UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

Transmissions

Brain Health Research Centre

NEWSLETTER DECEMBER 2014

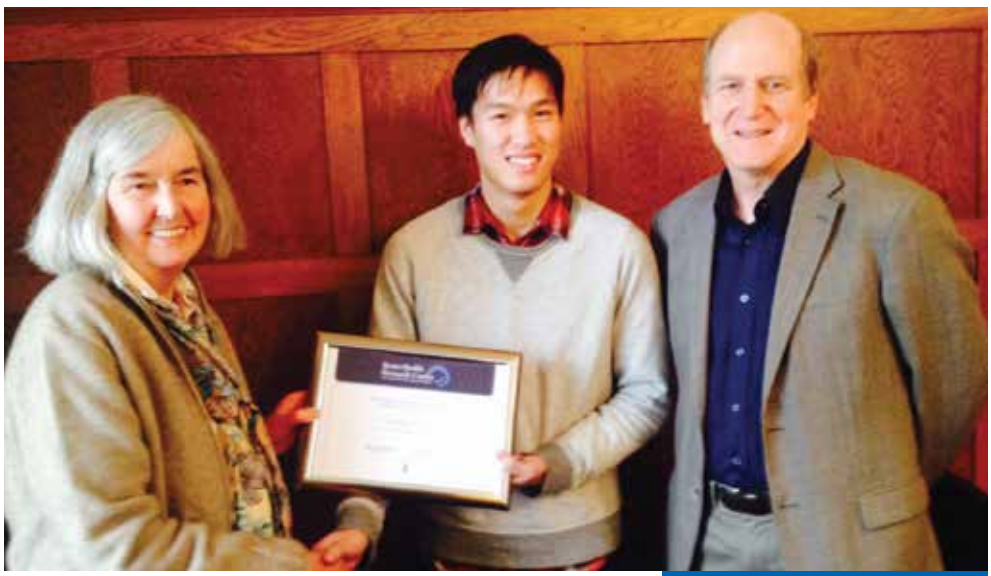
IN THIS ISSUE

Changes at our centre

Our director, Cliff Abraham and deputy director John Reynolds are moving on to new roles with the Centre of Research Excellence, a joint venture with University of Otago, Auckland University and AUT. The workload that this entails means they need to step down from their BHRC roles.

We welcome Professor David Bilkey and Dr Christine Jasoni as our new Director and Deputy Director and look forward to hearing from them in our February 2015 newsletter

Scholarship success results in wonderful opportunities



Greig Joilin, Prof Cliff Abraham, BHRC Director, and Helen Thacker.

Earlier this year we were pleased to welcome Helen Thacker to our Centre to meet Greig Joilin the recipient of the new annual 'Helen Rosa Thacker PhD Scholarship in Neurological Research', which she has very kindly funded.

Helen enjoyed meeting with Greig and discussing the research being undertaken along with supervisor Dr Joanna Williams. This included a tour through the laboratory which Greig works in and a visit to the University of Otago's Anatomy Museum.

Helen was also thrilled to have an opportunity to meet Professor Dirk de Ridder the Neurological Foundation Chair of Neurosurgery and learn of the research he is currently involved with.

The $5,000 scholarship has enabled Greig to further his research work by visiting and working for two months at the Queensland Brain Institute at the University of Queensland. Greig along with another University of Otago PhD student Brigid Ryan worked under the guidance of Associate Professor Charles Claudianos and his lab.

This opportunity for Greig to collaborate with other researchers is not only a valuable experience, but an insight to the world of neuroscience, opening more opportunities in the quest for knowledge.

FOOTNOTE FROM **GREIG JOILIN**

Being awarded the Helen Rosa Thacker Scholarship for Neurological Research has enabled me to extend the opportunities available to me as part of my PhD. The extra funding not only allowed me to go to Brisbane to do research work at the Queensland Brain Institute, but also enabled me attend the Neuroscience 2014 conference in Washington DC. Here I was given the opportunity to present my work to the wider neuroscience scientific community. I was also able to hear and speak with the leading experts in the field. These opportunities have helped me develop further as a scientist and as a person. I am very grateful to Helen Thacker and the Brain Health Research Centre for providing this scholarship as none of the above would have been otherwise possible.

Deputy Director looking forward to focusing on new CoRE challenges

Dr John Reynolds

Dr John Reynolds is stepping aside from the Deputy Directorship of our centre due to his increasing commitment to the Directorate of the CoRE and the Interim Management Group for the Ageing Well National Science Challenge. These commitments, added to his portfolio during 2014, have meant that he feels he is no longer able to devote the time to the BHRC role that it deserves.

