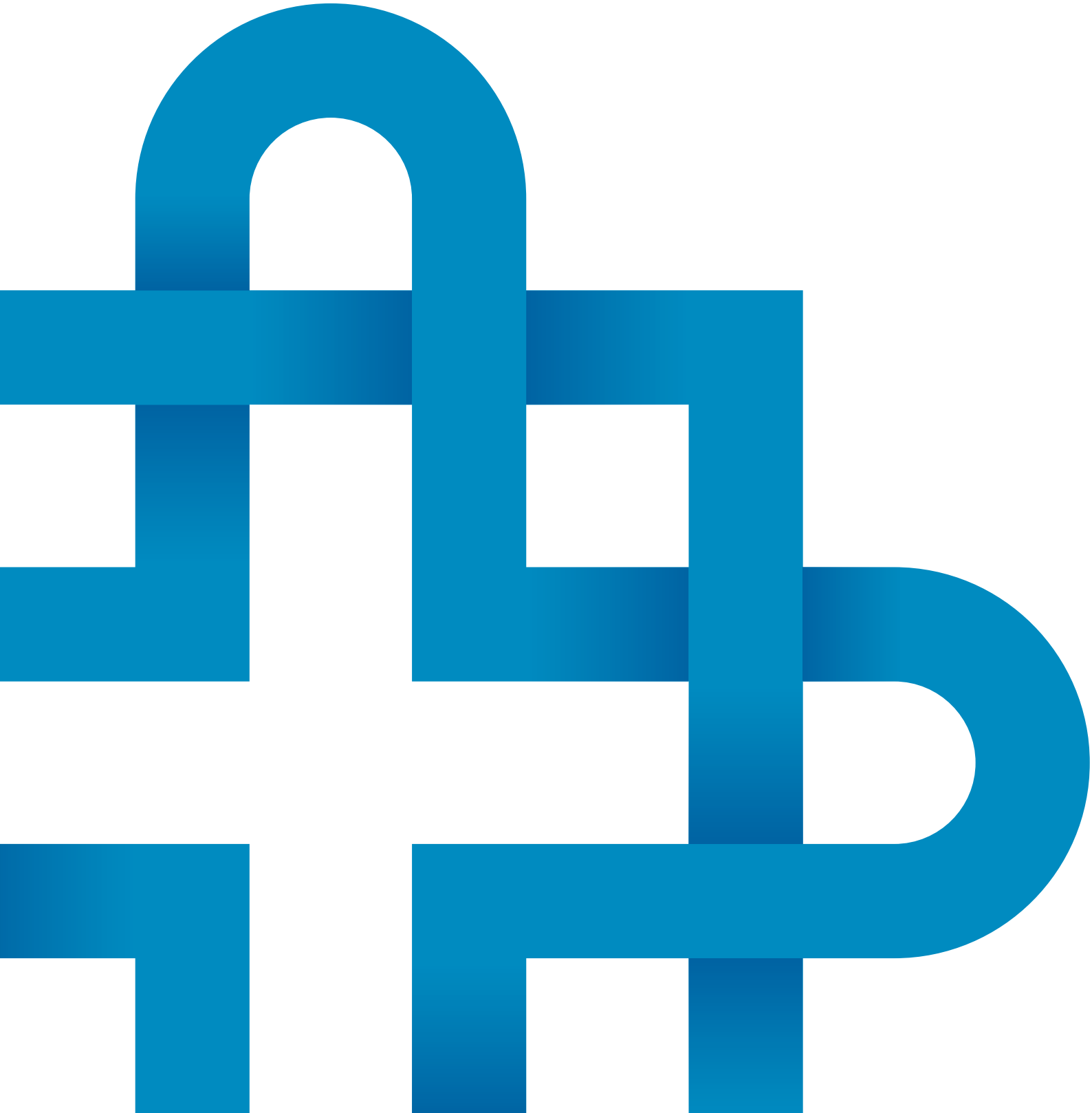
New Zealand Brain Research Institute

Annual Report 2016



Contents

Activity snapshot

21 papers publi
1701 research p
visits, 2695 outp
assessments, 8
theses, 18 ongo
33 public talks,
and 23 staff.

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31 students

Countries represented

Belgium, Germ
Iran, Malaysia,
Pakistan, Philip
Saudi Arabia, S
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any, India,
New Zealand,
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South Africa,
n, USA.

Disciplines represented

Engineering, M
Medical Physic
Psychology, Ra
Surgery, Veteri

athematics,
s, Medicine,
diography,
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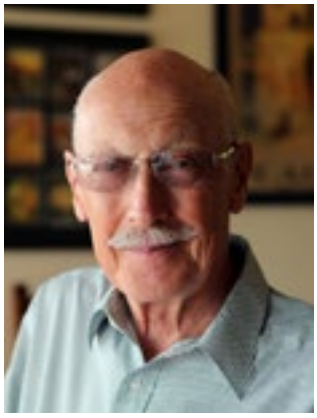
Our People

Board

John G Bayley
Chairman
(until Sept 2016)

Dr Cheryl Doig
Chairperson
(from Sept 2016)



Professor
Ivan Donaldson

Mike Stenhouse
CMRF Representative

Simon Carey
CMRF Representative

Professor
Steve Weaver

Professor
David Murdoch

Professor
Ian Wright

Directors

Dr Michael MacAskill
Research Director

Professor Tim Anderson
Clinical Director

Kate Russell
Commercial Director

Dr Tracy Melzer
MRI Manager

‘NZBRI is the focal point of research on brain and neurological disorders in Canterbury, providing a collaborative environment to nurture young researchers.’

Professor David Murdoch
Dean, Head of Campus, Otago Medical School Christchurch

Chair's Report

2016 has been an active year for the New Zealand Brain Research Institute (NZBRI) as it continues its foundational research on the brain and neurological disorders.

