dr Aron Chakera
The University of Western Australia
Raine Lecture: Understanding inflammation and infection: can it improve outcomes in dialysis patients?

PROFESSOR DAVID FINDLAY

The University of Adelaide, Australia
Host: Professor Minghao Zheng
The University of Western Australia
Raine Lecture: Osteoarthritis and bone: but I digress

PROFESSOR JAMES O'CONNELL

Boston University, USA
Host: A/Professor Lisa Wood
The University of Western Australia
Raine Lecture: Healthcare for people who are homeless: reflections from the Boston experience

PROFESSOR MARY WLODEK

The University of Melbourne, Australia
Host: A/Professor Donna Geddes
The University of Western Australia
Raine Lecture: Programming developmental disease risk: Effects of lifestyle and transgenerational influences

PROFESSOR AKIHIRO YAMANAKA

Nagoya University, Japan
Host: Professor Shane Maloney
The University of Western Australia
Raine Lecture: Behavioural Control Using Optogenetics

2018 Charter Hall Visiting Postdoctoral Scholar Award

DR EMANUELA ZANNIN

Politecnico di Milano, Italy
Host: A/Professor Jane Pillow
The University of Western Australia
Raine Lecture: Assessment of cardio-pulmonary function: application in positive pressure ventilation

VISITING PROFESSOR AWARDS ALLOCATED IN 2018 (VISITS IN 2019)

NUMBER OF APPLICATIONS:

10

HOST INSTITUTIONS:

Curtin University
Edith Cowan University
The Perron Institute for Neurological and Translational Science
The University of Western Australia

VISITING PROFESSOR INSTITUTIONS:

Defence Science Technology Laboratory (DSTL), UK
John Hopkins University, USA
Mayo Clinic, USA
The University of Melbourne, Australia
The University of Sydney, Australia
University of Cambridge, UK
University of Cologne, Germany

FIELDS OF RESEARCH:

Biological Sciences
Biological Psychology
Cancer Cell Biology
Cancer Therapy
Cardiology
Chemical Sciences
Clinical Pharmacology and Therapeutics
Developmental Psychology and Ageing
Endocrinology
Epidemiology
Foetal Development and Medicine
Molecular Targets
Neurosciences
Orthopaedics
Psychiatry
Regenerative Medicine
Reproduction

SUCCESSFUL:

(70% success rate)

7

AMOUNT AWARDED:

$38,404

VISITING PROFESSOR AWARDS

PROFESSOR TIMOTHY PHILIP ATKINS
Defence Science Technology Laboratory, UK
Host: Dr Mitali Sarkar-Tyson
The University of Western Australia
Bugs and Drugs: Antibiotics therapies for dangerous pathogens
$4,387

PROFESSOR XU CAO
John Hopkins University, USA
Host: Professor Minghao Zheng
The University of Western Australia
The role of bone marrow mesenchymal stem cells in bone remodelling, osteoporosis and osteoarthritis
$6,540

PROFESSOR PAUL CROARKIN
Mayo Clinic, USA
Host: Dr Jennifer Rodger
The Perron Institute for Neurological and Translational Science
Recent innovations and developments in neuromodulation for child and adolescent psychiatric disorders
$1,180

PROFESSOR THOMAS ERREN
University of Cologne, Germany
Host: Professor Lin Fritschi
Curtin University
Chronobiology: An evolutionary legacy challenged in today's 24x7-world
$6,646

PROFESSOR JOHN O'BRIEN
University of Cambridge
UK Host: Professor Osvaldo Almeida
The University of Western Australia
Preventing Dementia: Are We There Yet?
$8,000

PROFESSOR DES RICHARDSON
The University of Sydney, Australia
Host: Dr Elin Gray
Edith Cowan University
Befriending the lysosome to treat cancer: Therapeutically stabilising MIG6 to degrade EGFR
$3,790

PROFESSOR MARY WLODEK
The University of Melbourne, Australia
Host: A/Professor Donna Geddes
The University of Western Australia
Adult, pregnancy and transgenerational consequences of being born small
$7,861

RAINE VISITING PROFESSOR AWARD

University of Pittsburgh, USA
Host: Professor Minghao Zheng,
The University of Western Australia

Visit: 29 Jan 2018 – 2 Feb 2018

$5,700

PROFESSOR FREDDIE FU

A collaborative approach to the management of sport-related injuries

(Raine Lecture: Innovation in Sports Medicine: Is the Latest Always the Greatest?)

Professor Freddie Fu is the Professor and Chair of the Department of Orthopaedic Surgery at the University of Pittsburgh in Pennsylvania, USA. He is a world-renowned surgeon and medical researcher whose major research interests are anatomic anterior cruciate ligament (ACL) reconstruction and clinical outcomes, and the bioengineering of sports-related injuries. Professor Fu has received over 260 professional awards and honours, made over 1,150 presentations, co-authored 173 book chapters, is an author of over 570 peer-reviewed articles, and has edited 30 major orthopaedic textbooks. He has also developed several orthopaedic research programs, including military orthopaedics and sports injury-related orthopaedics. A previous Raine Visiting Professor, Professor Rocky Tuan, works with Professor Fu, and together they have established a research centre for Military Regenerative Medicine at the University of Pittsburgh.

Professor Fu was invited as a Raine Visiting Professor by Professor Minghao Zheng from the Faculty of Health & Medical Sciences at The University of Western Australia, with the objective of establishing joint research projects and clinical training programs in orthopaedics between The University of Western Australia and the University of Pittsburgh. During Professor Fu's visit, he conducted a lecture titled "Innovation in Sports Medicine: Is the Latest Always the Greatest?" to approximately 100 attendees as part of the Raine Visiting Professor Lecture series, presented to 25 orthopaedic registrars in a seminar held at Harry Perkins Institute of Medical Research, and was the keynote speaker for the Raine ACL Reconstruction and Regeneration Symposium that was attended by up to 50 attendees. He also had the opportunity to visit Orthocell Limited, Perth Bone and Tissue Bank (PlusLife), the Perron Institute, Sir Charles Gairdner Hospital and Hollywood Private Hospital as well as network and interact with orthopaedic consultants and researchers at various functions including the Orthocell Dinner and the Consultants Dinner that was organised during his visit.

Professor Minghao Zheng and Professor Freddie Fu, with his Raine Medallion.

The visit by Professor Fu allowed him to share clinical management strategies and teaching methods with Perth's orthopaedic community, which could lead to a more cross-disciplinary approach to the management of sport-related injuries.

