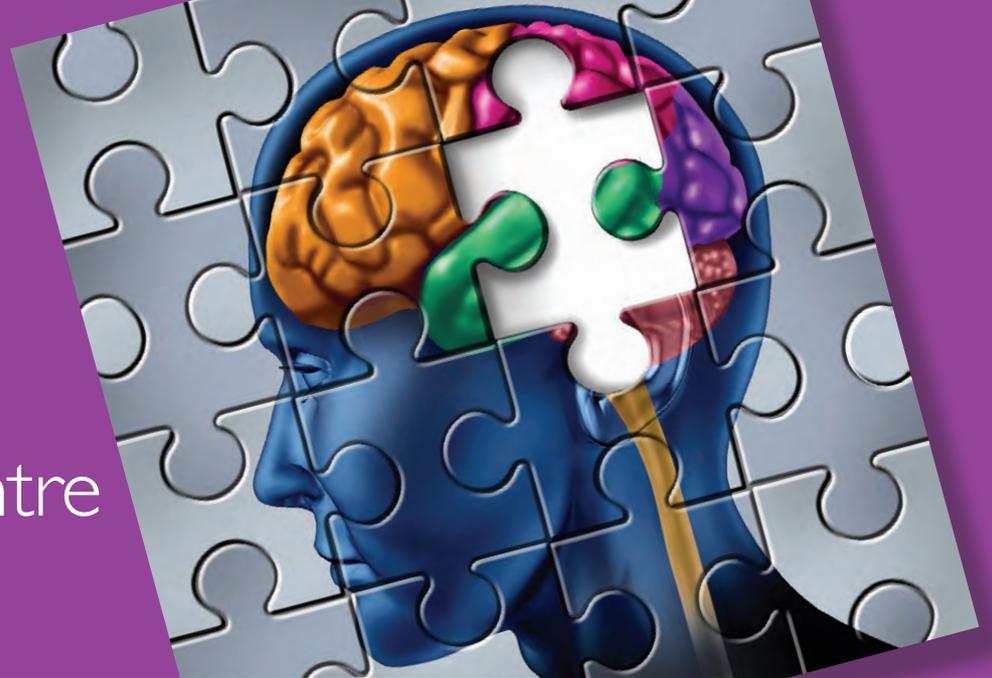




# Brain Health Research Centre

NEWSLETTER JUNE 2013



## IN THIS ISSUE

Dr Brian McMahon announced as Patron of the BHRC

What's new in the BPU

2013 Young Investigator

From maternal health to mental health

Upcoming events

Supporting the BHRC in 2013

## NEWS IN BRIEF

### Lottery grants success

Congratulations to our BHRC members Prof Warren Tate and PhD student Angus Mackay (Biochemistry), Dr Yiwen Zheng (Pharmacology and Toxicology), Prof Cliff Abraham (Psychology), and Dr Andrew Clarkson (Anatomy) who have recently benefited from Lottery Health Research grants, to pursue research aimed at improving the health of New Zealanders.

## Dr Brian McMahon announced as Patron of the BHRC

It is with great pleasure that the Brain Health Research Centre announces Dr Brian McMahon has agreed to become Patron of the Centre. A University of Otago Medical School graduate, Dr McMahon has had a commendable military and medical career spanning 60 years, and is well known and respected in the Otago community.

Dr McMahon retired as a Brigadier, having served in the New Zealand Defence Force for over 40 years. He commenced his service as the Resident Medical Officer in Waiouru in 1966 and saw active service in 1969 as a Medical Officer in the 1st New Zealand Services Medical Team in Vietnam. Dr McMahon's military career was culminated in his appointment as Director-General of Defence Force Medical Services in 1980. He also had the honour of being appointed as the Honorary Surgeon to her Majesty the Queen 1980-83 prior to his retirement from military service in 1983.

When asked what the highlight of his career was, Dr McMahon had trouble choosing. He decided that a very memorable time was when he was appointed Medical Superintendent at Cromwell hospital in 1961. Dr McMahon thoroughly enjoyed his time working in Cromwell noting "I was a rural Doctor in a rural town, where I was friend and Doctor for the entire community".

Dr McMahon remained active within the Defence Medical Services and in 2002, he was appointed Honorary Colonel for the Otago University Medical Company. Dr McMahon credits the training he received at the University of Otago Medical School in preparing him for the wide range of casualties and diseases he treated whilst serving as a surgeon in the Vietnam War.



Dr Brian McMahon receiving the 'ANZAC of the year' award in 2011.

After his military career, Dr McMahon went on to have a distinguished medical career as a Medical Superintendent at both Wakari and Dunedin Hospitals and as a lecturer at Otago Medical School.