We have an experienced and globally recognised team of researchers and clinicians who have made major contributions to conferences; supervised and undertaken research; and been involved in collaboration through the Brain Research New Zealand Centre of Research Excellence and through international connections. Medical research is vitally important and the work of NZBRI is especially so. Funding such research can be challenging and we do appreciate the regular donations and generous bequests that make our work possible. We acknowledge the support of the Alan Trembath Estate and the programmes that will be served through this bequest.

The success of NZBRI is only as strong as its people. On behalf of the Board, I would like to acknowledge the huge contribution and commitment of the NZBRI team. In my short time on the Board I have been impressed by the richness of the research team, ably led by Dr Michael MacAskill (Research Director) and Professor Tim Anderson (Clinical Director). Our researchers illustrate the importance of international relationships and the power of collaborative endeavours to make a difference in the lives of the community they serve. Our Commercial Director, Kate Russell, has continued to provide clear direction, strengthened our operational practices and developed new networks. I would also like to acknowledge the support of the administrative and executive team and the work undertaken to ensure that NZBRI runs smoothly.

The Friends of the NZBRI (FBI) continue to serve us well, and their support and enthusiasm is highly valued. In 2016 the Friends launched a highly successful Opera Meets Art event and this will now become one of the main fundraising events for 2017.

In August 2016 John Bayley resigned from the NZBRI Board. John played an integral part in the establishment and development

of NZBRI from the beginning of the Institute's history. John has witnessed the evolution of the Institute to where we are today as active members of the national 'Brain CoRE' and with a wealth of internationally-presented and published work in the area of brain health. He has been a pivotal figure in our growth and a well-respected chair of NZBRI and we thank him for his dedication and commitment to our work.

There have been a number of other changes on our board. Emeritus Professor Steve Weaver, previously Deputy Vice-Chancellor (Research) at Canterbury University has continued in an independent director role on the NZBRI Board. Professor Ian Wright has joined NZBRI Board as the new Deputy Vice-Chancellor (Research and Innovation) at University of Canterbury. Professor David Murdoch, Dean and Head of Campus of the University of Otago, Christchurch also joined the NZBRI Board. Both these new appointments bring diverse expertise and value to the Board. Professor Ivan Donaldson, Mike Stenhouse and Simon Carey have continued to provide strong experience and commitment to the NZBRI Board.

We have developed a strategic approach to board appointments, aimed at maintaining diversity and positioning us for the future. We aim to provide a governance mix which has expertise in diverse areas including research, commercial experience and a future focus. This strategic approach to governance will see us appoint two new directors in the new financial year.

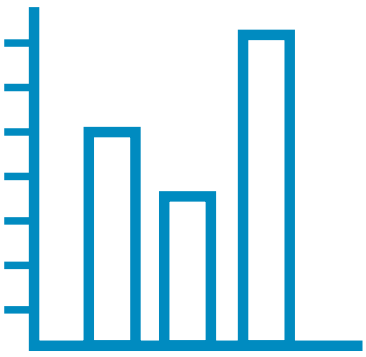
2016 has seen the board of NZBRI and CMRF continue to work closely, building on the significant work undertaken in 2015. NZBRI operates under a financial structure which is fully owned by CMRF. Summarised financial and performance information derived from the audited Performance Report for NZBRI for 2016 is included within this publication.

Income of $2,447,929 included a grant of $125,000 from the CMRF parent to support our administrative function. This helps us optimise the monies spent on the provision of research facilities, personnel and research projects. You will read of the significant work undertaken in the extensive reports that form part of this Annual Report.

2016 has been a year of continued progress and consolidation. We look forward to 2017 as a year for new horizons, especially as the new Health Precinct begins to take shape nearby. It is an exciting time for health and holds many opportunities for the work of our dedicated team.

Dr Cheryl Doig
Chairperson, NZBRI

Research Director's Report and SSP



Health research is an expensive enterprise so it is sometimes easy to focus excessively on the financial side and lose sight of what we are actually doing and why.

In recent years, however, the government has also required charitable organisations to include non-financial information in our annual accounts. In the 'Statement of Service Performance' (SSP), we must report on how we want to impact on society, and what services and achievements we delivered during the year to reach those goals. We're pleased to share this information with you in this year's report, along with our traditional accounts.

The SSP means that our financial report now gives a much more rounded view. This is particularly the case for NZBRI, as much of what we do (in running clinics, carrying out research projects, and training graduate students) doesn't actually flow through our accounts. Much of our work is funded outside our organisation: many of our staff are employed by universities or the health system, and many of our students receive scholarships and work on projects that are funded externally. The vision for the NZBRI was to bring clinicians and scientists together, into a physical location that would break down barriers between institutions, but also between researchers and neurological patients and research volunteers. So the money we spend on what might appear to be mundane items like rental and building running costs creates a great multiplier effect to enable new research opportunities and clinical services. NZBRI exists to provide an environment for collaboration and cooperation, allowing us to achieve things that wouldn't be possible if we were scattered across our home departments and institutions.

Given that our Statement of Service Performance covers items like our number of student graduates, publications, and clinic and research sessions, here I'd like to mention some of our other achievements in 2016. For example, our MRI Research Manager, Dr Tracy Melzer, was awarded the prestigious Sir Charles Hercus Fellowship from the Health Research Council. This allows us to

secure this very talented young researcher in Canterbury for the next four years. Our highest media-profile project in 2016 was a NASA/European Space Agency-funded project to scan the brains of scientists returning from a winter in Antarctica. Without Tracy's leadership and expertise in imaging, the city would miss opportunities like this.

The NZBRI is now firmly embedded in the national Brain Research New Zealand Centre of Research Excellence (CoRE), a network that spans researchers and clinicians from Auckland to Otago. In 2016, the CoRE funded Dr Toni Pitcher to continue her pioneering work to understand the impact of Parkinson's in Māori. The CoRE also awarded a scholarship to Dr Sharon Jay, a neurosurgery trainee, to take a year to investigate using MRI to measure the effects of traumatic brain injury. We really need more clinicians to get involved hands-on in research, and this has been a great initiative.