Professor Freddie Fu presenting at the Raine Visiting Professor Lecture.

RAINE VISITING PROFESSOR AWARD

Boston University, USA
Host: A/Professor Lisa Wood,
The University of Western Australia

Visit: 4 - 11 November 2018

$5,112.48

DR JAMES O'CONNELL

Healthcare for people experiencing homelessness

(Raine Lecture: Healthcare for people who are homeless: reflections from the Boston experience)

Dr Jim O'Connell established America's first Medical Respite Centre (MRC) for homeless people in 1985. He was invited as a Raine Visiting Professor by Associate Professor Lisa Wood from the School of Population and Global Health at The University of Western Australia.

His visit was very timely as the Department of Communities was undergoing a consultation process at the time to put together a 10-year State Homelessness Plan and the Sustainable Health Review had just put out its preliminary report, of which, healthcare for people experiencing homelessness was a key focus area. Through sharing his experiences and advice, he was able to strengthen the case for funding and improvements to the service delivery of such programs.

Further, his more than thirty years of experience providing medical services to Boston's rough sleepers allowed him to disseminate new knowledge, skills and practices to the Homeless Healthcare's staff including the Street Health, the Royal Perth Hospital Homeless Team and the After Hours Support Service team, improving their operations and knowledge base.

During his visit, Dr O'Connell presented at the Raine Visiting Professor Lecture series where he shared knowledge about his career and experiences in working with the homeless population of Boston, giving incredible insights into the health conditions seen, the types of services they have provided and the stories of patients he has treated. He also spoke about the concept of a MRC for people who are homeless, a facility that is much needed in Perth. The lecture was attended by approximately 100 people and generated positive feedback with a number of follow-up contacts with The University of Western Australia team who hosted his visit.

Dr O'Connell being presented his Raine Medallion by Professor Robyn Owens (Raine Chair).

Dr O'Connell, Steph MacFarlane (SE Sydney Local Health District) and a Homeless Healthcare Nurse with the Street Health Van.

Dr O'Connell presenting at the Raine Visiting Professor Lecture.

Dr O'Connell was also the Keynote Speaker at the Inaugural Forum on Homelessness and Health that was attended by 100 people from across the housing, community and health sectors. He also conducted a seminar on his research findings and career achievements as part of the UWA School of Population and Global Health seminar series to an audience of approximately 40 researchers from the School.

Dr O'Connell accompanied the Street Health team to deliver operational advice and assistance associated with medical services on the street to homeless individuals, and

visited formerly homeless patients who had been recently housed as part of the nightly rounds by the After Hours Support Service.

He also attended several meetings including with the director of the Royal Perth Hospital Homeless Team, Dr Amanda Stafford, where he accompanied them on their ward round; representatives from the East Metropolitan Health Service and the Western Australia Primary Health Alliance along with Associate Professor Lisa Wood, Dr Andrew Davies (Homeless Healthcare) and Steph Macfarlane (Homelessness Health Program Manager, South Eastern Sydney Local Health District, New South Wales) to discuss the cost and health benefits of medical respite programs in Australia; and a meeting at the Department of Communities along with Associate Professor Lisa Wood and Ms Shannen Vallesi to discuss Dr O'Connell's experience and involvement in the Boston Homelessness Plan development and how a MRC in Perth would tie into the Western Australian 10 year plan.

Panel Discussion at the Forum on Homelessness and Health. Pictured from left: Dr O'Connell. Dr Amanda Stafford (RPH), Dr Andrew Davies (Homeless Healthcare) and the Lived Experience Panel Tracey, Richard and Jonathon.

Dr O'Connell also participated in the 50 Lives 50 Homes Rough Sleepers Working Group, a collaboration of 28 organisations that meet on a monthly basis to coordinate care and support for people who are currently sleeping on the streets and are part of the 50 Lives program (The first Housing First program in WA).

These meetings and collaborations have paved the way for global networking opportunities between directly involved organisations and their associated networks, and has already started to facilitate future research collaborations.

Politecnico di Milano, Italy
Host: Professor Jane Pillow, The University of Western Australia

Visit: 8 Oct - 5 Nov 2018

$4,200

DR EMMANUELA ZANNIN

Developing new methods for the mechanical ventilation of babies with respiratory distress

Raine Lecture: Assessment of cardio-pulmonary function: application in positive pressure ventilation

Dr Emmanuela Zannin is a postdoctoral fellow at the Biomedical Technologies Lab, Politecnico di Milano, Italy. She was invited as a Charter Hall Visiting Postdoctoral Scholar by Associate Professor Jane Pillow from the School of Human Sciences at The University of Western Australia. Dr Zannin is a biomedical engineer with specific expertise in novel technologies for the diagnosis and monitoring of respiratory mechanics, mechanical ventilation, and preterm neonatal lung disease. Dr Zannin obtained her Ph.D. and M.Sc. in Biomedical Engineering in 2010 and 2005, respectively, where her projects aimed at the development of new methods for the optimization of mechanical ventilation in patients with respiratory distress, with a special focus on neonatal applications.

She was a visiting academic at the Murdoch Children Research Institute in Melbourne for 3 months in 2011 and a long-term research fellow at the University Children's Hospital in Basel, Switzerland, between October 2016 and March 2018. Between 2008 and 2016, she was co-founder and member of the board of directors of Restech s.r.l, a spin-off company of Politecnico di Milano, aiming at developing and commercialising novel biomedical devices for lung function evaluation and home monitoring of chronic respiratory diseases.

The purpose of Dr Zannin's visit was to develop and submit manuscripts, explore potential new collaborations, and to evaluate the feasibility of new data analyses on existing datasets.

During her visit, Dr Zannin presented a Raine Lecture explaining a novel approach for evaluating the function of the heart and lungs during artificial respiration, and met with potential collaborators at the Telethon Kids Institute and the Harry Perkins Institute of Medical Research regarding potential novel analyses to be performed on existing datasets.

She trained research staff in the Anaesthetics Department at Perth Children's Hospital on lung function equipment provided by her institution to allow a new study to commence. She also worked with Associate Professor Jane Pillow to evaluate options for measurement of lung volume during artificial respiration at very high breathing rates.

GLOBAL CONNECTIONS IN 2018

These are the global connections facilitated by Raine funding programs in 2018

Many of our funding programs facilitate the dissemination of research knowledge and collaboration with international researchers, at conferences or via laboratory visits.

We also facilitate the visits of international researchers to WA to impart their knowledge and expertise to improve WA research.