Internationally, Dr McMahon is an active member of the Leprosy Trust Board Fiji (Inc) based in Suva. As the Chairman, and then Medical Advisor to the Christchurch based Pacific Leprosy Foundation, he has undertaken missions in the South West Pacific and South East Asia. He is also Patron of the New Zealand Vietnam Health Trust. This Trust was established by the military 'Medical Corps' and civilian

personnel who worked in Vietnam during the Vietnam war in the 1960's and 70's. He has regularly travelled to Vietnam, in particular Bong Son where he served during the war, to assist with Trust projects. Despite being now into his 80's, Dr McMahon continues to contribute to the education of medical students and has been a powerful influence on the careers of many successful medical professionals, both in the military and civilian settings.

Dr McMahon's five children have all carved themselves distinguished careers. His only daughter Jenny, is a Nurse, Nutritionist, research scientist, and is currently President of the New Zealand Red Cross. His sons have all been successful in their areas of expertise including a successful businessman, Orthopaedic surgeon, Oral Maxillofacial Surgeon, and a retired soldier who has now joined the Police Force.

Dr McMahon has been recognised a number of times for his contributions to New Zealand and Medicine being a Commander Order of the British Empire (CBE), Knight of the Order of St John (KStJ), and Knight Commander Order of St Lazarus of Jerusalem (KCLJ). He was named the Royal New Zealand Returned Services' Association 'ANZAC of the Year' in 2011.

Professor Cliff Abraham, Director of the BHRC, commented "We are thrilled to welcome Dr McMahon as Patron of the Centre. With his lifetime of service as a doctor and a humanitarian both in New Zealand and internationally, he has been extremely influential to many in the community. We know that through his support of us as our Patron, we can advance the centre's research and links within the community."

## What's new in the BPU

Dr Andrew Clarkson, a Senior Research Fellow in the Department of Anatomy and Psychology, is the Deputy Chair and a regular user of the BPU facilities. After completing his PhD at the University of Otago, Dr Clarkson spent two years working in the Department of Neurology at the University of California, Los Angeles. In 2008, he was awarded the New Zealand Neurological Foundation Repatriation Fellowship to establish a laboratory at the University of Otago.

The Behavioural Phenotyping Unit (BPU) is a testing suite which allows animal model experiments to be carried out in a controlled environment for accurate and detailed testing with specialist equipment, such as cameras and tracking software. The BPU and specialist equipment is available for all to use. The Unit's Coordinator Julia Jenkins is available to help train students from Honours level upwards on equipment use, if they have had no previous experience conducting behavioural experiments. Additional information can be obtained from Julia Jenkins at [BPU.tech@otago.ac.nz](mailto:BPU.tech@otago.ac.nz). The BPU at the University of Otago is now in its second year after being sponsored jointly by the BHRC and the University in 2011.

Dr Clarkson's current research focuses on promoting recovery of function following a stroke. Stroke is the leading cause of long-term disability and is the third largest killer in New Zealand. There are approximately 60,000 stroke survivors in New Zealand, and 24 people a day who suffer a stroke. The ability for the adult brain to regenerate or recover from acute injury is limited, and although acute stroke deaths have declined in recent years, the incidence is still increasing as our population ages.

The mechanisms of recovery post-stroke have not been well defined and studies have shown that there is limited capacity for neural repair, which includes re-mapping of cognitive functions and the sprouting of new connections in tissue adjacent to the stroke. In

2010, Dr Clarkson, along with colleagues at University of California, published a study about a compound that when administered in slow release doses, reactivated neurons in the brain responsible for limb function. The compound was a benzodiazepine-like compound antagonist that is specific for  $\alpha 5$ -subunit-containing extrasynaptic GABA(A) receptors, which was initially developed to treat Alzheimer's disease. The neurons that had been reactivated had initially appeared to be dead or dormant after a stroke. Six weeks post-treatment, the mice had 50% of motor limb mobility gained. The research suggests that some brain cells affected by strokes have not been killed, but are merely dormant and able to be reactivated.

Dr Clarkson is just weeks away from embarking on further research on stroke recovery at the BPU. His new study follows on from his research on limb recovery, and will focus on establishing new stroke models for cognitive recovery. Dr Clarkson has acquired four Bussey Touch Screens to complete memory testing post-stroke. Memory for previous learning using the touch screens will be tested post-stroke, as well as the ability to complete new touch screen learning and memory tasks. Dr Clarkson is confident to have results from his cognitive recovery research by the end of the year. The new touch screens are the first in New Zealand, and will be a great asset for future studies at the BPU. These are the same touch screens that are already being used around the world for testing of memory impairments in other neurological conditions such as Alzheimer's Disease and Schizophrenia. The touch screens are also being used to test potential memory improving drugs. If groups are interested in using the Bussey Touch Screens or learning more about what they can be used for, they can contact Dr Clarkson at [andrew.clarkson@otago.ac.nz](mailto:andrew.clarkson@otago.ac.nz) or visit the website [www.campden-inst.com](http://www.campden-inst.com)

## NEWS IN BRIEF

### Oamaru public lecture

In April, BHRC members John Reynolds, Cliff Abraham, and Christine Jasoni headed north to present their research work to the Oamaru community. Organised by Genetics Otago, the three researchers presented talks at Waitaki Boys and Waitaki Girls High Schools followed by a standing room only evening lecture at the Oamaru Opera House. It was great to see a large turnout for the event, and excellent questions being asked by an attentive audience. Watch out for more information on more public talks throughout the south planned for later this year.



