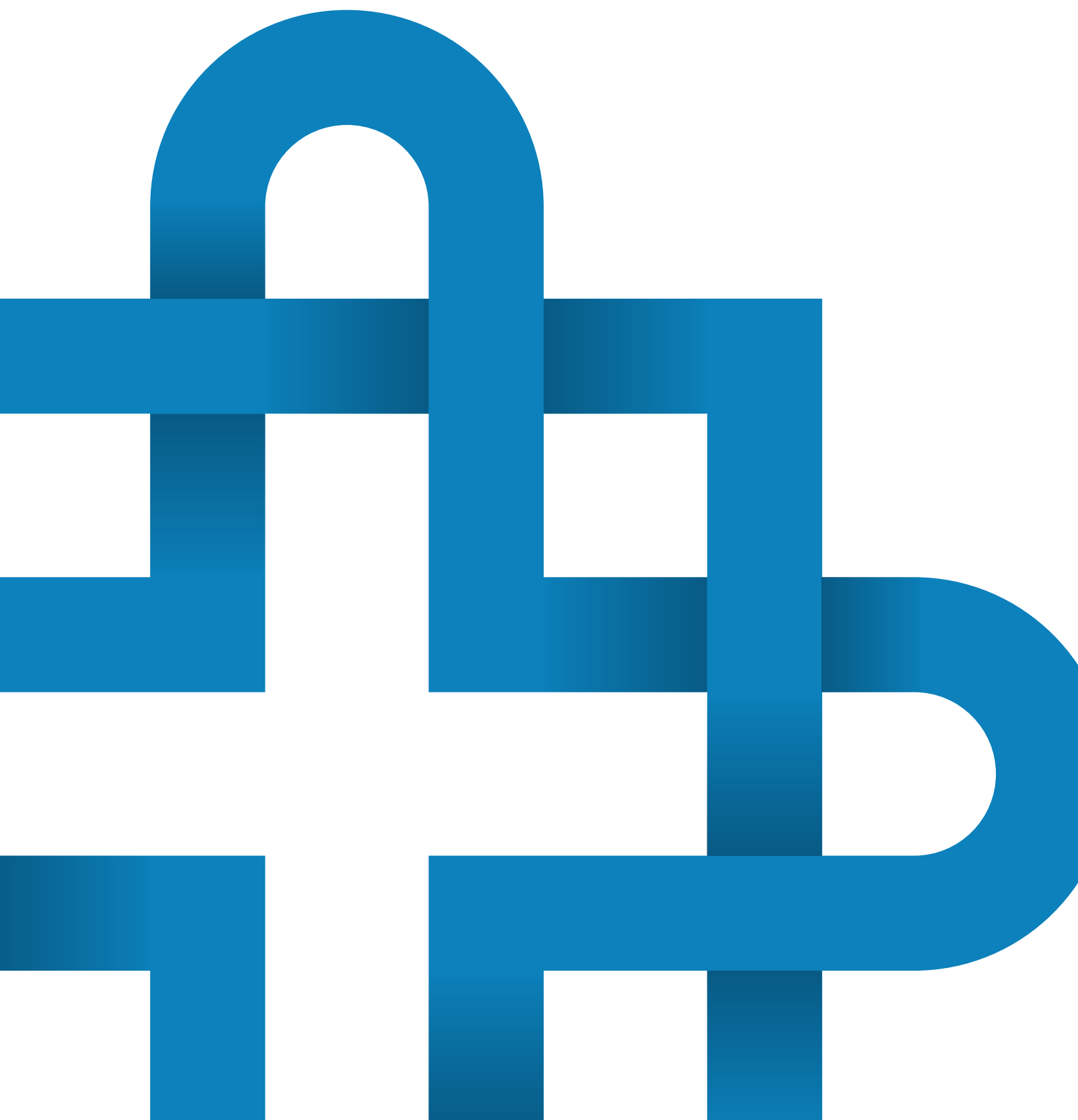
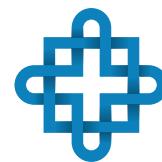


New Zealand  
Brain Research  
Institute

*Annual Report 2014*



# SNAPSHOT

**Staff - 25**

**PhDs completed - 22**

**Papers Published - 190**

**Research Volunteers - 1406**

**Graduate Students - 21**

**Disciplines Covered**

**Bioengineering**

**Mathematics**

**General Medicine**

**Neurology**

**Neurophysiology**

**Neuroscience**

**Nursing**

**Physics**

**Physiotherapy**

**Psychology**

**Radiography**

**Radiology**

**Countries Represented – 9**

**NZ**

**Malaysia**

**Saudi Arabia**

**United Kingdom**

**USA**

**India**

**Belgium**

**Iran**

**China**

## OUR MISSION

*NZBRI improves brain-health for our community, through research, education and best clinical practice*

The New Zealand Brain Research Institute is a wholly-owned subsidiary of the



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## Board



John Bayley - Chairman



Prof. Ivan Donaldson



Prof. Richard Faull



Prof. Steve Weaver



Sue Bramwell



Mike Stenhouse

## Directorate



Dr Michael MacAskill  
Research Director



Prof. Tim Anderson  
Clinical Director



Kate Russell  
Commercial Director

## CHAIRMAN'S REPORT

2014 was another active year for the Institute in its research into the human brain and related neurological disorders. A regular complement of specialist personnel in conjunction with a committed group of PhD and graduate students have secured funding, produced a regular flow of research papers and achieved recognition at both national and international forums throughout the year.



A highlight of the research year has been the successful selection of the Institute as one of the ten national Centre of Research Excellence (CoRE) organisations funded through the Tertiary Education Commission. These CoRE's are comprised of a national network of research collaborators, required to operate at the leading edge of their fields within the international research community. The CoRE attracts substantial government investment funding over a five-year period 2015 to 2020. The Institute's participation within "The Aging Brain" CoRE is co-hosted by the Universities of Auckland and Otago. It aims to identify early clinical, genetic and brain imaging markers that predict cognitive decline occurring as people age. This enables the selection of those most likely to benefit from novel preventative treatments for such conditions as dementia.

The Board acknowledges the exceptional leadership and planning by all concerned, in attaining this national recognition of research excellence. We anticipate additional benefits will flow from the closer association with like research entities involved in the project. In particular, we congratulate Prof Tim Anderson, Prof John Dalrymple-Alford and Dr Tracy Melzer from the Institute as named researchers in the CoRE. Consistent with the Institute's clinical focus, involvement with patients as part of the CoRE, outside normal clinical assessment and practice will be an example of how an active research programme can directly contribute to community healthcare.