PUBLICATIONS

Publications arising from research supported by the Raine Medical Research Foundation

RAINE PRIMING GRANTS

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CLINICIAN RESEARCH FELLOWSHIPS

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Research Collaboration Awards

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"I want my money to be used to find a cure for the illness that took Joe from me. I grieve every day because I couldn't find a doctor to do something for him, and I can't help thinking of all those other women who lose their husbands in the same way. It's a tragedy. I want all the money earned by the estate to go into medical research."

Excerpt from The Mary Raine Story: From Putney to Perth, Meg Sangster

THE RAINE STUDY

Advancing knowledge, enhancing lives

THE WESTERN AUSTRALIAN PREGNANCY COHORT (RAINE) STUDY

The Raine Medical Research Foundation awarded a major research grant in 1989 to for the establishment of the West Australian Pregnancy Cohort Study. It was named 'the Raine Study' to acknowledge the original grant from the Raine Medical Research Foundation and the ongoing support received from the Foundation.

The study aimed to develop a long-term cohort to research the role that early life events (from the womb onwards) had on later life. From 1989 to 1991, 2,900 pregnant women (Gen1) volunteered to be part of the study. Since the Raine Study was established, the children (Gen2) have been followed up at regular intervals providing an increasingly rich source of data for local, national and international research.

The Raine Study is one of the largest prospective cohorts of pregnancy, childhood, adolescence and adulthood to be carried out anywhere in the world.

- Over 30,000 pieces of data (and >30 million pieces of genetic information) have been collected on each of the Gen2 participants in the last 30 years
- Over 500 peer-reviewed journal articles have been published on the Raine Study resources
- In 2019 it will be 30 years since the Raine Study began
- >400 babies (Generation 3, Gen3) have been born to the Raine Study cohort participants, (estimated to reach 1,500 babies within 10 years)

the Raine Study

2018 ANNUAL ACTIVITY REPORT

Professor Peter Eastwood (Raine Study Director)
Professor Leon Straker (Raine Study Scientific Director)
The Raine Study Team

Highlights for 2018

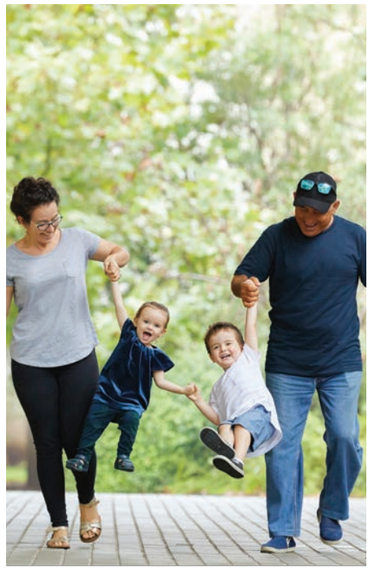
The focus for 2018 was to update, revise and modernise the human and technical systems of the Raine Study, to create the basis for sustainable growth into the future.

Progressed development of a 5-year strategic plan in collaboration with staff and committees including development of vision, mission and values

Strengthened new committee structure

- Developed members and activities of Management, Scientific and Participation committees
- Facilitated meetings of committees (Scientific Management Committee x18, Management Committee x10, Scientific Review Committee x2 face to face meetings and x6 e-meetings, Community Advisory Committee x4)

Developed Researchers
Introduced new researcher engagement policy and embedded this into the research project management system (Raine Study Online Submission System, ROSS)



Developed Special Interest Group (SIG) leaders
Conducted meetings with SIG leaders to define the role, including development of website material and planning discussions (SIG Leaders Committees x 4)

Strengthened new staff structure

- Developed competence of staff in all positions
- Engaged staff in strategic plan development
- Appointed a new Data and Biosamples Manager

Strengthened the Unincorporated Joint Venture (UJV) by:

- Encouraging continued high level partner support and good governance of the Raine Study by the members of the UJV Board
- Providing continuing validation of the value of involvement
- Encouraged exploration of alternative funding sources including the potential for associated UJV members and the commercial use of the Raine Study data

Strengthened consumer engagement
Supported development of consumer representatives
Gained consumer perspectives on strategic plans and future greater engagement

Maintained operational and science leadership

- Supported data collection from Gen0/1, Gen2_26, Gen2_27, Gen2_econ, Gen_3
- Supported successful grant applications
- Developed standard operating procedures for key project components

Started multiple processes to establish effective curation and use of Raine Study data

- Developed relational database and tested with different types/generations of data
- Developed processes for quality control of the existing data and completed review of the majority of data in two follow-ups
- Drafted a documented data pipeline for all new data from collection to publication
- Conducted larger scale WAHTN funded pilot of secure analysis system (SHAPE)
- Explored opportunities for consolidation of biosamples

Refined new project management system
Multiple refinements to ROSS and grant application to Western Australian Health Translation Network (WAHTN) for major upgrade submitted for 2019 funding

Represented the Raine Study at State and National meetings as well as other institutions

- AHRA/WAHTN Data Committee Workshop (Melbourne, March)
- Bio banking consultation workshop (Perth, November)
- Meeting with staff from the office of the new National Data Commissioner for consultation on the new Data Sharing and Release legislation (Perth, November).
- Attended workshop on 'Ensuring the most effective use of NHMRC funding in the support of cohort studies involving Australians (Canberra, November)

GRANT APPLICATIONS 2017 (FOR 2018 FUNDING)

Thirteen grant applications totalling $12.4 million were prepared and submitted in 2017 for research projects and Raine Study development projects to commence in 2018, of which four were successful totalling $3.6 million.

NHMRC 1134894, 2018-2022

K Steinbeck, R Skinner, L Sanci, D Schofield, F Brooks, A Dawson, R Ivers, L Perry, B Liu, P Collin, M Kang, A Third, J Mooney-Somers, L Straker, S Gibson, P Hazell, L Baur, S Eades, S Sawyer.

A Centre of Research Excellence in Adolescent Health: making health services work for adolescents in a digital age.

$ 2,496,294

CANCER AUSTRALIA 1147677, 2018-2020

J Stone, C Saunders, D Sampson, M Hickey, L Lilge, G Cadby, J Shepherd, M Giorgi, M Cook.

Measuring breast density in younger women to inform primary prevention and early detection of breast cancer.

$592,636

NHMRC 1142858, 2017-2021

RC Huang, R Foong, G Hall, A Lin.

LIFECYCLE - Early life stressors and lifecycle health.

$453,810

DEPARTMENT OF HEALTH WA, 2018-2019

A Smith, P O'Sullivan, Y Wang, J Karppinen, D Samartzis, L Straker, P Kent, M Hancock, D Beales, S Linton.