L-R Associate Professor John Reynolds, Professor Cliff Abraham, and Dr Christine Jasoni

# 2013 Young Investigator

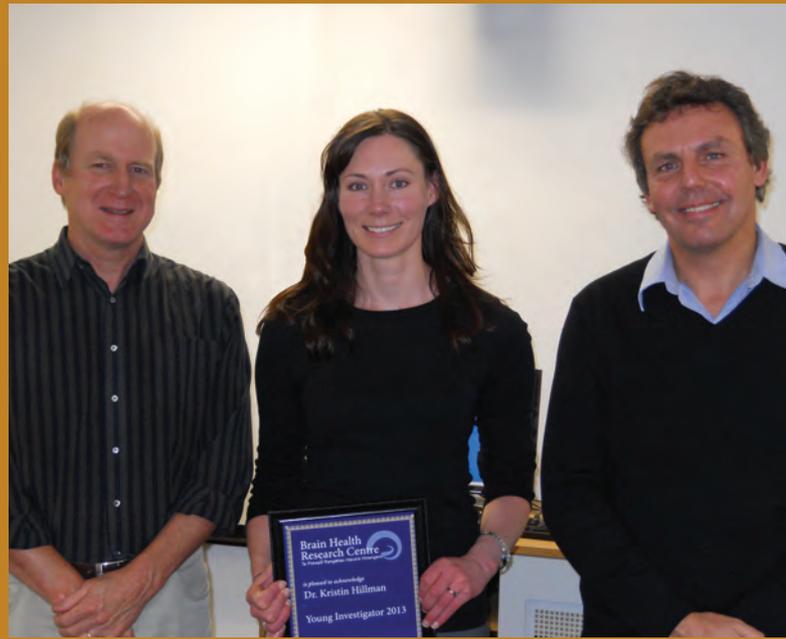
The annual BHRC Young Investigator lecture was this year awarded to Dr Kristin Hillman, who presented her research 'Delving into the neuroscience of work ethic'.

Dr Hillman, originally from the United States, moved to New Zealand in 2008 to join The University of Otago Psychology department as a Postdoctoral fellow. Dr Hillman has held a lecturer's position since 2011. Her research examines the neural mechanisms of decision-making, particularly how the brain assesses and expends effort in cost-benefit type decisions.

One facet of effort expenditure that we can all relate to is work ethic - the tendency to select a high-effort high-reward pursuit over easier, but less rewarding alternatives. It is not well understood however, how the brain encodes and drives the high-effort choice behaviour. Using a combination of behavioural paradigms and in vivo recording, Dr Hillman's recent work suggests that activity in the anterior cingulate cortex (ACC) may play a key role in work ethic. The ACC, located in the frontal cortex, has been previously implicated in cost-benefit type decisions. Dr Hillman and Professor David Bilkey have started to delineate specific neural mechanisms within ACC that may help inform an individual when, and when not, to invest extra effort towards a goal.

In their most recent study, Dr Hillman and Professor Bilkey recorded ACC neurons while competitive tasks were being undertaken.

These initial studies in the ACC suggest that this brain region may play a key role in decisions where we need to consider "Is it worth the



2013 Young Investigator Dr Kristin Hillman with Professor Cliff Abraham and Associate Professor John Reynolds

effort?". Stronger activity patterns in the ACC may tell us "Yes, it is", which could represent a neural cornerstone of the colloquial work ethic. Current research in Dr Hillman's lab, supported by the Marsden Fast Start funding scheme, aims to delve further into this idea.

## From maternal health to mental health

### Does our mother's health during pregnancy affect our well-being?

Scientific research has already told us that drinking and smoking during pregnancy can cause physical birth defects, learning disabilities, developmental delay, and mental illness. In this scenario, drinking and smoking are voluntary actions and women can be counselled to avoid such activities during pregnancy.

Working in this general area is Dr Christine Jasoni, a Senior Lecturer in the Department of Anatomy. Originally from the United States where she gained her PhD in Developmental Neuroscience, Dr Jasoni relocated to New Zealand to join the University of Otago. The focus of Dr Jasoni's research is on discovering how the maternal environment during pregnancy affects the formation of the foetal brain.