In May, both Prof Anderson and Dr Melzer were successful in securing significant research grants from the Health Research Council for Parkinson's, dementia and associated imaging studies, which remain as a core focus of the Institute's activity.

In April, the Board farewelled Guy Johnson as retiring Executive Director of the CMRF and the Brain Research Institute. The founding of the Institute in 2004 incorporating the legacy of the late Cas van der Veer can be largely attributed to Guy's vision and influence. He has been responsible for its administration since inception. We thank Guy for his service over this extended period and trust he enjoys deserved satisfaction from his contribution to the establishment of what is now a vibrant research entity.

The Board welcomed Kate Russell as our new Commercial Director and CEO of the CMRF. Kate comes to us with an extensive background in "not-for-profit" organisations and is demonstrating a strong and beneficial influence on the commercial operation of the Institute. Arrangements have been agreed whereby the Institute will become more closely associated with the CMRF as a group. This will particularly relate to fundraising where marketing of the entities will be more efficiently promoted under a common branding regime. This enhanced commercial relationship is without compromise to the autonomy of the Institute in determining its research activity and the CMRF's independence in contestable research funding.

The Institute operates under a company structure, which is fully owned by the CMRF. Annual audited financial statements for New Zealand Brain Research Ltd are included in full within this report. In summary, the financial outcome was a small deficit of \$37,000 on activities for the year after expenditure of \$973,000. These monies are spent in the provision of research facilities, premises and administrative functions in support of personnel and research projects being conducted by the Institute.

Participating researchers are mainly university employees who independently secure the predominant financial contribution for their projects through applicable grants from external funding agencies and other various sources.

Income of \$936,000 included a drawdown of \$200,000 from the Institute's designated funds invested through the CMRF. These funds are held by the CMRF in a separate Brain Research Institute Portfolio specifically for expenditure at the Institute. They are utilised at the discretion of the Board in support of annual budgeted research activities as considered prudent. Any drawdown is credited to the Institute by way of grant from the CMRF.

Craigs Investment Partners manage investment of the Institute's Portfolio and continue to perform creditably in the generation of investment earnings which accrue to the Portfolio. The balance of the Portfolio at year end was \$1.37 mill.

Annual income was boosted by the receipt of substantial donations from the Orr Family Trust and the ongoing annual support of Mr Ray Newton.

I conclude on behalf of the Board by offering our thanks to all those who continue to contribute to the success of the Institute. The Friends of the BRI are a tireless group in their public promotion and fundraising support for the Institute. The research and clinical directorate lead by Dr Michael MacAskill and Prof Tim Anderson guide a solid group of researchers whose obvious passion for their projects is a fundamental strength of the organisation.

The clinical objectives of our research could not be achieved without those patient volunteers who willingly make themselves available for this purpose. Survival of the Institute inevitably depends on public financial contribution and the generosity of the Institute's benefactors in support of our research ideals, by way of legacies and regular donations which are gratefully acknowledged.

John G Bayley  
Chairman  
**New Zealand Brain Research Ltd**





## RESEARCH DIRECTOR'S REPORT

The New Zealand Brain Research Institute exists in order to increase our understanding of the brain and to improve the standard of care for patients affected by neurological disorders. Since its establishment in 2004, the guiding principle of the Institute has been to create a collaborative environment which allows clinicians, scientists and students to work together, regardless of institution or academic discipline. Our landmark achievements in 2014 have largely been to extend that successful local model into substantial contributions to national and international collaborations.

Our Chairman's report mentions the Institute's involvement in the newly-created national "Brain Research New Zealand" Centre of Research Excellence (CoRE). The government's intention for the CoRE programme is to recognise priority areas of research and to stimulate the creation of nationwide networks to share resources and expertise. Our Institute's focus is on person-centred research, involving extensive testing, assessment, and brain imaging of patients, and interviewing of family members. Involvement in the CoRE allows much stronger collaboration with our colleagues in Auckland and Dunedin, who have complementary strengths at the "wet lab" level, examining the brain at the microscopic level of individual neurons, for example. We are also leveraging investment from the CoRE to extend one of our major Parkinson's projects by recruiting additional patients in both Auckland and Dunedin. From a clinical perspective, the CoRE will also be rolling out a national Dementia Research Clinic in all three centres. This will provide directly for an improved standard of care and assessment for people with memory impairments while also providing a solid foundation for better understanding the disorders that affect them.

The importance of our area of research has also been recognised in the government's National Science Challenge process, in which one of the selected challenges is research into "Ageing Well". Led by Prof. John Dalrymple-Alford, the Institute is proposing to incorporate cognitive and physical therapy into that challenge, extending some of the work we are already doing within the CoRE framework. The aim is to translate our extensive experience in the assessment of older people's well-being into targeted programmes that can directly counteract some of the effects of neurodegenerative disease.

The Institute's Parkinson's research programme, led by Prof. Tim Anderson (clinical neurology, University of Otago) and Prof. John Dalrymple-Alford (neuropsychology, University of Canterbury), has reached impressive proportions. Over the last eight years, the team has conducted 661 comprehensive neuropsychological and movement assessments of 187 patients and 64 healthy older controls, with over 300 of those sessions also having associated brain imaging. This has made the study very attractive to international partners. The NZBRI programme is now the major contributor to a Dutch-led international consortium which is combining the data from many projects, in order to better understand the progression of cognitive impairment in Parkinson's. Associated with that is a Canadian project which is analysing the DNA from many of those patients, and again, NZBRI is a dominant contributor. This collaboration has produced exciting preliminary findings, identifying genes that might explain the substantial variation in progression to dementia in Parkinson's. Our participants' DNA has also been sent to the Queensland Brain Institute, which is investing hundreds of thousands of dollars in sophisticated analysis. These international genetics collaborations achieve benefits for all. Our international partners receive a large number of samples from very well-described patients. We, meanwhile, benefit from their substantial investment in expensive analysis procedures while being able to "stick to our knitting" and focus on dealing with face-to-face assessments of our participants.



The NZBRI's multiple sclerosis research programme, lead by consultant neurologist Dr Debbie Mason, is smaller but has achieved an equally impressive outcome. They have worked to identify the nearly 500 people over the last two years who have been newly diagnosed with multiple sclerosis (MS) or the first lesion that might lead on to a later diagnosis of MS. This first New Zealand-wide incidence study will provide an immensely valuable resource for studying the impact of the disease and to follow up the progress of the patients over time. This has required active support from all neurologists nation-wide, and benefits from input by international MS experts Professors David Miller (University College London) and Bruce Taylor (University of Tasmania).