Lumbar pathology – irrelevant finding or treatment target for low back pain?

$75,000

WAHTN 2017

L Straker, P Eastwood, D Glance

Secure health data analysis and processing environment (SHAPE) stage 2

$50,000

GRANT APPLICATIONS 2018 (FOR 2019 FUNDING)

Nine grant applications totalling $2.3 million were prepared and submitted in 2018 for research projects and the Raine Study development projects to commence in 2019, of which six were successful totalling over $1.4 million.

NHMRC 1161445, 2019-2023

R Skinner, J Marino, S Lymer, D Doherty, K Steinbeck, L Straker, M Kang, R Tait.

The health, social and economic implications of risk-taking in adolescence over the life-course: a data linkage study of the Raine cohort.

$1,061,015

NATIONAL HEART FOUNDATION 102301, 2019

T Mori, L Beilin, M Schlaich, J Yang.

Aldosterone, cardio-metabolic profile and early life factors in the Western Australian Pregnancy Cohort (Raine) Study.

$74,878

NATIONAL HEART FOUNDATION 102170, 2019

A Haynes, L Taylor, D Green, L Straker, J McVeigh.

Developmental origins of adult myocardial structure and function: heart health and the Raine cohort.

$75,000

ROYAL PERTH HOSPITAL MEDICAL RESEARCH FOUNDATION, 2019

C Le-Ha, T Mori, L Beilin, M Hickey.

Associations of prenatal androgen exposures and of age at menarche with cardiovascular risk factors in early adulthood: a prospective cohort study.

$20,000

LOTTERYWEST 420171061, 2018-2019

L Campbell.

Website upgrade and re-brand elements.

$36,792

WAHTN-MRFF, 2019

L Straker, P Eastwood, D Glance

Supporting governance, discovery and translation from large health datasets: Development of a research project online management system to support strong governance and translation from health studies.

$146,165

Figure 4 presents the total number of submitted and successful Raine Study grant applications over the last 10 years. The total amount awarded per year to Raine Study grant applications over the last 10 years is shown in Figure 5.

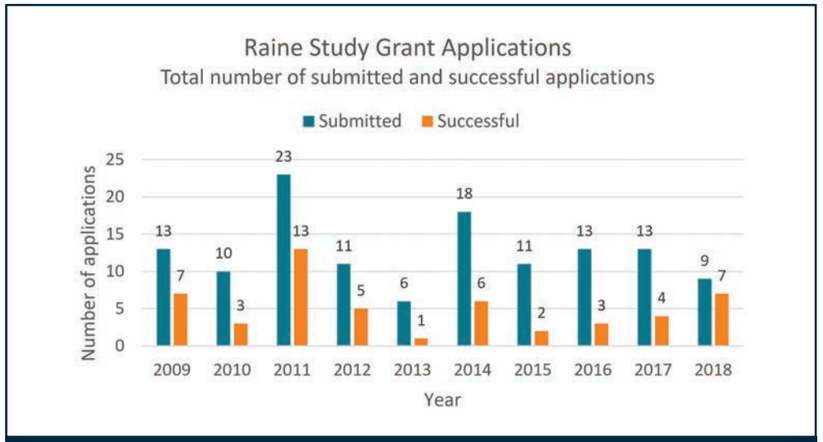


Figure 4. *Number of submitted and successful grant applications per year*

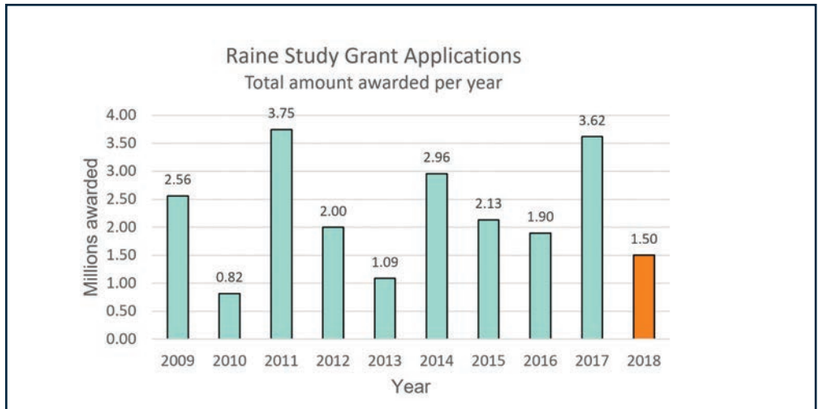


Figure 5. *Total amount ($millions) awarded to successful grants per year*

New applications to utilise the Raine Study data

In 2018 there were 51 new projects approved and 34 manuscripts reviewed. There were 113 data and biosample requests (Figure 6).

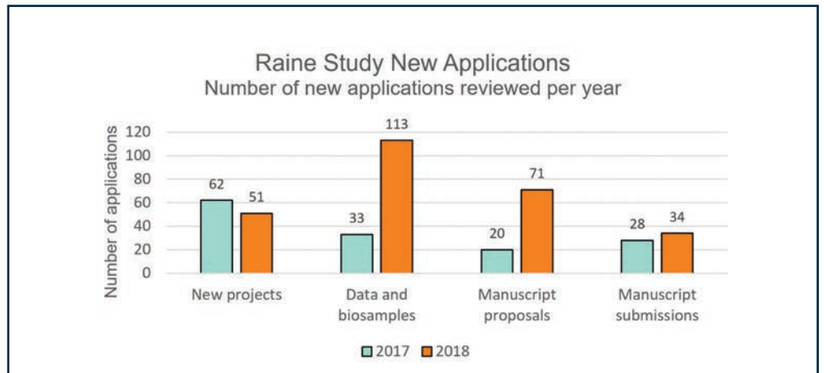


Figure 6. *Number of Raine Study new applications in 2017 and 2018*

Publications

In 2018, 39 peer-reviewed papers were published bringing the total to 506 (Figure 7), with 90% of these in journals with impact factors of 2 or greater (Figure 8).