The CoRE is getting brain researchers across the country to communicate and collaborate more than ever before. We're also benefitting from increased collaboration on technology: the New Zealand eScience Infrastructure (NeSI) means we are able to use pooled computing resources. This is reducing the time taken to run some of our most complicated analyses from months on our computers to just days, or even hours, on one of the nationally-shared supercomputers in Auckland or Wellington.

The Universities of Canterbury and Otago have been key partners in the NZBRI since its formation in 2004 but this year we have also solidified a strong research partnership with Lincoln

University. The group there, led by Professor David Palmer has made huge strides in understanding and potentially even curing Batten disease, a currently terminal condition affecting children. We have been working with them to use MRI to monitor the effects of their genetic therapy, which is impressively reducing the deterioration of the brain in the sheep they are treating.

Along with the Brain Research CoRE, we would like to thank the Neurological Foundation, the University of Otago, and the Health Research Council for funding our research in 2016. The support of the Orr Family Estate in particular has been critical in sustaining our major ongoing longitudinal project in Parkinson's, an internationally significant endeavour. Lastly, I would like to thank our patients and research volunteers for their unceasing generosity with their time and efforts.

Michael R. MacAskill
PhD, Research Director, NZBRI

The New Zealand Brain Research Institute (NZBRI) has three main charitable aims

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— Reveal new knowledge about the brain and its dysfunction

— Improve the standard of care for people with neurological disorders, locally, nationally, and globally

— Educate clinicians, scientists, and the public on brain research findings and techniques.

NZBRI 2016 Statement of Service Perfor

Reveal new knowledge about the brain and its dysfunction

Output

Publish research outputs in peer-reviewed journals

The primary output of a research institution is publication of papers in peer-reviewed scientific and clinical journals.

Performance Measures		Performance
Quantity	At least 20 papers published per year	105% (21 papers published)
Quality	Publish in international journal, unless compelling reason to disseminate locally	100%
Evidence	Publications viewable on our public website: **nzbri.org/labs/publications**	
Outcome	NZBRI research papers will be cited widely in the academic literature The primary outcome of a successful research paper is influence upon scientific and clinical thought, as measured by the number of times that paper is cited by other research groups	

In the 2015 SSP, a chart of yearly citations to all publications from the NZBRI was shown. This organisation-level information is no longer available from the 'Web of Knowledge' source, and hence we have reported here on just a subset of papers.

The figure adjacent shows the seven most-highly cited papers published by Institute researchers since the Institute was founded in 2004 (i.e. the seven papers that have been cited more than 100 times). In terms of citations, these papers (and the body of other publications) continued to be influential in 2016.

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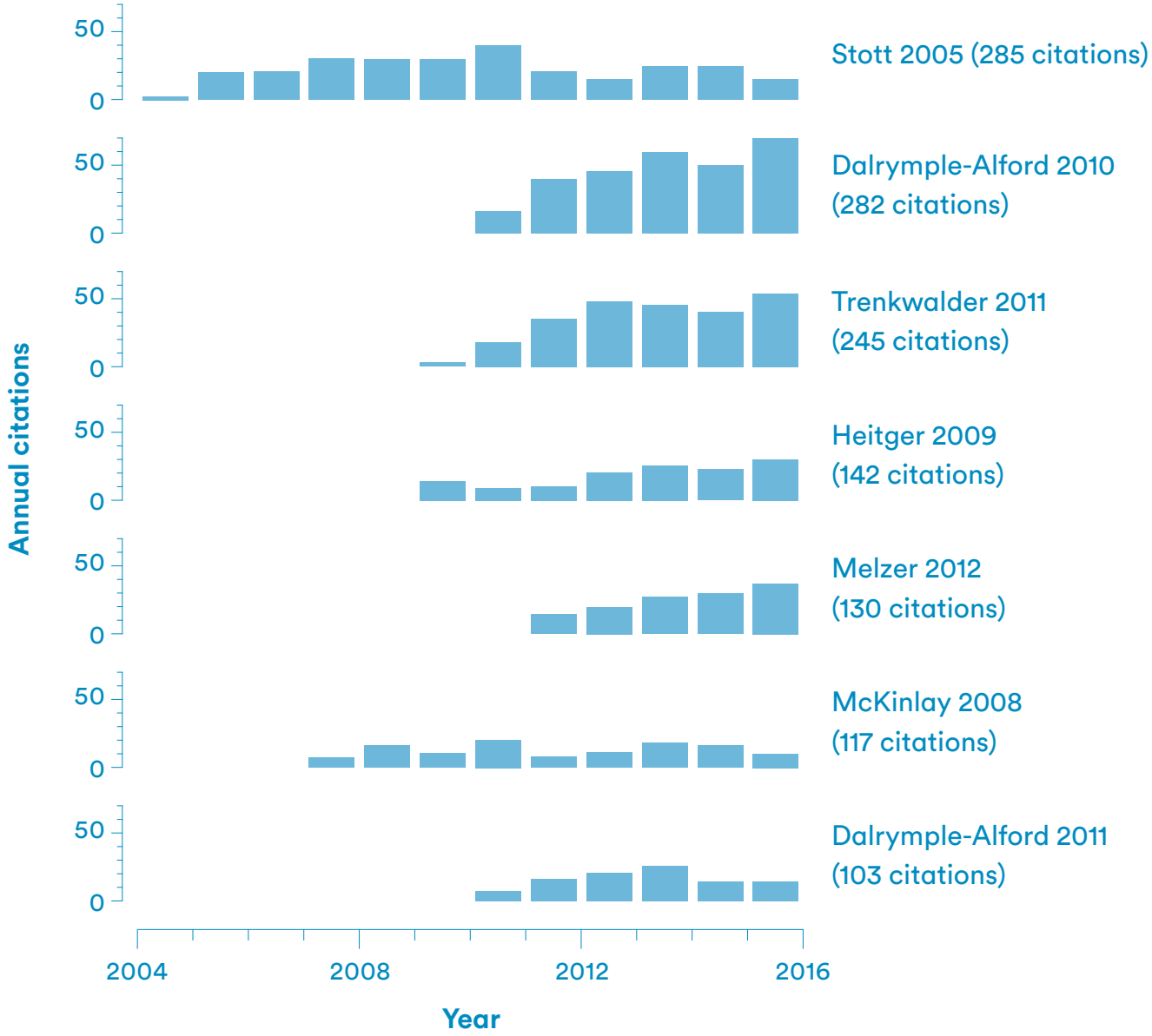
The most highly cited papers from the NZBRI (those with >100 citations)