The Neurotechnology research programme is lead by Prof. Richard Jones and has had a particularly successful year in attracting graduate students, from local and international universities. The traditionally engineering-heavy group now also has three psychology graduates. As well as continuing the group's existing work in micro-sleeps and sleep apnoea, they are extending into a new area, using EEG to measure brain activity in people with substance addiction problems.

Late last year, the research group led by Dr Maggie-Lee Huckabee had grown sufficiently to be able to migrate from the NZBRI to establish a stand-alone stroke rehabilitation centre for the University of Canterbury, based at St George's Hospital. Within a few months, growth at the NZBRI was sufficient to recover from the drop in student staff and numbers, so the strength of these parallel initiatives bode well for the future of neurological research in Christchurch.

Brain research is an expensive process, particularly when it involves MRI and other forms of imaging. We've been very fortunate to be successful in achieving highly-contested funding support from a number of local, national, and international sources: the Health Research Council, Neurological Foundation, Canterbury Medical Research Foundation, Marsden Fund, University of Otago, University of Canterbury, the Community Trust, European Space Agency, and the United States National Institutes of Health.

External research income is highly unstable, and NZBRI has at times been able to use its own capital funds to provide for the continuation of research activities in between receiving external funding. This relies upon our ability to attract donations and philanthropic backing. In 2014, the generous support of the Orr Family Trust in particular has allowed us to sustain and provide some certainty to our research and clinical activities in the dementia area. To keep the Institute afloat requires community support, and so our researchers have been active in communicating with the public. In 2014, we had prominent coverage on TV3 and Radio New Zealand, and gave many presentations to local service groups and educational organisation like U3A. Another community success this year was our partnership with Therapy Professionals, a private provider of a wonderful music-based therapy programme for people with neurological disorders (the 'CanterBrainers Choir'). This was facing closure until we agreed to bring it under the NZBRI umbrella and source charitable funding to allow this fantastic programme to continue sustainably. Our research is only possible with the generous support of our patients and volunteers, and it was wonderful to be able to give something back to them very tangibly this year.

Health research is an exciting and satisfying field. Personal highlights for me this year have included spending more time away from my desk, back in the eye movement lab, working face-to-face with our patients and volunteers. I was also privileged to teach scientific computing courses at Nottingham University and at the Medical School of Shahid Beheshti University in Tehran, and had the singular experience of working with fellow eye-movement researchers in Kuala Lumpur. For the first time, they are allowing us to measure what an orang-utan sees, while searching for food or even swinging from the tree-tops. Like all research institutes, we ultimately prove our worth by publishing our results in the international peer-reviewed literature and contributing freely to the body of knowledge. Our 21 papers from 2014 are listed below. All are available by request from our website, [www.nzbri.org](http://www.nzbri.org)

Michael R MacAskill, PhD - *Research Director*



- Alla & Mason. Multiple sclerosis in New Zealand. *Journal of Clinical Neuroscience*
- Alla, Pearson, Debernard, Miller, & Mason: The increasing prevalence of multiple sclerosis in New Zealand. *Neuroepidemiology*
- Athukorala, Jones, Sella, & Huckabee: Skill training for swallowing rehabilitation in patients with Parkinson's disease. *Archives of Physical Medicine and Rehabilitation*
- Baylor, McAuliffe, Hughes, Yorkston, Anderson Kim, & Amtmann: A differential item functioning (DIF) analysis of the Communicative Participation Item Bank (CPIB): Comparing individuals with Parkinson's disease from the United States and New Zealand. *Journal of Speech Language Hearing Research*
- Debernard, Melzer, van Stockum, Graham, Wheeler-Kingshott, Dalrymple-Alford, Miller, & Mason: Reduced grey matter perfusion without volume loss in early relapsing-remitting multiple sclerosis. *Journal of Neurology, Neurosurgery, and Psychiatry*
- Espiner, Dalrymple-Alford, Prickett, Alamri, & Anderson: C-type natriuretic peptide in Parkinson's disease: reduced secretion and response to deprenyl. *Journal of Neural Transmission*
- Harland, Collings, McNaughton, Abraham, & Dalrymple-Alford: Anterior thalamic lesions reduce spine density in both hippocampal CA1 and retrosplenial cortex, but enrichment rescues CA1 spines only. *Hippocampus*
- Jonmohamadi, Poudel, Innes, & Jones: Comparison of beamformers for EEG source signal reconstruction. *Biomedical Signal Processing and Control*
- Jonmohamadi, Poudel, Innes, & Jones: Source-space ICA for EEG source separation, localization, and time-course reconstruction. *NeuroImage*
- Jonmohamadi, Poudel, Innes, & Jones: Voxel-ICA for reconstruction of source signal time-series and orientation in EEG and MEG. *Australasian Physical & Engineering Sciences in Medicine*
- Le Heron, Wright, Melzer, Myall, MacAskill, Livingston, Keenan, Watts, Dalrymple-Alford, & Anderson: Comparing cerebral perfusion in Alzheimer's disease and Parkinson's disease dementia: an ASL-MRI study. *Journal of Cerebral Blood Flow & Metabolism*
- Macrae, Jones, & Huckabee: The effect of swallowing treatments on corticobulbar excitability: A review of transcranial magnetic stimulation induced motor evoked potentials. *Journal of Neuroscience Methods*
- McAuliffe, Kerr, Gibson, Anderson, & LaShell: Cognitive-perceptual examination of remediation approaches to hypokinetic dysarthria. *Journal of Speech, Language & Hearing Research*
- Pearson, Alla, Clarke, Taylor, Miller, Richardson, & Mason: Multiple sclerosis in New Zealand Maori. *Multiple Sclerosis*
- Pitcher, MacAskill, & Anderson: Trends in antiparkinsonian medication use in New Zealand. *Parkinson's Disease*
- Poudel, Innes, Bones, Watts, & Jones: Losing the struggle to stay awake: Divergent thalamic and cortical activity during microsleeps. *Human Brain Mapping*
- Toh, MacAskill, Dalrymple-Alford, Myall, Livingston, Macleod & Anderson: Comparison of cognitive and UHDRS measures in monitoring disease progression in Huntington's disease: a 12-month longitudinal study. *Translational Neurodegeneration*