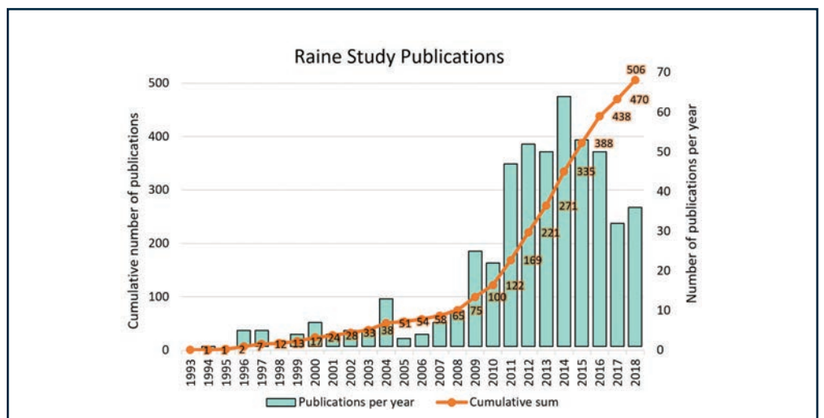


Figure 7. *Number of Raine Study publications by year*

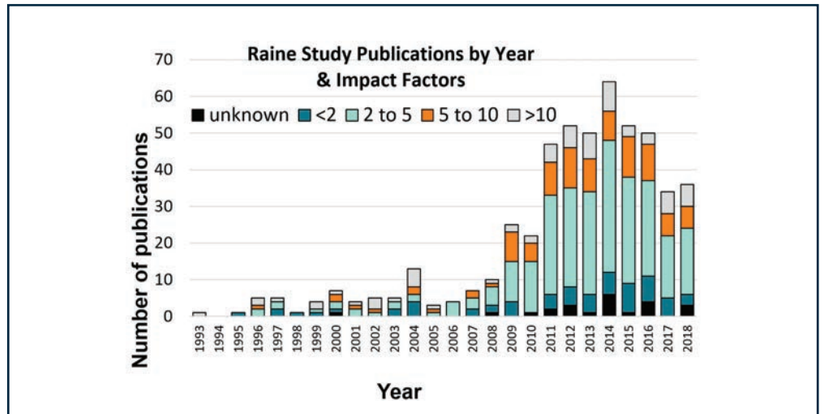


Figure 8. *Number of Raine Study publications by year and impact factors*

Built Environment, GIS and Health Seminar

On Wednesday 19th of September the Raine Study Built and Social Environment SIG held a seminar on the 'Built Environment, GIS and Health'. Organiser and presenter Dr Hayley Christian provided an overview of the evidence of the impact of the built environment on health, Ms Bridget Beesley presented information on GIS and other types of measures used to capture the built environment.

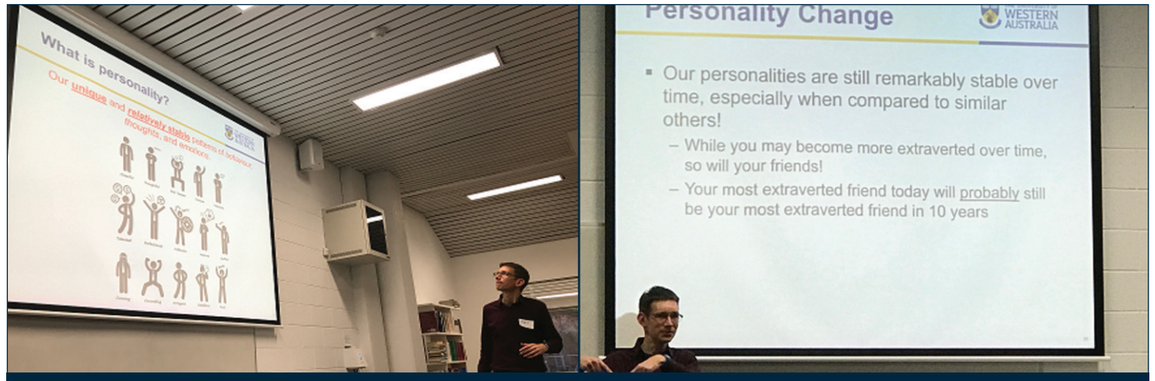
Dr Gina Trapp presented examples from her current research including her paper on the link between proximity to alcohol outlets and adolescent alcohol intake. Dr Amanda Wheeler gave an overview of exposure models and explained the details of the ASPREE project.

Presenters (Left to Right): Ms Bridget Beesley, Dr Hayley Christian, Dr Gina Trapp, Dr Amanda Wheeler

Presenter Dr Hayley Christian giving an overview of Built Environment and Health research

Work and Personality Workshops

During September the participants who completed the work and personality questionnaire were offered an opportunity to attend an interactive workshop. Assoc/Prof Patrick Dunlop shared information about how people choose different types of work and how their work can affect wellbeing and adult psychological development.



Presenter Assoc/Prof Patrick Dunlop

Annual Scientific Meeting 2018

On Friday 30th of November, over 175 researchers from Western Australia and beyond attended the 11th Annual Scientific Meeting (ASM). There were three researchers invited to present their latest findings as well as fourteen Early Career Researcher presentations. As in previous years, the ASM provided an opportunity to showcase research activities undertaken over the previous 12 months and an opportunity for researchers to network and share ideas.

The Raine Medical Research Foundation donated two $750 prizes for the best presentations by early-career researchers. Mr Will McIntosh and Dr Samantha Lee were both outstanding in their presentations and were awarded their prizes by Dr Amanda Cleaver, Director of the Raine Medical Research Foundation.