NZBRI 2016 Statement of Service Perfor

Reveal new knowledge about the brain and its dysfunction

Output

Assess new and existing participants in research studies

Performance Measures		Performance
Quantity	Follow-up existing participants in primary longitudinal and imaging Parkinson's studies	229 participants assessed across 1052 visits, 64% increase on 2015
Quantity	Continue assessment of participants in study of cognitive enrichment in Parkinson's (recruitment commenced in 2015)	70 participants assessed across 560 visits
Quantity	Commence study to use a new PET tracer to detect tau protein in Parkinson's disease. Total patients required 70, goal to recruit 56 in 2016	Not achieved, 0 of 56 patients recruited (due to international supplier being unable to provide the radioactive PET tracer)
Quantity	Assess participants in other independent sub-studies in Parkinson's	72 visits for 36 participants in Auckland Theory-of-Mind study, 17 visits for Woodward CNP study
Quantity	Recruit participants to study of effect of CPAP on cerebral bloodflow and cognition in sleep apnoea	15 participants recruited (2 have completed 6 month follow-up assessment)

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Improve the standard of care for people with neurological disorders

Output

Provide clinic facility for neurological outpatient assessments

Performance Measures		Performance
Quantity	Number of new and existing Canterbury DHB outpatient visits hosted	2695 outpatient assessments conducted on-site by CDHB neurologists.
Outcome	Canterbury people will receive improved care or levels of assessment by involvement in pharmaceutical trials or international studies	
	STAR 1 trial: Double blind study of cannabidiol for partial onset epilepsy: 9 patients, 25 visits	
	Duodopa study: Open label study of levodopa/carbidopa intestinal gel for Parkinson's patients: 1 patient, 4 visits	
	STEADFAST study: Double blind study of azeliragon for mild Alzheimer's patients commenced: 1 patient, 1 visit	
	ENROLL HD: Observational study of families with Huntington's: 90 patients, 90 visits. Ongoing longitudinal study	
	PREVANZ study: Trial of vitamin D supplementation in multiple sclerosis. Recruitment complete (12 patients)	

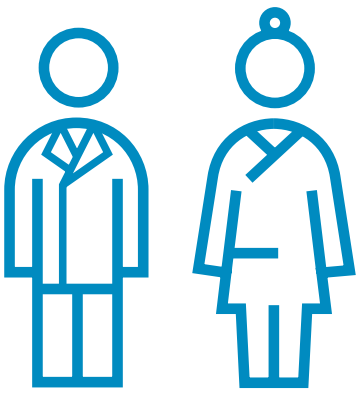
NZBRI 2016 Statement of Service Perfor

Educate clinicians, scientists, and the public on brain research findings and techniques

Output

Provide opportunities for students to complete graduate qualifications in brain research

Performance Measures		Performance
Quantity	Number of PhD completions	2 theses completed (Toh & Lamvik), 10 ongoing
Quantity	Number of Masters degree completions	6 theses completed (Henderson, Kaur, Langbridge, McPhail, Nicolson, Stark), 8 ongoing
Quality	Pass external national/international expert examination	100%



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Output

Provide public education opportunities for brain research

Performance Measures		Performance
Quantity	Number of presentations given by researchers and management to community service and education groups	33 (to Kiwanis, Probus, Canterbury MS & Parkinson's Society, Rotary, Lions, Zonta, Country Womens' Institute, U3A, various retirement communities)
Quantity	Number of public talks given	2 (Neurological Foundation public lecture; University of Otago Christchurch public lecture)
Quantity	Number of interviews in public media	2 (North & South Magazine, Radio New Zealand 'Our Changing World' programme)
Quantity	Number of other appearances in media	1 (Stuff New Zealand/Sunday Star Times story arising from media release)
Quantity	Number of targeted research-focussed newsletters distributed	2 (one each to the local communities of Huntington's and Parkinson's patients)

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Dr Michael R. MacAskill
Research Director, NZBRI

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Clinical Director's Report

One important new initiative during 2016 has been the participation of NZBRI in an Australasian study of cannabidiol treatment for difficult to control epilepsy.

Another has been an international pharmaceutical trial investigating the potential of a new drug for early Alzheimer's disease, in conjunction with specialist geriatricians from Burwood Hospital. This heralds the evolving commitment of NZBRI clinicians and researchers to the treatment and prevention of Alzheimer's disease. We are looking forward to the establishment of Dementia Prevention Research Clinics (DPRCs) in mid-2017 as part of our involvement in the national collaboration, Brain Research New Zealand Centre of Research Excellence.

The NZBRI hosts all of the CDHB Neurology department outpatient clinics which take place on several days of the week. Patients have the convenience of parking onsite and the neurologists have the convenience of working together at the same clinic times. The clinics provide the opportunity for patient participation in the NZBRI neurological research activities. Specialist multiple sclerosis (MS) clinics, MS pharmaceutical trials and epidemiological research are undertaken by neurologist Dr Debbie Mason at the NZBRI. Three neurological nurses and a medically trained research coordinator are based at the Van der Veer clinical area, providing an essential service in overseeing advanced treatments for Parkinson's and MS, and supporting the NZBRI clinical research and pharmaceutical studies.