Toosy, Mason, & Miller: Optic neuritis. *Lancet Neurology*

Ulrich, Aitken, Abraham, Dalrymple-Alford, & McNaughton: Effects of thalamic lesions on repeated relearning of a spatial working memory task. *Behavioural Brain Research*

Watanabe, Matsuo, Zha, MacAskill, & Kobayashi: Fixational saccades alter the gap effect. *European Journal of Neuroscience*

Wu, Taylor Kilfoyle, Smith, McGuinness, Simpson, Walker, Bergin, Cleland, Hutchinson, NE Anderson, Snow, TJ Anderson, Paermentier, Cutfield, Chancellor, Mossman, Roxburgh: Autonomic dysfunction is a major feature of cerebellar ataxia, neuropathy, vestibular areflexia 'CANVAS' syndrome. *Brain*



When the Institute, along with its parent organisation, the Canterbury Medical Research Foundation, decided to start a rebranding process, late in the 2014 year, we scouted around for people and stories to help us tell the Canterbury public what we do and garner support and donations to our cause.

Two people were selected and we will be using their images and message extensively across a variety of media in 2015.

Sue Robinson's story is one of courage and a generous giving spirit. Sue is married with three boys ranging in age from 25 - 37. The youngest of the boys has Duchennes muscular dystrophy and came to be adopted by Sue and her husband after they had him for a short period as respite carers. Sue tells us that despite expressing their interest in adopting early on with their son, they were unable to at the time as they were not legally married, so they got married specifically so they could adopt!

Sue was a degree-qualified early childhood teacher at the time of her diagnosis, of Parkinson's, six years ago. She simply knew something was not right and in particular that she had lost her sense of taste. After her diagnosis, her employer, who was not at all supportive of her condition, made it impossible for her to stay in her job, despite Sue being able to still work at the time. Sue misses her work very much and remains very proud of her qualifications.



Sue has lost 40kgs since her diagnosis and tells me that her grandchildren look at photos of her prior to the weight loss and do not recognise her! As well as managing her own condition and being the main carer for her son, Sue has been very active on the Muscular Dystrophy Board at local and national levels.

## RESEARCHER PROFILE – PROFESSOR TIM ANDERSON

Prof Tim Anderson is a neurologist and the Clinical Director at the NZBRI. In this latter role, he has responsibility for oversight of the clinical activities at the NZBRI. He has appointments as a professor of medicine at Otago University, Christchurch, and neurologist with the CDHB Department of Neurology, and also undertakes a small amount of private practice. All of these clinical activities are based at the NZBRI in the dedicated clinic space, the Van der Veer clinics at 40 Stewart Street.



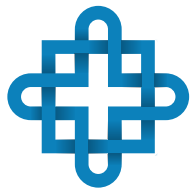
His particular interest and expertise is in the field of Movement Disorders - a subspecialty concerned with Parkinson's disease (PD), Huntington's disease (HD) and other neurological conditions that cause tremors (shaking) muscle spasms and muscular jerks. He undertakes two specialised CDHB clinics every week, diagnosing and treating patients with these conditions. In addition he treats debilitating muscle spasms (torticollis, facial spasms, foot or hand spasms) with botulinum toxin ("botox") in a dedicated half-day clinic every fortnight. There are also weekly research clinics related to participation in international research studies and pharmaceutical trials of new medications. One of these ongoing studies is the Enroll-HD study.

This is a huge international study that will ultimately include thousands of people with Huntington's disease (HD) and their families funded by a private organisation CHDI (Cure Huntington's Disease Initiative) with the aim of establishing a massive international Huntington's database as a springboard and catalyst for further research into this devastating inherited disorder. So far our NZBRI site has enrolled 70 participants into the study, including some from the Otago-Southland region with the support of neurologists in Dunedin. This successful enrolment status is in no small way due to the enthusiasm of our clinical research coordinator, Laura Paermentier.

Together with Parkinson's nurse Helen Skene, Tim provides access to advanced therapies for Parkinson's patients in Canterbury. One such provision is an *apomorphine pump* service in which patients with difficult-to-control Parkinson's have continuous infusion of apomorphine (not related to morphine but a replacement for the dopamine which is low in PD) into the subcutaneous tissue of the abdomen. This therapy provides smoothing of the erratic control that some people with PD get with their oral medications. Some other PD patients are referred up to Auckland for treatment of their condition by stimulators placed deep in the brain.

Dr Debbie Mason, Neurologist, also undertakes specialized clinics and research trials in multiple sclerosis (MS) at the NZBRI Van der Veer clinic facility; aided by Jane Eagle, nurse coordinator. These pharmaceutical trials have enabled Canterbury patients with MS to have access to new and developing therapies that are some time away from the market. Thus there are advantages to both patients and researchers from the dedicated clinics and clinical research studies and trials – patients get access to regular clinical review from specialists in their field and new medications, and the researchers are able to invite patient participation in the many research activities at the NZBRI.

So it has been a rewarding 12 months for Tim's clinical research at the NZBRI. Not only has his team been able to provide expert treatment for their neurological patients, but also, as noted by Dr MacAskill in his report, they have secured important research grants and established successful international collaborations. There is an extremely busy year ahead in 2015-16 with patient clinic activities and the new projects under HRC and CoRE funding.



## Friends of the New Zealand Brain Research Institute

The Friends of the Brain Institute (FBI) is an enthusiastic community group of volunteers established under the guidance of Professor Ivan Donaldson. The primary aims of the Friends are three-fold: to fundraise for ongoing neurological research at the Institute; to raise the public profile of the Institute, particularly to potential and existing sponsors; and from time to time give back in a meaningful way to the patients, their families and friends associated with the Institute, including educational support such as seminars and workshops.

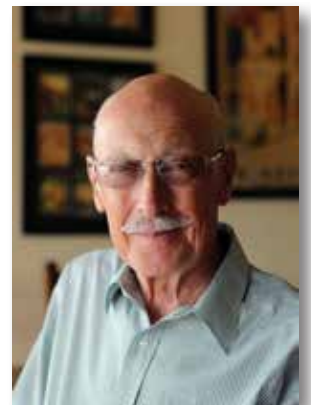
The FBI committee includes: Professor Ivan Donaldson, Gabrielle Tasman, Mel Brew, Douglas McCaul, Liz Barry, Sharon Rees-Thomas, Dr Michael MacAskill, Fiona Bellett, Dr Daniel Myall, Kathryn Mulcock and new members Fay Keeling and Caroline Wagteveld McKenzie.