John has given a lot to the centre and has greatly enjoyed the role. He was quick to reiterate that that he will remain part of the BHRC as a Principal Investigator. When asked for comment he said: "The strong synergies between the CoRE and the Centre will bring strength to Otago as a research centre and I will be looking for every opportunity to interact with the teams we have here. My sense is that the BHRC is the home and the CoRE occupies a set of rooms within the house along with the other research divisions."

John wishes the new Director David Bilkey and Deputy Director Christine Jasoni well as they take over the reins of the BHRC.

UPCOMING EVENTS

Brain and Mind Integrative Neuroscience, Matariki Network Conference, 1-3 Dec 2014

We are excited to be hosting Neuroscientists from six sister universities from around the world, who are will be in Dunedin to share their work, hear about our work and discuss possible collaborations in the future.

Brain Week 14-20 March 2015

In conjunction with Otago Museum and the Neurological Foundation.

A week of events, including one event in Queenstown - The complete programme for Brain week 2015 will be listed in our February 2015 newsletter. We are currently planning a full week of events, seminars and activities based at the Otago Museum, Dunedin.

Queenstown 18 March 2015

Professor Michael Nilsson, Director Hunter Medical Research Institute, NSW. In association with the Queenstown Catalyst Trust.

Brain Health Research Centre, not just about the aging brain

Professor Stephen Robertson

Professor Stephen Robertson is one of the new members to our centre in 2014. Often people relate brain disorders with aging, but clinical geneticist, researcher and paediatrician, Professor Robertson reminds us many conditions of the brain develop before birth or during childhood. With time shared between the University of Otago and the Genetic Health Services New Zealand (the national clinical genetics service , his position as the Cure kids Professor of Paediatrics is a hectic, but rewarding role.

A team of researchers are working with him, looking at the genetic causes of malformations in children, with a particular focus on conditions affecting the skeleton and brain. A key theme of their research is looking at how and why genes mutate to impair development of the structure and function of the brain. Professor Robertson described his work as finding a clinical signature of a genetic disorder and then working backwards to identify the exact genetic change that caused it.

"Some malformations of the brain are caused by defect migration and movement of neurons during development – nests of cells land up in the wrong place or are disordered. By identifying these presentations and looking in the genomes of affected individuals answers can be developed." he said.

It is time consuming, but rewarding when new discoveries are made. During a recent interview, Professor Robertson pointed to a nearby filing cabinet and said "There are over 4000 samples and MRI's from around the world in there. We work with colleagues worldwide and we have developed a global reputation for the work we do here in Otago."

For families who carry genetic diseases through generations, this research can give understanding and opportunities for future hope.

People orientated projects motivate research fellow

Assistant Research Fellow Rose Smither's scientific career began with nine years as laboratory technician in the Department of Physiology at the University of Otago. This gave her a very good understanding of what goes on in the world of research. From there, Rose headed off on her OE, ending up in London and worked at the Institute of Neurology at University College London as a research technician, exploring stem cell research for treatment of spinal injury.

"This research was extremely motivating and I made my decision to continue in research on my return to New Zealand." Rose said.

Currently Rose is working with Dr Louise Parr-Brownlie and Professor Brian Hyland on a Health Research Council project investigating optogenetics to improve motor function for Parkinson's disease.

"I had a Great Uncle with Parkinson's and was keen to work in this area as I had seen first-hand the unwanted side effects from the current drugs for this condition. This makes me very keen to be part of this research. It is believed that deep brain stimulation using electrical pulses may have side effects, so now we are now looking at using light, rather than electrical pulses to stimulate the brain."

Assistant Research Fellow Rose Smither's

A career highlight I was time spent working with Professor Valery Feigin, who was guest speaker at our Conference in June this year. Rose gathered information from stroke patients and their families over a period of time to analyse the impact, diagnostic trends and recovery patterns of over 2,500 stroke patients in the Auckland region. This was the first study of this scale in New Zealand and it is hoped that the learnings from it will alter the way patients are treated throughout the recovery process. The study also focused on prevention. Many people had no idea that high salt levels in diet increased the chance of stroke. Rose hopes that this work, not only helped the stroke patients involved, but that the knowledge shared, may mean entire families will make lifestyle changes which could lessen the chance of more of them having strokes.

BHRC Member Honoured

We would like to congratulate one of our members; Professor Neil McNaughton who has been newly elected as a Fellow of the Royal Society of New Zealand.

Prof McNaughton is an internationally acclaimed behavioural neuroscientist who has developed a neuropsychological theory of anxiety. His research covers widespread areas, from drug-screening models of anxiety and the biological basis of human personality to learning and emotion. His "brain by-pass" technique is being used in a clinical trial of therapeutic treatment for brain trauma in the United States. During his time at Otago University, Professor McNaughton has been extensively involved in the development of our Neuroscience programme, including the development of the undergraduate Neuroscience programme (the only one of its kind in New Zealand).