I continue to conduct two Parkinson's and Movement Disorders clinics in the Van der Veer clinical area at 40 Stewart Street. The majority of patients attending the clinics have Parkinson's disease but patients are referred with an array of movement disorders (shakes, jumps, jerky movements and spasms) of neurological cause for diagnosis and treatment. These clinics are an important teaching resource, with 5th year medical students attending weekly as do medical registrars from Burwood-based Health Care of the Elderly department. The clinics continue to be an invaluable

‘The clinics continue to be an invaluable source of patient volunteers for our clinical research activities and pharmaceutical therapy trials.’

source of patient volunteers for our clinical research activities and pharmaceutical therapy trials.

Huntington's disease (HD) is an inherited neurodegenerative disorder that causes progressive cognitive and behavioural problems along with jerky movements, and loss of balance and coordination. It can present anywhere from teens to old age and usually leads ultimately to institutional care. We provide regular multidisciplinary HD clinics for patients and family members, at the NZBRI as part of a nationally unique service under the auspices of the CDHB for patients and families. We also now annually assess nearly 100 HD patients and family members as part of the huge international Enroll-HD study which aims to find a cure for this debilitating genetic disorder.

So it has been a very active year of clinical endeavour at the NZBRI with several areas of new activity. 2017 looms as equally busy and exciting, especially with the establishment of the DPRCs.

Professor Tim Anderson
Clinical Director, NZBRI

Neuroimaging at the NZBRI

Brain imaging remains an integral part of the work we carry out at the NZBRI. Researchers employ Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) imaging to investigate many topics, ranging from child development through to diseases of the elderly, and beyond.

In 2016, we performed 234 hours of MRI scanning on the 3T MRI scanner at Hagley Radiology, and an additional 49 amyloid PET scans on the GE PET scanner at Southern Cross Hospital. There were 14 different studies that utilized imaging in their research.

The Parkinson's disease research group was the largest user of imaging, specifically using MRI to (1) track disease progression over time as part of an ongoing longitudinal study, (2) investigate mild cognitive impairment in Parkinson's disease, and (3) test whether a programme of physical and cognitive enrichment can alter the trajectory of the disease. Other projects that collected imaging data in 2016 include:

- Blood flow in obstructive sleep apnoea
  (PIs: Richard Jones and Carrie Innes)
- Magnesium sulphate at 30–34 weeks gestational age
  (MagNUM—PI: Prof Caroline Crowther, Liggins Institute, University of Auckland)
- The genetics of motor control
  (PI: Liz Franz, Psychology, Otago, Dunedin)

A number of studies completed imaging data acquisition in 2016. These include the following:

- NZ Very Low Birthweight cohort
  (PI: Brian Darlow, Pediatrics, Otago)

- Micronutrients to combat ADHD
  (PI: Julia Rucklidge, Psychology, Canterbury)
- Neurostructural, Cognitive, and Physiologic Changes During a 1-year Antarctic Winter-Over Mission
  (PI: Mathias Basner, University of Pennsylvania, USA)
- Improving fat suppression in magnetic resonance imaging of patients with metal implants
  (PI: Phil Bones, Mechanical Engineering, Canterbury)
- Post-traumatic stress disorder
  (PI: Richard Porter, Psychological Medicine, Otago)
- Locating the vestibular cortex with a head tap
  (PI: Jeremy Hornibrook, CDHB)
- Pilot scanning
  - MRI scanning in a sheep model of Batten disease
    (PI: David Palmer, Lincoln)
  - Neurogenic stuttering
    (PI: Catherine Theys, Communication Disorders, Canterbury)

Amyloid PET scanning continued in 2016, with two complimentary studies acquiring data:

- Amyloid deposition in PD with Mild Cognitive Impairment
  (PIs: Tim Anderson & John Dalrymple-Alford)
- Amyloid deposition in PD (excluding MCI—PI: Tracy Melzer)

There were also a total of 8 students and employees whose work relates to imaging: 3 PhD students (Mustafa Almuqbel & Dr Simon Feng, Medicine, Otago; Katharina Russell, Lincoln), 3 Master's students (Jamie Small & Mildred Tan, Medical Physics, Canterbury; Dr Sharon Jay, Medicine, Otago), and 3 research assistants (Maddie Pascoe, Krysta Trevis, and Samantha Groves, NZBRI). These students represent three institutions, across multiple departments.

Other business:

Pacific Radiology Group (PRG) installed a new research-grade 3T MRI scanner in Dunedin, in July 2016. I travelled to Dunedin on two occasions to help prepare this machine for research. PRG has also installed the same type of 3T MRI scanner here in Christchurch. We have commissioned the scanner and are ready to begin research scanning (Mar 2017). Ongoing studies will remain on the current scanner (the 3T GE scanner, currently located at Hagley Radiology, 16 St. Asaph), but all new studies will commence on the new scanner (located at St. George's Hospital).

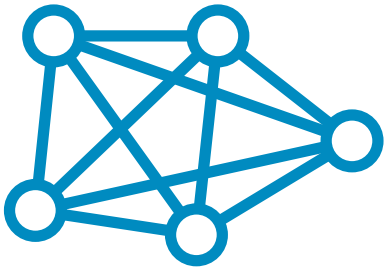
In November, I attended a meeting in Barcelona, Spain, 'Barcelona Cognition and Neuroimaging in Parkinson's disease.' This meeting gathered together experts in the field to present recent data, but more importantly, propose and plan future collaborations. The group has formulated a collaborative project, in which we will play an important role. This has the potential to be an important collaboration going forward.

At the Australasian Winter Conference on Brain Research (AWCBR), held in Queenstown, Dr Rebekah Blakemore and I organised a neuroimaging symposium, which we hope to convert into an annual event.

Dr Tracy Melzer
MRI Manager, NZBRI

Research Reports

Cognitive and physical exercises for Parkinson's disease



One of the primary goals of modern-day medical research is to uncover ways to counter the effects of brain decline associated with degenerative diseases.