The FBI is proud of its fundraising achievements over the last three years. In particular, the Friends Annual Golf Tournament held each November has proven to be an outstanding success under the stewardship of Mel Brew and Douglas McCaul. The third tournament on 21 November 2014 raised the sum of \$30,000, with the 2014 Major Sponsor being the Christchurch Radiology Group. The tournament is very popular and now boasts a loyal following with return patronage of both teams and sponsors.

The “Music for the Mind” Opera fundraiser on 23 August 2014 at the Omarino Wine Park featuring “The Opera Club” raised the sum of \$4,200.

The FBI were honored to host the launch of Professor Donaldson’s memoir, “The Truant from Medicine” on 2 October 2014. Professor Donaldson is generously donating the proceeds of the sale of this book to the NZBRI. The donation from sales to date is \$8,000. The Friends of the Brain Institute sincerely thank Ivan for his kindness in making this substantial donation.



The Friends Committee welcome interest and enquiry from experienced individuals, ideally connected with business or other networks, who may wish to join the team.

I sincerely thank all members of the FBI Committee for their commitment, sheer hard work and fortitude in bringing together the various elements required for the FBI’s successful fundraisers. Your incredible generosity, not only of time but of your own personal resources, is humbling. You are inspirational.

Thank you to Kate Russell for her leadership and “can do” attitude. Thank you to John Bayley for his sage advice and wisdom. Finally, fundraisers cannot be successful without the enormous support and goodwill of family, friends, Board members, business and the wider community. Our Friends group thanks each and every one of you.

**Kathryn Mulcock, Chair, Friends of the NZ Brain Research Institute**



## HIGHLIGHTS FROM THE 2014 STRATEGIC PLAN

In 2014, the Board and Management set out to articulate a key set of goals that would guide our thinking and actions over the coming three years. This Strategic Plan has created a roadmap of activity and aspiration to ensure the healthy growth of the Institute, through to 2017.

### Goals

#### **1. Secure the future of NZBRI through sustainable projects**

- We will leverage our strength in attracting PhD students to our work
- We will develop our capacity as a partner in the Brain CoRE project alongside Auckland University and Otago University
- We will identify and evaluate potential for extension and diversification from our current research foci

#### **2. Development of capacity in human resources**

- We will develop new roles as required to support and enhance existing projects and to ensure that we are taking account of the need for succession-planning
- We will, where possible, support key valued personnel to remain with us when external funding is delayed
- We will act as a good employer to counter structural inequalities in development of research careers
- We will ensure continuation of funding for scholarships and Summer Studentships as valuable learning opportunities for emerging researchers

#### **3. Development and growth in collaborative relationships and projects**

- We will ensure that we maximise all opportunities for healthy, close working relationships with other institutions, academic and clinical, to implement projects and increase capacity across the spectrum of brain research

#### **4. Place a stake in the ground in the Health Precinct**

- The NZBRI and CMRF group will continue to communicate our desire to have a physical presence in the Christchurch Health Precinct

#### **5. Increase public recognition and financial support for the NZBRI**

- We will undertake proactive and consistent messaging and fundraising to increase understanding of, and support for our work
- We will increase our fundraising activity to give the wider public an opportunity to financially support the NZBRI





## ACKNOWLEDGEMENTS

The Friends of the NZBRI  
Pegasus Bay Wines  
The Orr Family Trust  
Christchurch Radiology Group  
Court Theatre  
Strawberry Fare  
Rosanna Penna  
Lions Club of Kaiapoi  
Estate Ethel Hitchen  
The Canterbrainers Choir

Professor Ivan Donaldson  
Ray Newton  
The Order of St Lazarus  
Allergan  
Christchurch Golf Club  
B S Nankivell  
James Furneaux  
Annie Lee  
Canterbury Community Trust

Our sincere thanks to the many patients who give their time to assist us as research subjects. Without these community-spirited people, who make the choice to help others sharing their journey with the conditions they live with, our work would not be possible. Thank you all for your selfless and generous participation.

## REAL STORIES



David Chua is a man of many talents and has had a wide variety of roles throughout his working life. Along the way he has also had three children and two grandchildren.

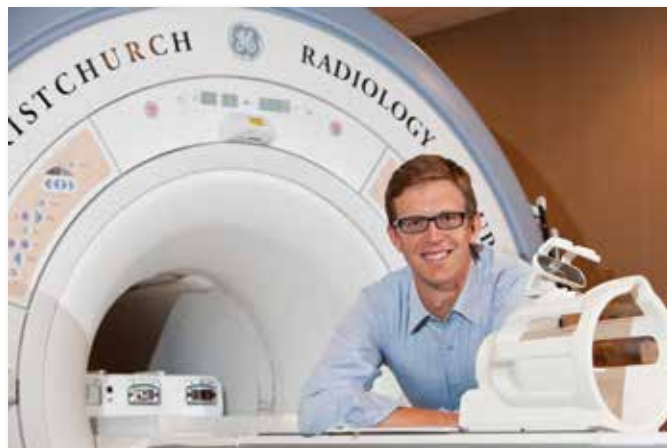
At the time of his diagnosis with Parkinson's David was a chef at Twiggers. The first sign that something was going wrong for him occurred seven years ago with the loss of his sense of smell (a real challenge for a chef) and he noticed that he was finding writing a lot more difficult, with his handwriting becoming a lot smaller than usual.

He has been under the care of Prof Anderson for some time now. David is very happy that he can use a computer to write now so his handwriting is no longer an issue. He has considered the Parkinson's as a new chapter in his life and he and his wife have a great attitude to living with his condition.



## RESEARCHER PROFILE – DR TRACY MELZER

The past year has been busy for the MRI arm of the NZBRI, with multiple studies commencing and continuing over 2014. The topics covered range from Parkinson's disease, to preterm birth, to brain scanning of rare birds. The various imaging projects reflect the opportunity for collaborative research facilitated by the NZBRI, with imaging projects in conjunction with the Universities of Otago (both Christchurch and Dunedin campuses), Canterbury, and Auckland; Canterbury District Health Board; and international partners including Harvard, Duke, University of Pennsylvania, University of Calgary, and University College London.