Appendix 1. Publications list 2018

1. Appannah, G., et al. (2018). “Determinants of a dietary pattern linked with greater metabolic risk and its tracking during adolescence.” J Hum Nutr Diet 31(2): 218-227.
2. Armstrong, R., et al. (2018). “Predicting language difficulties in middle childhood from early developmental milestones: A comparison of traditional regression and machine learning techniques.” J Speech Lang Hear Res 61(8): 1926-1944.
3. Ayonrinde, O. T., et al. (2018). “Sex differences between parental pregnancy characteristics and nonalcoholic fatty liver disease in adolescents.” Hepatol 67(1): 108-122.
4. Beaumont, R. N. W., et al. (2018). “Genome-wide association study of offspring birth weight in 86 577 women identifies five novel loci and highlights maternal genetic effects that are independent of fetal genetics.” Hum Mol Genet 27(4): 742-756.
5. Bhat, S. K., et al. (2018). “Maternal smoking and low family income during pregnancy as predictors of the relationship between depression and adiposity in young adults.” J Dev Orig Health Dis 9 (5): 552-560.
6. Blanken, L. M., et al. T.; Whitehouse, A. (2018). “A prospective study of fetal head growth, autistic traits and autism spectrum disorder Autism Res; 11 (4): 602-612.
7. Coenen, P., et al. (2018). “The association of adolescent spinal-pain-related absenteeism with early adulthood work absenteeism: A six-year follow-up data from a population-based cohort.” Scand J Work Environ Health 44(5): 521-529.
8. Da Costa, C. E., R. H.; Jacques, A.; Swanepoel, W.; Whitehouse, A. J. O.; Jamieson, S. E.; Brennan-Jones, C. G. (2018). “Does otitis media in early childhood affect later behavioural development? Results from the Western Australian Pregnancy Cohort (Raine) Study.” Clin Otolaryngol 43 (4) 1036-1042.
9. Demenais, F., et al. (2018). “Multiancestry association study identifies new asthma risk loci that colocalize with immune-cell enhancer marks.” Nat Genet 50(1): 42-53.
10. Dunican, I. C., et al. (2018). “Laboratory and home comparison of wrist-activity monitors and polysomnography in middle-aged adults.” Sleep Biol Rhythms 16(1): 85-97.
11. Guastella, A. J., et al. (2018). “Does perinatal exposure to exogenous oxytocin influence child behavioural problems and autistic-like behaviours to 20 years of age?” J Child Psychol Psychiatry 59(12): 1323-1332.
12. Hart, R. J., et al. (2018). “The impact of antenatal Bisphenol A exposure on male reproductive function at 20-22 years of age.” Reprod Biomed Online 36(3): 340-347.
13. Hart, R. J., et al. (2018). “The possible impact of antenatal exposure to ubiquitous phthalates upon male reproductive function at 20years of age.” Front. Endocrinol 9: 1-11.
14. Haworth, S., et al. (2018). “Consortium-based genome-wide meta-analysis for childhood dental caries traits.” Human Mol Genet 27(17): 3113-3127.
15. Hickey, M., et al. (2018). “Relationship between umbilical cord sex hormone binding globulin, sex steroids, and age at menarche: a prospective cohort study.” Fertil. Steril. 110(5): 965-973.
16. Howie, E. K., et al. (2018). “Correlates of physical activity and sedentary time in young adults: the Western Australian Pregnancy Cohort (Raine) Study.” BMC Pub Health 18 (1): 10.
17. Howie, E. K., et al. (2018). “Accelerometer-derived activity phenotypes in young adults: a latent class analysis.” Int J Behav Med 25 (5): 558-568
18. Hysi, P. G., et al. (2018). “Genome-wide association meta-analysis of individuals of European ancestry identifies new loci explaining a substantial fraction of hair color variation and heritability.” Nat Genet 50(5): 652-656.
19. Jones, A. C., et al. (2018). “Persistent activation of interlinked type 2 airway epithelial gene networks in sputum-derived cells from aeroallergen-sensitized symptomatic asthmatics.” Sci Rep 8(1): 1511.
20. Lammers, N., et al. (2018). “Are serum ferritin and transferrin saturation risk markers for restless legs syndrome in young adults? Longitudinal and cross-sectional data from the Western Australian Pregnancy Cohort (Raine) Study.” J Sleep Res: e12741.
21. McKeown, N. M., et al. (2018). “Sugar-sweetened beverage intake associations with fasting glucose and insulin concentrations are not modified by selected genetic variants in a ChREBP-FGF21 pathway: a meta-analysis.” Diabetologia 61(2): 317-330.
22. McVeigh, J. A., et al. (2018). “Organized sport participation from childhood to adolescence is associated with bone mass in young adults from the Raine Study.” J Bone and Mineral Res 34 (1): 67-74.
23. Oddy, W.H., et al (2018) Dietary patterns, body mass index and inflammation: pathways to depression and mental health problems in adolescent. Brain Behav Immun 69: 428-439
24. Pena, A. S., et al. (2018). “The majority of irregular menstrual cycles in adolescence are ovulatory: results of a prospective study.” Arch Dis Child 103(3): 235-239.
25. Reynolds, A. C. B., et al. (2018). “Working (longer than) 9 to 5: are there cardiometabolic health risks for young Australian workers who report longer than 38-h working weeks?” Int Arch Occup Environ Health 91 (4): 403-412.
26. Shah, R. L,. et al (2018). “A genome-wide association study of corneal astigmatism: The CREAM Consortium.” Mol Vis 24: 127-142.
27. Smith, C. E., et al. (2018). “Genome-wide interactions with dairy intake for body mass Index in adults of european descent.” Mol Nutr Food Res 62 (3): Article number 1700347
28. Stockil, L., et al. (2018). “Urogenital symptoms: prevalence, bother, associations and impact in 22 year-old women of the Raine Study.” Int Urogynecol J 29 (12): 1807-1815.
29. Symen Ligthart, A. V., et al (2018). “Genome Analyses of >200,000 Individuals Identify 58 Loci for Chronic Inflammation and Highlight Pathways that Link Inflammation and Complex Disorders.” Am. J. Hum. Genet. 103(5): 691-706.
30. Trapp, G. S. A., et al. (2018). “Proximity to liquor stores and adolescent alcohol intake: A prospective study.” Am J Prev Med 54(6): 825-830.
31. Trevenen, M. L., et al. (2018). “Development and validation of an algorithm to temporally align polysomnography and actigraphy data.” BPEX 4(2): Article number 025014.
32. Turcot, V. L., Y., et al (2018). “Protein-altering variants associated with body mass index implicate pathways that control energy intake and expenditure in obesity.” Nat Genet 50(1): 26-41.
33. Varcin, K. J., et al. (2018). “Maternal pre-pregnancy weight and autistic-like traits among offspring in the general population.” Autism Res 12 (1): 80-88.
34. Waage, J., et al. (2018). “Genome-wide association and HLA fine-mapping studies identify risk loci and genetic pathways underlying allergic rhinitis.” Nat Genet 50(8): 1072-1080.
35. Warrington, N. M., et al. (2018). “Maternal and fetal genetic contribution to gestational weight gain.” Int J Obes (Lond) 42(4): 775-784.
36. Warrington, N. M., et al. (2018). “Genome-wide association study identifies nine novel loci for 2D:4D finger ratio, a putative retrospective biomarker of testosterone exposure in utero.” Human Mol Gen 27(11): 2025-2038.

2018 RAINE ANNUAL AWARDS CEREMONY

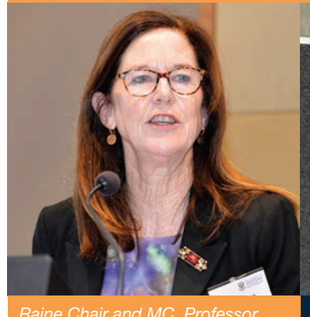
This annual celebration commemorates the present and past awardees of the Foundation, our generous partners and donors, and the support provided by all those who have sat on our Research Committees. Thanks goes to our extensive list of over 500 alumni and supporters over the last 60 years!