While most research understandably focuses on biological interventions, there is also a place for non-pharmacological approaches. Studies in animals and in humans show that increased physical and cognitive activity throughout life is associated with a healthier lifespan. Some research suggests that these benefits may be true even after the diagnosis of a neurological condition such as Parkinson's disease (PD).

Such a study is nearing completion at the NZBRI. Professor John Dalrymple-Alford and Professor Tim Anderson, in collaboration with colleagues at Canterbury and Otago Universities, are testing the idea that the addition of these two lifestyle factors will be beneficial to people with a PD diagnosis. PD volunteers were enrolled in an 8-month intervention in which half of the patients received 'active enrichment' and the other half received 'passive enrichment'.

All participants continued with their regular care, plus contact with the research team to assess their everyday levels of physical and cognitive activity. Members of the active enrichment group, however, performed specific physical exercises under the supervision of Otago University physiotherapists, using an individualized programme delivered in small group classes. The active group also received an array of cognitive (thinking and memory) tasks which they competed weekly with their spouse, friend or a researcher. These systematic cognitive activities varied and/or increased in difficulty every two or three weeks. Such exercises are unique in that rather than popular 'brain exercises' they are instead theoretically derived to stimulate the many distributed networks in the brain that support a person's various cognitive skills. Different cognitive changes commonly occur over time in people with a PD diagnosis, so it important to look at many different cognitive tasks, unlike previous research studies.


Smart

‘Professor John Dalrymple-Alford and Professor Tim Anderson, in collaboration with colleagues at Canterbury and Otago Universities, are testing the idea that the addition of these two lifestyle factors will be beneficial to people with Parkinson’s Disease.’

The project is a major undertaking, despite the relatively small number of patients enrolled. We anticipate analysis of results later in 2017 and that our findings will provide a springboard for new developments in this exciting field of translational brain research.

Professor John Dalrymple-Alford
Professor of Psychology, NZBRI

Fundraising and the FBI

Fundraising for 2016 was off and racing with the second running of the Riccarton Charity Race day in association with the Canterbury Jockey Club and the Hickman Family Trust.

The next event across the line was our Trivia Night at the Rydges Latimer Christchurch. Top prizes were awarded by The Christchurch Casino and Rydges. The competition was tough, the grey-matter was tested with a lot of fun was had by the twenty teams who attended.

The first 'Friends of the BRI' (FBI) event was our 'Opera meets Art' evening at the Christchurch Art Gallery. A wonderful fusion of donated art for sale, fine wine from Pegasus Bay, delicious canapes from Lizzie's Cuisine and the beautiful sounds of The Opera Club ringing throughout the Christchurch Art Gallery. The event was an instant success, with tickets selling quickly. Under the guidance and expertise of Australian Music Director, Sharolyn Kimmorley, ticket-holders were treated to a night of popular opera tunes from a cast of twenty-three singers and an award-winning 12-year old violinist who wowed the audience with his skill. After such a successful evening, this has now become an annual event.

The jewel in the crown of the FBI fundraising calendar, is the FBI Golf Tournament, held at the Christchurch Golf Club in November. The Club is a generous supporter, with their Patron, Sir Bob Charles, playing each year. Principal Sponsor, Pacific Radiology (formerly the Christchurch Radiology Group), have supported this event since its inception. Auctioneer, Connor Paton from Mike Pero Real Estate helped get the bidding going at the prize-giving, all contributing to the $35,000 raised for the day.

We sincerely appreciate the dedication of the Friends of the NZBRI committee. In 2016, Kathryn Mulcock stepped-down as Chair with Mel Brew stepping into the role. Committee members Gabrielle Tasman, Ivan Donaldson, Fay Keeling, Liz Barry, Douglas McCaul, Sharon Rees-Thomas and Robyn Gillespie, make great ambassadors for the NZBRI.


GOLF Shop
Callaway

‘The jewel in the crown of the FBI fundraising calendar, is the FBI Golf Tournament, held at the Christchurch Golf Club in November. The Club is a generous supporter, with their Patron, Sir Bob Charles, playing each year.’

As well as gaining income from events, we welcome discussions with those planning to leave a lasting legacy and support our charity in their Will. This is a very important driver of our long term sustainability. Thank you to all those throughout 2016 who helped make fundraising for NZBRI a success, we look forward to working with you again in the future.

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Professor Ian Wright
Deputy Vice Chancellor (Research and Innovation), University of Canterbury

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Published Articles

Alamri, MacAskill, Anderson.
Repeated lumbar punctures for non-clinical indications: how do patients feel? European Neurology

Alamri, Vogel, MacAskill, Anderson.
Plasma exosome concentration may correlate with cognitive impairment in Parkinson's disease. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring

Alla, Pearson, Taylor, Miller, Clarke, Richardson, Willoughby, Abernethy, Sabel, Mason.
Disability profile of multiple sclerosis in New Zealand. Journal of Clinical Neuroscience

Almuqbel, Melzer, Myall, MacAskill, Pitcher, Livingston, Wood, Keenan, Dalrymple-Alford, Anderson.
Metabolite ratios in the posterior cingulate cortex do not track cognitive decline in Parkinson's disease in a clinical setting.
Parkinsonism & Related Disorders

Blakemore, Sinanaj, Galli, Aybek, Vuilleumier.
Aversive stimuli exacerbate defensive motor behaviour in motor conversion disorder. Neuropsychologia

Blakemore, Neveu, Vuilleumier.
How emotion context modulates unconscious goal activation during motor force exertion. NeuroImage

Blakemore, Rieger, Vuilleumier.
Negative emotions facilitate isometric force through activation of prefrontal cortex and periaqueductal gray. NeuroImage

Buckley, Helton, Innes, Dalrymple-Alford, Jones.
Attention lapses and microsleeps during tracking, psychomotor vigilance, and dual tasks.
Consciousness and Cognition