Three large projects acquired most of the MRI data in 2014. The first is our well-established, longitudinal study that follows individuals with Parkinson's disease over time (Profs Tim Anderson and John Dalrymple-Alford). At each assessment, individuals complete comprehensive neuropsychological, clinical, and eye movement assessment, along with MRI scanning. We are now seeing many participants six years after their first assessment, tracking their progression with objective measures derived from MRI.

The second is headed by Professor Brian Darlow (Paediatrics, Otago) and is gathering information about health and developmental outcomes in young adulthood for NZ children born in 1986 who were born very early or of very low birthweight (<1500 grams). To date, approximately 140 individuals have been scanned with advanced MRI. Dr Debbie Snell (Burwood Academy for Independent Living) heads the third large study, using MRI to examine potential brain differences between individuals that have had a mild traumatic brain injury and recovered well versus individuals that have not recovered as expected.

Other ongoing studies range from using functional MRI to investigate how the brains of both anxious and non-anxious participants with Parkinson's disease response to different facial emotions, to tracking changes in the brain associated with 'cognitive enrichment', a program aimed at slowing cognitive decline.

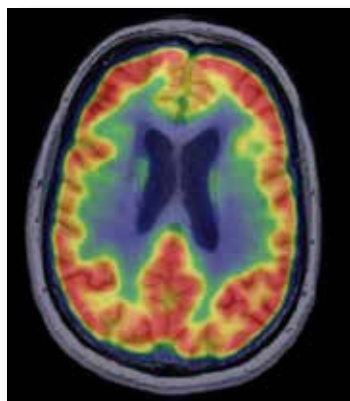
We have partnered with psychologists and psychiatrists to investigate the brain's response to stress hormones, specifically in relation to traumatic experiences associated with the Canterbury earthquakes. Professor Liz Franz (Psychology, Dunedin) has even flown participants with a rare genetic variant to Christchurch to scan participants with a rare genetic variant on the 3T scanner at Hagley Radiology.

In collaboration with Dr Paul Scofield, Senior Curator of Natural History at the Canterbury Museum, we scanned a very rare specimen of the French Polynesian shore bird *Prosobonia* (killed and preserved in 1922). This scan established that we could obtain useful brain images of preserved bird specimens, and measure brain size. Future work may include other endangered or extinct birds and tuatara.

We also became involved in a collaborative study funded by the European Space Agency to examine brain changes over a 1-year period spent in Antarctica, which will be used as a model for isolation,

lifestyle, and stress in space. All participants were scanned prior to leaving for Antarctica (Oct-Nov 2014), and as Christchurch is one of two launching sites for Antarctica (along with Hobart), we will scan all participants within a few days of returning from Antarctica (Oct 2015).

In 2014, the NZBRI added positron emission tomography (PET) imaging as an additional research tool. PET imaging uses a radioactive drug (tracer) to image metabolic activity in the brain. Excitingly, PET is not limited to imaging metabolism. It can also be used to image the accumulation of amyloid in the brain (a protein associated with Alzheimer's disease). As part of the HRC-funded project, we will be adding amyloid PET to our assessments in 2015.



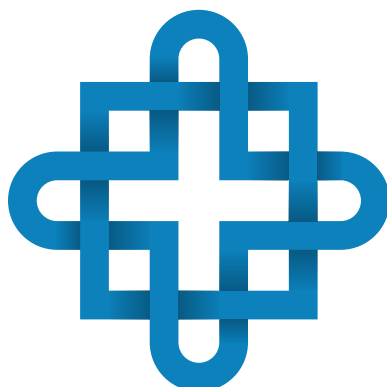
**Figure: An example of a metabolic PET scan in an individual with Parkinson's disease. Red indicates high metabolic rate, while green-blue indicates lower metabolism.**

Participation in the Brain Research NZ CoRE has increased our collaboration with researchers in other centres around NZ. The Dementia Research Clinics, a flagship platform of the CoRE, will involve MRI scanning of individuals at risk for dementia in Auckland, Christchurch, and Dunedin.

We have been heavily involved in developing the MRI protocol, as well as planning implementation and data analysis. Likewise, the NZBRI has become involved in the famous Dunedin Multidisciplinary Health & Development Study. This study has been following approximately 1000 individuals born in Dunedin in 1972-73. In the next follow up, advanced MRI will be added to the assessments, and it is likely that scanning will occur at the NZBRI.

2015 will also see the commencement of MRI studies investigating stuttering and, in collaboration with Lincoln University, we will also scan our first sheep.

We had one PhD and one MSc student complete thesis work this year, and will have seven postgraduate students working on imaging projects in 2015. With the influx of competitive grant funding obtained in 2013-14, 2015 is poised to be an exciting year for MRI research at the NZBRI.



# **New Zealand Brain Research Limited**

Annual report  
for the year ended 31 December 2014

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## Compilation report

### Report to the Directors of New Zealand Brain Research Limited

#### Scope

On the basis of the information you provided we have compiled, in accordance with Service Engagement Standard Number Two: Compilation of Financial Information, the annual report of New Zealand Brain Research Limited for the year ended 31 December 2014. This has been prepared in accordance with New Zealand generally accepted accounting practice as described in the statement of accounting policies.

#### Responsibilities

You are solely responsible for the information contained in the annual report and have determined that New Zealand generally accepted accounting practice is appropriate to meet your needs and for the purpose that the annual report is prepared.

The annual report is prepared solely for your benefit. We do not accept responsibility to any other person for the contents of the annual report.

#### Disclaimer of liability

We have compiled the annual report of New Zealand Brain Research Limited for the year ended 31 December 2014 in accordance with the limited procedures agreed in our letter of engagement dated 3 July 2012.

Our procedures use accounting expertise to undertake the compilation of the annual report from information provided by you. The compilation is limited primarily to the collecting, classifying and summarisation of financial information supplied by you. Our procedures do not involve verification or validation procedures. No audit or review has been performed and accordingly no assurance is expressed. We have not attempted to verify the accuracy or completeness of the information and therefore neither we nor any of our employees or agents accept any responsibility for the accuracy of the information from which the annual report has been prepared.

This annual report has been prepared at your request for your purposes only and neither we nor any of our employees or agents accept any responsibility on any ground whatsoever, including liability in negligence, to any other person.

KPMG

KPMG - Christchurch

Dated: 21/4/2015.

## Approval of annual report

The Directors are pleased to present the annual report, including the financial statements of New Zealand Brain Research Limited, for the year ended 31 December 2014.