Awards Ceremony held on 5 December 2018.

Our guest speaker, Dr Melissa O'Donnell, talking about her research into alcohol-related harm in young people

Dr Melissa O'Donnell (Telethon Kids Institute)

UniClub Banquet Hall



Raine Chair and MC, Professor Robyn Owens (UWA)

Dr Amanda Cleaver (Raine Foundation Director) and Mr Sean L'Estrange (Member for Churchlands).

Dr Rajesh Thomas (DoH)

Dr Diana Tan (UWA)

2019 Raine Priming Grant awardees

Dr Elin Gray (ECU)

Dr Adnan Khattak (DoH), Dr Nicholas Larkins (DoH), Dr Andrew Toner (DoH)

Professor Simon Biggs (UWA), Professor Robyn Owens (Raine Chair/ UWA), and Dr Campbell Thomson (UWA)

Dr Lee Nedkoff (UWA), Dr Anabel Sorolla Bardaji (UWA)

Professor Richard Vaughan (UWA), Professor Jeff Hamdorf (UWA)

Celebrating our 2019 awardees and over 500 alumni

Ms Jodie Hegarty (DoH), Ms Karen Bradley (DoH), Professor Anne Williams (Murdoch University)

Ms Sarah Harris (University of Notre Dame), Professor Garry Allison (Curtin University)

INVESTMENTS AND FINANCIAL REPORTS

FINANCIAL REPORTS

Investment Performance

Overall the University's investment portfolio delivered a net return of +1.6% for the year (Dec 2017: +6.9%). The portfolio experienced gradual gains throughout 2018 which were substantially eroded during the December quarter on the back of significant market volatility, resulting in a full year gross return of +2.0% and +1.6% after external management fees.

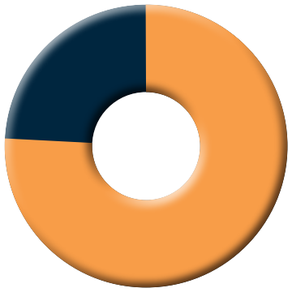
The Short-Term Pool (STP) delivered a net return of +2.3%, performing behind the forecast return (+3.5%).

Investment Distributions

The Long Term Pool (LTP) distributed 1.28% for the year, due to the impact of significant December quarter market volatility. The STP distributed 3.46% for the year, marginally below the original budget rate.

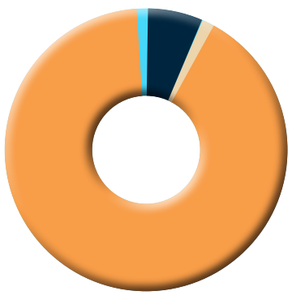
Investment Pool	Original Budget	Distribution Rate
LTP	5.56%	11.33%
STP	3.50%	3.50%

Raine Investment Exposure and Asset Allocations



Raine Investment Exposure

- Growth Asset 77%
- Defensive Asset 23%



Raine Asset Allocation

- Long Term Pool 93%
- Short Term Pool 1%
- Direct Securities 5%
- Property 1%

Note: Excludes DEXUS & Direct Property Investments

Raine Financial Update

The total carrying value of the Foundation's assets as at 31 December 2018 was $40.9M, of which 93% was invested in the LTP, 1% in the STP, 5% in Direct Securities and 1% in Property.

At December 2018, the Foundation distributed $1.56M to the Raine Research Committee Income and Expenditure (I&E) Account for future expenditure. The Foundation received donations from Charter Hall: $10,000 for a Visiting Postdoctoral Scholar Award and $7,975 to support further research through the Raine Medical Research Foundation.

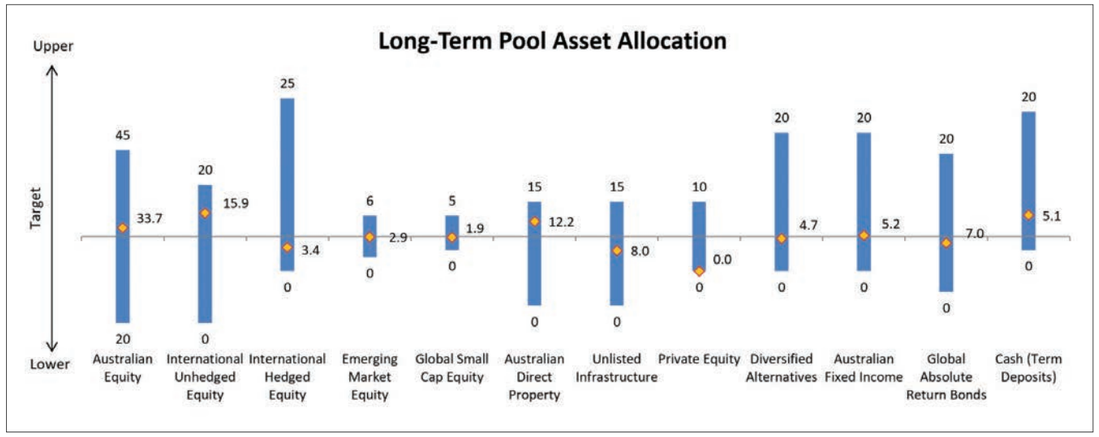
University Portfolio Asset Allocation
LONG TERM POOL (LTP) - STRATEGIC ASSET ALLOCATION

The LTP asset composition at 31 December 2018 remains neutral between growth and defensive assets, therefore the LTP is held within the strategic 80% growth and 20% defensive asset allocation. The primary Dynamic Asset Allocation tilt is an overweight position in International Unhedged Equity with an underweight tilt to International Hedged Equity.

In December, the Schroder Balanced Funds (Unlisted Infrastructure Proxy) was redeemed, partially funding the investment into Unlisted Infrastructure (with the remainder being funded via a rebalancing process within the LTP). The Unlisted Infrastructure remains underweight relative to Strategic Asset Allocation at the end of December with an overweight position held in Australian Direct Property.