Guella, Evans, Szu-Tu, Nosova, Bortnick, SNCA Cognition Study Group, Goldman, Dalrymple-Alford, Geurtsen, Litvan, Ross, Middleton, Parkkinen, Farrer.
α-synuclein genetic variability: a biomarker for dementia in Parkinson's disease. Annals of Neurology

Jonmohamadi, Jones.
Source-space ICA for MEG source imaging.
Journal of Neural Engineering

Jonmohamadi, Poudel, Innes, Jones.
Microsleeps are associated with stage-2 sleep spindles from hippocampal-temporal network.
International Journal of Neural Systems

Kaipa, Jones, Robb.
Are individuals with Parkinson's disease capable of speech-motor learning? A preliminary evaluation.
Parkinsonism & Related Disorders

Lamvik, Guiu Hernandez, Jones, Huckabee.
Characterization and correction of pressure drift in the ManoScan high-resolution manometry system: in vitro and in vivo.
Neurogastroenterology & Motility

MacAskill, Anderson.
Eye movements in neurodegenerative diseases.
Current Opinion in Neurology

Mace, Porter, Dalrymple-Alford, Collins, Anderson.
Acute tryptophan depletion and Lewy body dementias.
International Psychogeriatrics

Schluter, Ahuriri-Driscoll, Anderson, Beere, Brown, Dalrymple-Alford, David, Davidson, Gillon, Hirdes, Keeling, Kingham, Lacey, Menclova, Millar, Mor, Jamieson.
Comprehensive clinical assessment of home-based older persons within New Zealand: an epidemiological profile of a national cross-section.
Australian and New Zealand Journal of Public Health

Snell, Macleod, Anderson.
Post-concussion syndrome after a mild traumatic brain injury: a minefield for clinical practice.
Journal of Behavioral and Brain Science

Toppi, Astolfi, Poudel, Innes, Babiloni, Jones.
Time-varying functional connectivity of the cortical neuroelectric activity associated with behavioural microsleeps. NeuroImage

Trevis, McLachlan, Wilson.
Psychological mediators of chronic tinnitus: the critical role of depression. Journal of Affective Disorders

Trevis, McLachlan, Wilson.
Cognitive mechanisms in chronic tinnitus: psychological markers of a failure to switch attention.
Frontiers in Psychology

Wood, Myall, Livingston, Melzer, Pitcher, MacAskill, Geurtsen, Anderson, Dalrymple-Alford.
Different PD-MCI criteria and risk of dementia in Parkinson's disease: four year longitudinal study.
npj Parkinson's Disease

2016 NZBRI Completed Theses

Sarah Davies
Predicting and preventing aspiration pneumonia in patients with acute stroke and dysphagia. PhD (Speech and Language Sciences), University of Canterbury

Jonathan Hackney
An investigation and feasibility study in using a multi-stage screening approach including postal screening for the early detection of mild cognitive impairment in a community sample. PhD (Psychology), University of Canterbury.

Kristin Lamvik
Modulation of spontaneous and volitional swallowing: methodological and behavioural analyses. PhD (Speech and Language Sciences), University of Canterbury

Eng Toh
Saccades, eye-hand movement and cognition in Huntington's disease: a 12 month study. PhD (Medicine), University of Otago

Stephanie Henderson
Mindfulness for smoking-cessation: a behavioural and neurophysiological study.
MSc (Psychology), University of Canterbury

Guneet Kaur
Florbetaben Amyloid Imaging for cognitive impairment in Parkinson's disease. MSc (Medical Physics), University of Canterbury

Jessica Langbridge
A neurophysiological and behavioural assessment of interventions targeting attention bias and self-control in binge drinking. MA (Psychology), University of Canterbury

Morgan McPhail
Patient-caregiver adjustment to Parkinson's disease: a dyadic investigation. MSc (Psychology), University of Canterbury

Meisha Nicolson
Autobiographical memory and cognitive theory of mind in non-mild cognitive impairment Parkinson's patients. MSc (Psychology), University of Canterbury

Megan Stark
Cognitive impairment in Parkinson's disease: a study of early-phase amyloid PET and arterial spin labeling perfusion MRI. MSc (Medical Physics), University of Canterbury

Legacy

Acknowledgments

Strategic Partners

University of Otago Christchurch

University of Canterbury

Pacific Radiology Canterbury

Neurological Foundation

Canterbury District Health Board

Canterbrainers Choir

MS and Parkinson's Society

Friends of the Brain Research Institute

Trusts and Foundations

Canterbury Medical Research Foundation

Orr Family Trust

Dove Charitable Trust

Christchurch Casino Trust

Margaret Hutchings Charitable Trust

S J Charitable Trust

Donors Over $500

Note we have some donors who wish to remain anonymous

Campbell and Lesley Ballantyne

L P Bodger

Frank Dickson

K Dillon

Donaldson Family

Graham Watson

Kevin and Joanna Hickman

Murray and Judith Purvis

Graeme and Faye Sim

Edith Tripp

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Gabrielle Tasman

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Rotary Bishopdale Burnside

Rotary Christchurch South

The Opera Club

Businesses

Pegasus Bay Winery

Sharpies Golf

Mike Pero Cashmere

Christchurch Golf Club

Strawberry Fare

Christchurch Art Gallery

Christchurch Casino

Rydges Latimer Christchurch

Beaufort House Akaroa

Canterbury Jockey Club

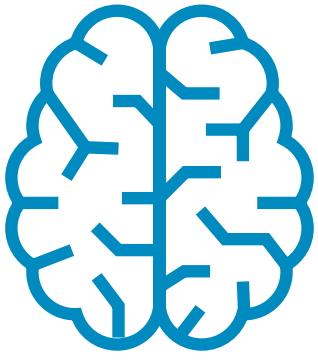
Classic Holidays Christchurch

Estates

Faye Harkness Estate

B C Cocks Estate

A Trembath Estate



Disclaimer

This summary financial report and the graphics embedded within the proceeding pages, have been authorized for issue by the Chair of the NZBRI Board Dr Cheryl Doig. The results presented in this summary have been extracted from the audited financial statements for the year ended 31 December 2016, which is available, by request, from the NZBRI Office, or online at our website **www.nzbri.org**