For and on behalf of the Board of Directors:

  
John Greenwood Bayley

  
Ivan Macgregor Donaldson

Dated: 22 April 2015



## Company directory

as at 31 December 2014

Nature of business	Specialist research in Parkinsons disease and other brain research		
Registered office	66 Stewart Street Christchurch		
Location of business	66 Stewart Street Christchurch		
Incorporation number	1851961		
Incorporation date	21 August 2006		
IRD number	94-592-666		
Directors	John Bayley Ivan Donaldson Sue Bramwell Richard Faull Mike Stenhouse Steve Weaver		
Shareholders	Canterbury Medical Research Foundation Inc	<div>100</div> <div>100</div>	Ordinary shares
Accountants	KPMG Level 3 62 Worcester Boulevard Christchurch 8013		
Bankers	ANZ Bank Christchurch		
Solicitors	Anthony Harper Christchurch		

The directory is to be read subject to the compilation report on page 2 of this report

# Statement of financial performance

for the year ended 31 December 2014

	Note	2014 \$	2013 \$
<b>Revenue</b>			
Friends Income		50,955	35,008
General Income		28,566	4,657
Grants and donations received		413,165	795,349
Interest Received		1,341	1,241
Pharmaceutical research income		204,918	238,763
Rent received		236,903	222,343
<b>Gross surplus</b>		<b>935,848</b>	<b>1,297,362</b>
<b>Expenses</b>			
Research costs	1	369,715	550,178
Administration	2	561,679	539,293
<b>Non cash items</b>			
Depreciation		41,475	38,551
		41,475	38,551
<b>Total expenses</b>		<b>972,869</b>	<b>1,128,022</b>
<b>Net surplus/(deficit)</b>		<b>(37,020)</b>	<b>169,340</b>

These statements are to be read in conjunction with the notes to the financial statements and subject to the compilation report on page 2 of this report

# Statement of movements in equity

for the year ended 31 December 2014

	Note	2014 \$	2013 \$
Net surplus/(deficit) for the year		(37,020)	169,340
Equity at beginning of year		299,073	129,733
<b>Equity at end of year</b>	<b>3</b>	<b>262,053</b>	<b>299,073</b>

These statements are to be read in conjunction with the notes to the financial statements and subject to the compilation report on page 2 of this report

## Statement of financial position

as at 31 December 2014

	Note	2014 \$	2013 \$
<b>Equity</b>	<b>3</b>	<b>262,053</b>	<b>299,073</b>
<b>Current assets</b>			
Cash and bank balances	4	207,071	182,301
Accounts receivable		61,392	79,946
GST refund due		15,030	14,336
		283,494	276,583
<b>Non current assets</b>			
Property, plant and equipment	5	168,439	209,015
<b>Total assets</b>		<b>451,933</b>	<b>485,598</b>
<b>Current liabilities</b>			
Accounts payable		80,662	92,880
Income received in advance		33,728	19,356
Accrued charges		4,200	-
Shareholders' current accounts	6	71,290	74,290
		189,880	186,526
<b>Non current liabilities</b>			
		-	-
<b>Total liabilities</b>		<b>189,880</b>	<b>186,526</b>
<b>Net assets</b>		<b>262,053</b>	<b>299,073</b>

These statements are to be read in conjunction with the notes to the financial statements  
and subject to the compilation report on page 2 of this report

## Statement of accounting policies

for the year ended 31 December 2014

### Basis of preparation

New Zealand Brain Research Limited is a company domiciled in New Zealand and registered under the Companies Act 1993.

The financial statements comprise of financial performance, movements in equity, financial position and accounting policies as well as the notes to these statements.

The financial statements have been prepared in accordance with generally accepted accounting practice in New Zealand. They comply with approved Financial Reporting Standards (FRS's) and Statements of Standard Accounting Practice (SSAP's) as appropriate for entities that qualify for and apply differential reporting concessions. The financial statements have been prepared on the basis of historical cost.

### Differential reporting

In terms of the framework for differential reporting an entity is exempt from certain financial reporting standards if it satisfies the criteria laid down in the framework; such an entity is called a qualifying entity. New Zealand Brain Research Limited is an entity qualifying for differential reporting exemptions as it has no public accountability and is not large in terms of the criteria set out in the Differential Reporting Framework.

All available differential reporting exemptions allowed under the framework for differential reporting have been adopted except for:

FRS 9 - Information to be disclosed in the financial statements, where some additional disclosures have been made.

### Property, plant and equipment

Items of property, plant and equipment are stated at cost less accumulated depreciation and impairment losses.

Where an item of property, plant or equipment is disposed of, the gain or loss recognised in the statement of financial performance is calculated as the difference between the sale price and the carrying amount of the asset.

### Depreciation

Depreciation is charged to the statement of financial performance based on the economic life of the asset. The following rates have been used:

Leasehold improvements 7.5% - 20.0% diminishing value

Plant and equipment 10.0% - 60.0% diminishing value

Computer equipment 48.0% diminishing value

Furniture and fittings 11.4% - 60.0% diminishing value

### Receivables

Receivables are stated at estimated realisable value after providing against debts where collection is doubtful. Bad debts are written off during the period in which they are identified.

### Taxation

The company is exempt from income tax as it is a registered charity.

These statements are to be read subject to the compilation report on page 2 of this report



## Statement of accounting policies

for the year ended 31 December 2014

### Goods and services tax

All amounts are shown exclusive of Goods & Services Tax (GST), except for receivables and payables which are shown inclusive of GST.

### Changes in accounting policies

The accounting policies adopted are consistent with those of the previous year.



## Notes to the financial statements

### 1 Research costs expenses

	2014 \$	2013 \$
Pharmaceutical research costs	243,136	249,514
Pharmaceutical trial costs	-	199
Research costs	5,996	192,441
Research salaries	120,583	108,024
	<b>369,715</b>	<b>550,178</b>

### 2 Administration

	2014 \$	2013 \$
Accountancy fees	12,325	11,850
Audit fees	3,000	-
Portfolio management fees	-	3,264
Management fees	36,000	21,500
Power	20,041	18,544
Security	1,044	1,044
Repairs and maintenance	5,097	19,022
Cleaning	21,460	19,616
Bank charges	576	401
Computer expenses	28,788	29,268
Fundraising expenses	8,555	18,004
General expenses	16,764	13,940
Insurance and ACC	21,434	19,589
Marketing, publicity and functions	4,475	1,000
Printing and stationery	16,502	19,518
Wages - general	56,638	52,911
Rent	305,197	282,542
Telephone, tolls and internet	3,785	7,280
	<b>561,679</b>	<b>539,293</b>

These notes are to be read subject to the compilation report on page 2 of this report

## Notes to the financial statements

### 3 Equity

	Quantity	2014 \$	2013 \$
Share capital	100	-	-
Retained earnings		262,053	299,073
<b>Equity</b>		<b>262,053</b>	<b>299,073</b>

All shares have equal voting and dividend rights, and upon winding up rank equally with regard to the company's residual assets.