Dr Jasoni's research focuses on relatively common pregnancy complications that women may experience, yet have no control over, such as infection (flu), gestational diabetes, obesity, and stress. From previous research, it is already known that these complications all highly elevate the risk that a baby may suffer from mental illness later in life. The goal of Dr Jasoni's research is to understand how these environmental influences increase the risk of mental illness in offspring and what can be done to protect the foetus in situations of pregnancy complications that the mother has little control over.

Dr Jasoni uses animal models to identify the changes in the brain of the developing foetus, when faced with suboptimal maternal health. She believes that altered brain formation may be a predetermining factor in later life brain dysfunction, such as mental illness. In studies of obese mothers, and mothers exposed to environmental factors linked to schizophrenia, the brain wiring and normal brain development processes were strikingly different in the foetuses. Dr Jasoni looks for alterations in fundamental processes in brain development to see which specific maternal factors impact negatively on the healthy foetal brain. From this, it is hoped that markers will be discovered to predict potential neurobehavioural disorders and to establish research backed guidelines for healthy pregnancies

With obesity and diabetes on the rise in Western society, it is extremely important that we understand the health implications of these diseases for future generations. Previous research has already shown that maternal obesity can greatly increase the likelihood that offspring will also be obese. Dr Jasoni's research follows on from this, and she is interested in understanding how it is that maternal obesity alters the development of the foetal brain circuits that regulate offspring body weight.

# Supporting the BHRC in 2013

## Speaking engagements

Our scientists are keen to share their work with the public. If you would like a speaker for your community group, please contact Alexis Poppelbaum on (03) 479 4150 or [bhrc-comm@psy.otago.ac.nz](mailto:bhrc-comm@psy.otago.ac.nz) and we can arrange someone to speak on a topic of interest to your organisation.

## Donating to the BHRC

Our team of researchers are committed to undertaking internationally excellent research to develop new treatments for neurological disorders. With your support, we can significantly enhance our research and ability to discover new treatments for brain diseases.

Donations to the BHRC are administered through The University of Otago Foundation Trust, a registered NZ charity. Donations made by NZ resident taxpayers qualify for a tax rebate. Cheques can be made out to 'The University of Otago Foundation Trust – BHRC', or to make your donation, please visit [www.givealittle.co.nz/org/BHRcentre](http://www.givealittle.co.nz/org/BHRcentre)

There are a number of other ways you can support our Centre, including considering a gift in your will, we would love to hear from you. Please contact Alexis Poppelbaum on (03) 479 4150 or [bhrc-comm@psy.otago.ac.nz](mailto:bhrc-comm@psy.otago.ac.nz)

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## Upcoming events

### Alzheimer's disease public seminar with Wendy Fleming and Hon Jo Goodhew

Thursday 6 June 2013, 5.30pm

Dunedin Public Art Gallery, 30 The Octagon, Dunedin

'Dementia – The epidemic is here' will be presented by our guest lecturer Wendy Fleming RN. Wendy is the Chair of Alzheimer's New Zealand Charitable Trust, and the Vice-Chair of Alzheimer's Disease International. Wendy is also an Honorary Life Member, and past Chair of Alzheimer's New Zealand.

Honourable Jo Goodhew, Minister for Senior Citizens and Associate Minister of Health will be introducing the seminar and speaking about the government's plans to support the increase of age-related diseases such as Alzheimer's.

### BHRC Conference

The 7th annual BHRC conference will be held on Friday 7 June. The conference includes sessions on Alzheimer's disease, blood borne biomarkers, novel therapeutics, and presentations from Postgraduate students.

This year we welcome guest speakers Professor Peter Schofield from Neuroscience Research Australia, and from The University of Auckland, Ju-li Lily Chang, Associate Professor Cristin Print, Professor Mike Dragunow and Associate Professor Debbie Young.

### Art in Neuroscience – supported by the BHRC

What happens when scientific images of the brain are given to artists as inspiration to create an art work? 14 BHRC Neuroscientists and 17 artists from the Otago Polytechnic Dunedin School of Art are working together on this exciting venture with some fantastic results.

Grand opening Friday 19 July, 5.30pm

Hunter Centre, Corner Great King & Frederick Streets

RSVP: To Jane Reynolds, 03 479 4066 or

[bhrc-admin@psy.otago.ac.nz](mailto:bhrc-admin@psy.otago.ac.nz), by Monday 15 July 2013

### Australasian Winter Conference on Brain Research

As part of the Queenstown Research Week, the 31st annual AWCBR is open for academics to attend and participate in. Early bird registration and abstracts must be received by 12 July, with standard registrations being accepted until 11 August.

Saturday 24 – Wednesday 28 August 2013

Copthorne Resort Hotel, Queenstown

Registrations: email [awcbr@psy.otago.ac.nz](mailto:awcbr@psy.otago.ac.nz) for registration information