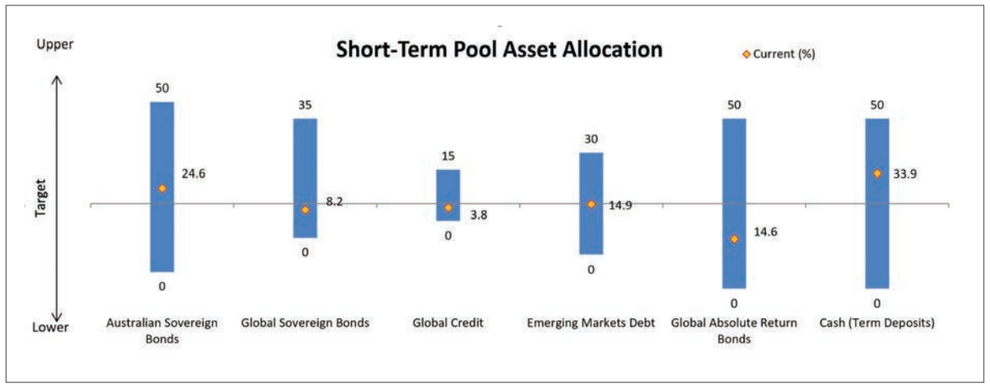
The private Equity allocation has yet to be funded, and this is expected to begin at the completion of the due diligence process. The Australian and International Unhedged Equity Funds were overweight as a proxy for the Private Equity exposure.

No other Dynamic Asset Allocation positions were implemented and all other funds remain broadly in line with their benchmark allocations.



SHORT TERM POOL (STP) - STRATEGIC ASSET ALLOCATION BENCHMARK

The STP (comprises of 100% defensive asset) asset composition at 31 December 2018. The DAA tilts employed within the STP at 31 December 2018 include underweight positions in Global Sovereign Bonds, Global Credit and Global Absolute Return Bonds with a corresponding overweight position in Cash. No new DAA positions were implemented over the quarter and all funds remain within their allowable ranges.



RAINE MEDICAL RESEARCH FOUNDATION

Income and Expenditure for the 12-month period ending 31 December 2018

	Notes	2018 YTD Actual $	2017 Annual Actual $
Raine Research Committee I&E Account			
DISTRIBUTIONS			
Distribution from Raine Foundation Capital Account			1,461,992
Quarter 1-4 capital distribution	1	1,522,567	-
INCOME	2		
Unspent funds retrieved		30,337	40,556
Management fee (BrightSpark Raine Alliance)		25,857	25,375
P Rigby donation transfer	3	10,000	-
General refund (council rates)		-	14,205
Book sales		60	840
Total Income		**1,588,821**	**1,542,968**
EXPENDITURE	2		
Specific Activities:			
Raine Visiting Professors		30,771	39585
Honorariums		-	16974
Raine Research Prize and Raine Study Awards		6500	2858
Raine Study Directorship	4	65,000	65,000
Raine Priming Grants:			
2016 Grants		-	350,535
2017 Grants		264,279	395,890
2018 Grants		513,708	-
Other Expenses:			
Operating Expenses		39,420	49,310
Salary Expenses		270,243	325,280
TOTAL EXPENDITURE		**1,189,921**	**1,245,433**
NET OPERATING RESULT		**398,900**	**297,535**

Notes:

1. Sum Quarter 1-4 Capital Distribution from Raine Research Committee Capital Account
2. Actual 'Income' is reported on a cash basis. Actual 'Expenditure' is reported in full when incurred
3. P Rigby donation previously recorded in the 'Other Bequests Account'. The Rigby Research Prizes were awarded in December 2016 from the Raine Research Committee I&E account
4. Raine Research Committee approved expenditure.

Statement of Investments for the 12-month period ending 31 December 2018

	Notes	2018 YTD Actual $	2017 Annual Actual $
INVESTMENTS	1		
Raine Foundation Capital Account		28,588,800	29,648,198
Raine Research Committee Capital Account	2,3	4,243,741	1,980,056
RMRF Operating (LTP)	3	-	1,522,567
Raine Research Committee I&E Account		398,900	297,535
Raine Research Committee Investment Account		4,808,865	4,748,089
Clinician Research Fellowships Interest Account	4	-	376,377
Strachan Bequest Capital Account	4	-	85,508
Strachan Bequest I&E Account	4	-	18,814
Wong Bequest Capital Account		5,687	5,615
Other Bequests Account	4	-	50,773
Donations Account		9,898	105
Total		**38,055,891**	**38,733,637**
Total pool Investments		**38,055,891**	**38,733,637**
Carrying Value - Other Investments			
24/95 Monash Avenue (Hollywood)		265,321	268,491
Dexus Property Group (DEXUS) Holdings	5	2,397,996	2,201,550
Imputation Credit (Accrual) - Dexus Property Group (DEXUS)		7,207	2,449
Total Other Investments - Carrying Value		**2,670,524**	**2,472,490**
Total Investments at Carrying Value		**40,726,415**	**41,206,127**
Market Value - Other Investments			
24/95 Monash Avenue (Hollywood)	6	482,850	482,850
Dexus Property Group (DEXUS) Holdings	5	2,397,996	2,201,550
Imputation Credit (Accrual) - Dexus Property Group (DEXUS)		7,207	2,449
Total Other Investments - Market Value		**2,888,053**	**2,686,849**
Total Investments at Market Value		**40,943,944**	**41,420,486**

Notes:

1. 2018 distribution rate net of fees: Long Term Pool at 1.28% and Short Term Pool at 3.46%
2. Transfer of 2017 distributions totalling $1,522,567 to the Raine Research Committee Capital Account
3. Transfer of funds to the Raine Research Committee Capital Account
4. Funds consolidated to Raine Research Committee Capital Account
5. Dexus Property Group (DEXUS) Holdings are marked to market at the reporting date
6. The reported market value for the property is based on the University's internal property valuation as at 31 December 2018.

HEALY MEDICAL RESEARCH FOUNDATION

Statement for the 12-month period ending 31 December 2018

	Notes	2018 Actual $	2017 Actual $
CAPITAL FUND			
Opening Balance		1,743,437	1,566,008
Long Term Pool investment income		22,316	177,429
		1,765,753	1,743,437
Less:		-	-
Capital Distribution		398,900	297,535
Closing Balance		**1,765,753**	**1,743,437**
Income and Expenditure			
Opening Balance		82,844	104,563
Short Term Pool investment income	1	3,006	4,002
Capital Distribution	2	-	-
Unspent funds retrieved		**13,857**	**10,413**
Total Income		**99,707**	**118,978**
Less expenditure:			
Healy Research Collaboration Awards		19,500	19,014
Operating Expenses		14,223	17,120
Total Expenditure		**33,723**	**36,134**
Closing Balance		**65,984**	**82,844**

Notes:

1. 2018 distribution rate net of fees: Long term pool at 1.28% and Short term pool at 3.46%
2. Committee approved to suppress annual 5% capital distribution.

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