#### Movements in retained earnings

Balance at beginning of year	299,073	129,733
Net surplus/(deficit)	(37,020)	169,340
<b>Balance at end of year</b>	<b>262,053</b>	<b>299,073</b>

### 4 Cash and bank balances

	2014 \$	2013 \$
ANZ cheque account	106,775	162,289
BNZ account	-	20,012
ANZ Direct Online Account	100,296	-
	<b>207,071</b>	<b>182,301</b>
<b>Total cash and bank balances classified as follows:</b>		
Current assets	207,071	182,301
	<b>207,071</b>	<b>182,301</b>

These notes are to be read subject to the compilation report on page 2 of this report

## Notes to the financial statements

### 5 Property, plant and equipment

	Cost \$	Depreciation \$	Acc depn \$	Carrying value \$
Leasehold improvements	78,681	7,450	28,137	50,544
Plant and equipment	320,982	24,255	241,376	79,606
Office equipment	1,536	649	833	702
Furniture and fittings	48,872	9,121	11,287	37,586
<b>Balance as at 31 December 2014</b>	<b>450,071</b>	<b>41,475</b>	<b>281,632</b>	<b>168,439</b>

	Cost \$	Depreciation \$	Acc depn \$	Carrying value \$
Leasehold improvements	78,681	5,282	20,687	57,994
Plant and equipment	320,567	30,637	217,122	103,445
Office equipment	1,536	184	184	1,351
Furniture and fittings	48,671	2,448	2,448	46,224
<b>Balance as at 31 December 2013</b>	<b>449,455</b>	<b>38,551</b>	<b>240,440</b>	<b>209,015</b>

Further information can be found in the depreciation schedule maintained in Xero.

### 6 Shareholders' current accounts

#### Canterbury Medical Research Foundation Inc

	2014 \$	2013 \$
<b>Balance at beginning of year</b>	<b>74,290</b>	<b>170,856</b>
<b>Less outgoings</b>		
Current account movement	69,781	178,900
Receipts on behalf	(66,781)	(82,335)
	3,000	96,565
<b>Balance at end of year</b>	<b>71,290</b>	<b>74,290</b>
<b>Total shareholders' current accounts</b>	<b>71,290</b>	<b>74,290</b>
<b>Total current account balances classified as follows:</b>		
Current liabilities	71,290	74,290
	<b>(71,290)</b>	<b>(74,290)</b>

These notes are to be read subject to the compilation report on page 2 of this report

## Notes to the financial statements

### 7 Operating lease commitments

	2014	2013
	\$	\$
Lease commitments under non-cancellable operating leases are as follows:		
Current portion	184,722	271,876
Non current portion	153,185	337,907
	<b>337,907</b>	<b>609,783</b>

During the year ended 31 December 2014, \$305,197 was recognised as an expense in the income statement in respect of operating leases (2013: \$282,542).

### 8 Capital commitments

There are no capital commitments as at 31 December 2014 (2013: \$nil).

### 9 Contingencies

There are no contingent liabilities as at 31 December 2014 (2013: \$nil).

### 10 Related parties

During the year there have been trading transactions between the company and Canterbury Medical Research Foundation Inc (CMRF). The company is a 100% owned subsidiary of CMRF.

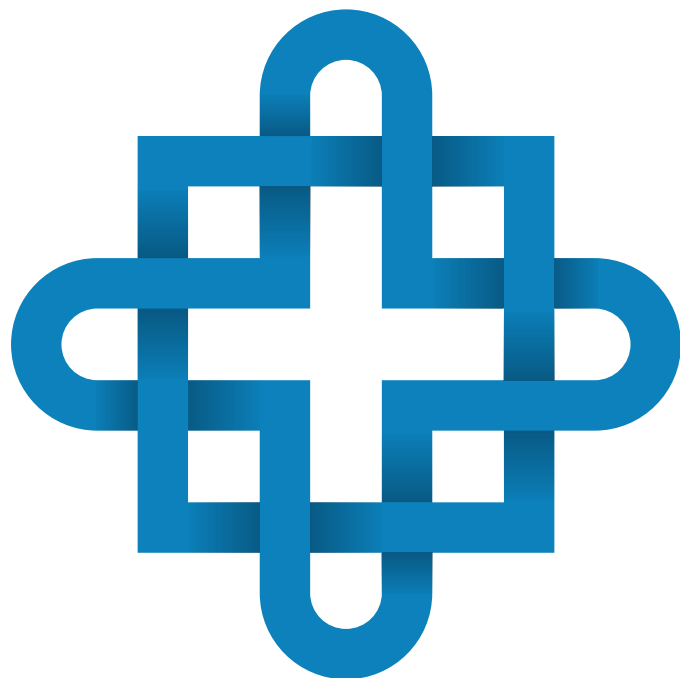
CMRF holds a Craigs Investment Portfolio for the specific use of New Zealand Brain Research Limited with funds of \$1,366,052 at 31 December 2014 (2013: \$1,475,212). The portfolio earned investment income of \$65,386 for the year ended 31 December 2014 (2013: \$82,335). This income is disclosed in the consolidated annual accounts for CMRF and accumulates to the funds held in the Craigs Portfolio for the specific use of the company.

There are grants paid from CMRF to the company each year. For the year ended 31 December 2014 there was a \$200,000 grant paid (2013: \$700,000 with an additional grant of \$81,940 for the transfer of assets). For 2014 these grant funds represent a drawdown from the Craigs Portfolio held by CMRF for the specific use of the New Zealand Brain Research Limited and are used to assist the company in costs related to brain research and other related costs.

CMRF and New Zealand Brain Research Limited lease premises from Stewart Street Holdings Limited and Stewart Street Investments Limited which are partly owned by interests associated with Guy Johnson, Mike Stenhouse and Ross Hutton who are members of the executive committee. Rental payments made during the year to Stewart Street Holdings Limited and Stewart Street Investments Limited amounted to \$305,197 (2013: \$282,542).







**[www.nzbri.org](http://www.nzbri.org)**