Financial Report 2016

2016 Overview

Bequests
$1,050,601

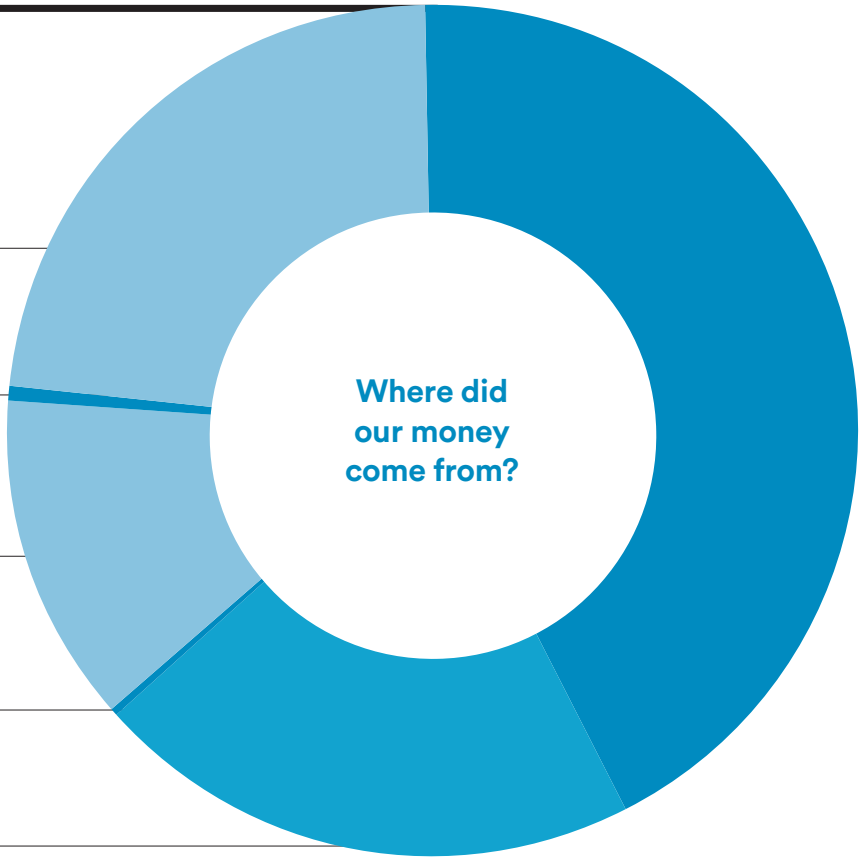
Research Activity
$572,486

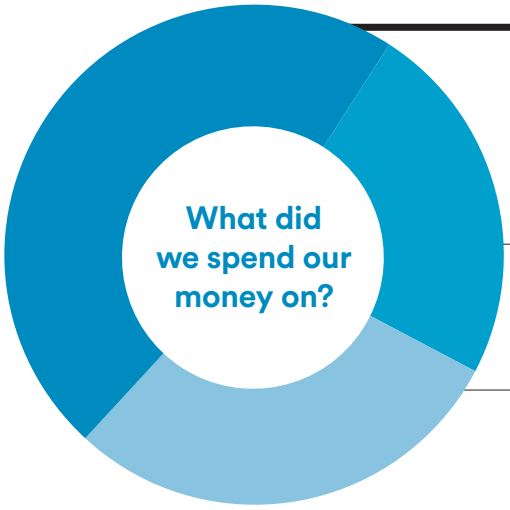
Investments
$7,520

Donations and Fundraising
$304,871

Other
$2,451

Grants
$510,000





Research
$597,507

Administration
$296,648

Occupancy
$370,677

Where did our money come from?	2015	2016
Research Activity	$554,299	$572,486
Investments	$1,224	$7,520
Donations and fundraising	$287,633	$304,871
Grants	$318,609	$510,000
Bequests	$0	$1,050,601
Other	$8,755	$2,451
Total revenue	**$1,170,520**	**$2,447,929**

What did we spend our money on?	2015	2016
Research	$512,024	$597,507
Occupancy	$356,441	$370,677
Administration	$297,806	$296,648
Total expense	**$1,166,268**	**$1,264,832**

A word on operational costs

There are significant challenges in fairly reflecting operational costs for many not for profits, including NZBRI. We are keenly aware of the need to keep administrative costs at a reasonable level, but must also maintain all the usual office and assessment systems that allow us to fulfil our purpose, all of which carry a cost. We are confident that we run the organisation efficiently and without waste and all supporters can be assured the majority of their generous donations get directly to research support.

Statement of Financial Position

	2015	2016
Accumulated profits	**$266,304**	**$1,456,810**

Current Assets	**2015**	**2016**
Cash and bank	$125,445	$101,278
Accounts receivable	$80,772	$49,778
Accrued interest (NZBRI 2 Portfolio)	$0	$2,276
Prepayments	$8,007	$7,708
GST Refund due	$9,562	$11,770
Shareholders current accounts	$28,710	$178,710
Total	**$252,495**	**$351,520**

Non-current Assets	**2015**	**2016**
Property plant and equipment	$141,447	$135,468
Accounts receivable	$0	$1,043,061
Total	**$141,447**	**$1,178,529**

Total Assets	**$393,942**	**$1,530,049**

Current Liabilities	2015	2016
Accounts payable	$58,662	$25,666
Cash and bank balances	$55	$1,177
Income recieved in advanced	$51,073	$22,099
Canterbrainers donations	$260	(-$273)
Accrued charges	$6,750	$6,000
Employee costs payable	$10,838	$18,570
Total	**$127,638**	**$73,239**

Net Assets	$266,304	$1,456,810