The Royal Society of New Zealand is an independent statutory organisation that promotes and advances science, technology and the humanities in New Zealand. Fellowship to the Royal Society is an honour conferred for distinction in research or the advancement of science, technology or the humanities. There are currently fewer than 400 Fellows.

Message from our Director

Professor Cliff Abraham

This has been another active and exciting year for the Centre. The message that the brain is our most important asset, and needs looking after (!), is getting heard more and more in the community. And our science and clinical research teams are discovering new and exciting ways to help in this cause. It's only going to get better from here.

One of the most exciting developments of the year is the creation of the new national Centre of Research Excellence devoted to studying and addressing the major issue of maintaining brain health during aging. As Co-Director of Brain Research New Zealand-Rangahau Roro Aotearoa, I am really looking forward to helping lead the effort now from a national perspective. Unfortunately, the time commitment that will be involved means that I need to step down from my current role as Director of the BHRC. Perhaps after helping start and develop the Centre over the past 8 years, it is indeed time for fresh blood in any case. I believe the Centre has grown immensely in stature over this time, locally to internationally, through the concerted efforts of all the Centre members. And I know this upward trajectory will only get better under the new leadership of Professor David Bilkey.

I want to thank all the members of the Centre who have given so willingly of their time to various Centre activities, especially those who have served on the Management Committee over the years, not to mention the members of the public serving on our external Advisory Board. I am particularly grateful to Associate Professor John Reynolds and Dr Nick Cutfield who have been such able Deputy Directors of the Centre. A special thank-you to our support staff who have kept me on track over the last few years: Jill Leichter, Alexis Poppelbaum, Jane Reynolds and Irene Mosley.

I will still be around to talk neuroscience and brain health, so look forward to staying in touch!

NEWS IN BRIEF

PhD candidate Megan Elder, originally from South Otago has received a Scholarship from DAAD (German Academic Exchange Service) to study for three months in Germany. Megan will be studying at the Max Planck Institute for Brain Research in Frankfurt under the direction of Professor Erin Schuman, one of the leading experts in neuronal protein synthesis. The Schuman lab is one of only two labs in the world that are using FUNCAT, a ground-breaking method of visualizing newly synthesized protein. Megan will spend her time in Frankfurt learning this new technique.

Students Karleigh O Conner and Jacob Young will be spending the summer in the lab after being awarded BHRC summer research studentships. Karleigh is investigating EEG results for patients with non-epileptic seizures to see if a diagnostic marker can be devised.

Jacob will be developing computer software solutions to improve video stimulus quality on an Augmented Reality prototype to be used for neuro-rehabilitation.

For regular updates and news stories on the Brain Health Research Centre visit

otago.ac.nz/ bhrc

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Algae possible key to future treatments

Imagine something as dangerous as the toxins in Algae bloom being the source of possible future therapies for neurological conditions such as Alzheimer's, Parkinson's, autism and schizophrenia. BHRC PhD student Shane Hellyer has spent this year researching these possibilities with the support of the Hanns Möhler Roche scholarship.

Shane Hellyer

During his final year at Bayfield High School in Dunedin, Shane took the opportunity to attend a University of Otago open day and visited the Pharmacology department. "As a science, Pharmacology really grabbed me and I was hooked." In his undergraduate year Shane moved into neuroscience, under the guidance of Professor Steve Kerr, who already worked with algal bloom and toxins.

"Being able to work with a new toxin, right from the start of it being identified, offered a challenge that intrigued me and my work has grown from there. I think the world of natural products and their therapeutic uses has real potential," Shane said.

Computer modelling has made it much easier for researchers to look at new toxins and their interactions between these naturally occurring products and to investigate possible future scientific and therapeutic uses. Working in collaboration with the Cawthron Institute in Nelson, the biggest non-crown research centre in NZ, Shane has worked for four and a half years on this project. The study has concluded that the pinnatoxins block nicotinic receptors in both skeletal muscle and the brain. This has both implications for the toxicity of these toxins and also potential applications for developing therapeutics, as these receptors are implicated in a number of diseases such as Alzheimer's, Parkinson's, cancer and schizophrenia.

Shane has already published articles in scientific journals on his research findings. "Working with something so new has helped motivate me to try and be the first to find some answers. More information on Shane's work can be found at: pubfacts.com/author/Shane+D+Hellyer

Brain Facts

The human brain weighs about 1.3kg and has over 100 billion neurons

Neurons are so small that you could fit around 31 on a single pin head

The left hemisphere has 186 million more neurons than the right hemisphere

Between 750ml and 1 litre of blood flows through the brain every minute