NeuRA
Discover. Conquer. Cure.

the NeuRA magazine

Issue 28 | **Autumn 2019**

NeuRA leads research into 'chemobrain' patient cure

- New research identifies early testing for Alzheimer's
- World first aged driver study led by NeuRA
- Dementia prevention diet for all
- Parkinson's collaboration with Michael J. Fox Foundation

Message from our CEO

Professor Peter Schofield AO

Prof Peter Schofield AO

We have started 2019 with great optimism with a publication in *Nature Medicine* by the international DIAN Study, in which NeuRA is a founding partner.

The study details evidence for a blood test that can predict Alzheimer's disease 16 years before clinical symptoms appear. This research has provided critical insight into the biomarkers that both contribute to, and predict the onset of Alzheimer's. Being able to identify a particular signature in the blood is the first step in the early detection and treatment of this devastating disorder of the brain. Our hope is that in the not-too-distant future a test can become part of a routine medical check-up, providing a cost-effective and efficient early warning of dementia.

In other news, I was humbled and honoured to be recognised in the 2019 Australia Day Honours for my service to the community and on behalf of the organisations and outstanding research teams I have had the privilege to lead. I intend to apply a continued focus on the urgent need for more research and funding into neuroscience in Australia, particularly into ageing, neurodegeneration and mental health disorders.

Neurological, mental illness and substance use disorders represent society's most complex, severe and costly health challenges and are the leading cause of global disability. In Australia brain disorders are also the leading cause of disability with more than a quarter of Australians affected. Together, these brain disorders have a combined cost of over $60 billion per annum.

I hope this award will help keep the spotlight on the urgent need for a strong, collective and integrated response, in which outstanding research advances like the work we are doing in Alzheimer's and dementia, can directly benefit the health outcomes of all Australians.

Prof Peter R Schofield AO *FAHMS PhD DSc*
CEO

Cover photo: Breast cancer advocate Karen Foster and NeuRA researcher Dr Adam Walker

NeuRA Events

Randwick Mayor visits NeuRA

L-R: Professor Anstey, Mayor Kathy Neilson, Ian Harris

Mayor of Randwick Kathy Neilson recently toured NeuRA stopping by to meet many of our amazing scientists, researchers and clinicians. First stop on the tour was the Paxinos Lab where she met Scientia Professor George Paxinos AO, who recently discovered a hidden nuclei in the brain, and who is one of the most cited neuroscientists in the world. She also met with Professor Kaarin Anstey and her team researching healthy ageing and dementia. It was wonderful to welcome our local Mayor to NeuRA and share our research vision and goals to support the community.

'Hip Festival' coming to a city near you in 2019

Registry Manager, Elizabeth Armstrong at Hip Fest, WA

The Australian and New Zealand Hip Fracture Registry (ANZHFR), based at NeuRA, has initiated a series of Hip Festivals to harness the collective knowledge of key stakeholders in the field. The Festivals aim to inspire and enable those involved in the provision of care. The first two Hip Festivals were held in Western Australia and New South Wales at the end of 2018. The ANZHFR has plans to take the Festival on the road to other Australian states and New Zealand in 2019. You can also watch an educational video on hip care with Professor Jacqui Close on our NeuRA seminar platform at **NeuRAtalks.org**

Tasmania 28 March: Launceston Clinical School
Queensland 31 May: The Prince Charles Hospital Education Centre

*For more information on the Hip Festivals, please contact **Karen Lee: k.lee@neura.edu.au** or **02 9399 1132**

Innovative MIND diet reduces risks of dementia

Multiple studies have found that the food we eat can significantly affect our risk of cognitive impairment. One diet in particular, the MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diet, has demonstrated notable correlations with improved brain health and a reduced risk of Alzheimer's disease and other types of dementia.

What is the MIND diet?

As the name implies, the MIND diet is derived from the Mediterranean and the DASH (Dietary Approaches to Stop Hypertension) diets. The MIND diet emphasises healthy eating habits with a focus on categories such as nuts, berries, leafy green vegetables, other vegetables, wine, beans, fish, poultry, whole grains and olive oil. It also limits food from the unhealthy categories such as fried food, pastries, sweets, butter or margarine, red meat and cheese. Multiple research studies have looked into whether the MIND diet helps prevent Alzheimer's disease and other types of dementia. Of a cohort of 960 older adults, researchers found that high adherence to the MIND diet was connected to a slowing down of cognitive decline that typically occurs with ageing. Visit **NeuRAtalks.org** for more information on reducing the risk of dementia.

Pain research receives significant boost

Pain research at NeuRA is set to benefit from a significant funding boost with Associate Professor James McAuley leading a global research collaboration to test interventions for Complex Regional Pain Syndrome (CRPS).

Associate Professor James McAuley

"Of all the chronic pain conditions, CRPS is the most devastating," says Associate Professor McAuley. "It's characterised by unbearable and terrifying burning or stinging pain and there are currently no available treatments. Our aim is to develop low-cost, evidence-based interventions that can be easily translated into clinical practice." The project, titled MEMOIR, will involve multi-national randomised controlled trials to test the most promising interventions for CRPS. For people living with pain this new research promises to seek low-cost options in reach of all people in our communities.

NeuRA's Motor Impairment team

NeuRA hosts the world's first Motor Impairment Conference

Recently NeuRA hosted the world's first Motor Impairment Conference, bringing together the brightest minds from all over the world.

This conference focused on all aspects of motor impairment from basic research through to translational medicine and clinical trials, with a host of excellent international speakers. The conference was opened by NeuRA's Deputy Director Professor Simon Gandevia.

Dr Adam Walker discovers potential treatment for 'chemobrain'

Dr Adam Walker

In a discovery that could one day help breast cancer patients, Dr Adam Walker has found a potential treatment for 'chemobrain', a condition that affects up to 60 per cent of women after receiving chemotherapy for breast cancer.

The study, published in PLOS-ONE and funded by the National Breast Cancer Foundation (NBCF), has the potential to transform cancer treatment research and eradicate the negative side-effects of cancer and chemotherapy.

Dr Walker says that up until now, scientists believed chemotherapy was the only cause of cancer-associated cognitive impairment such as memory, learning and concentration difficulties, commonly dubbed 'chemobrain'.

"However, studies have observed cognitive impairment in cancer patients prior to treatment," says Dr Walker.

"This suggests **the cancer alone may be sufficient to induce cognitive impairment,** but the mechanisms through which this occurs are unknown."

In his study using animal models, Dr Walker targeted **tumour-to-brain communication** and found breast cancer cells released markers that cause inflammation in the brain.

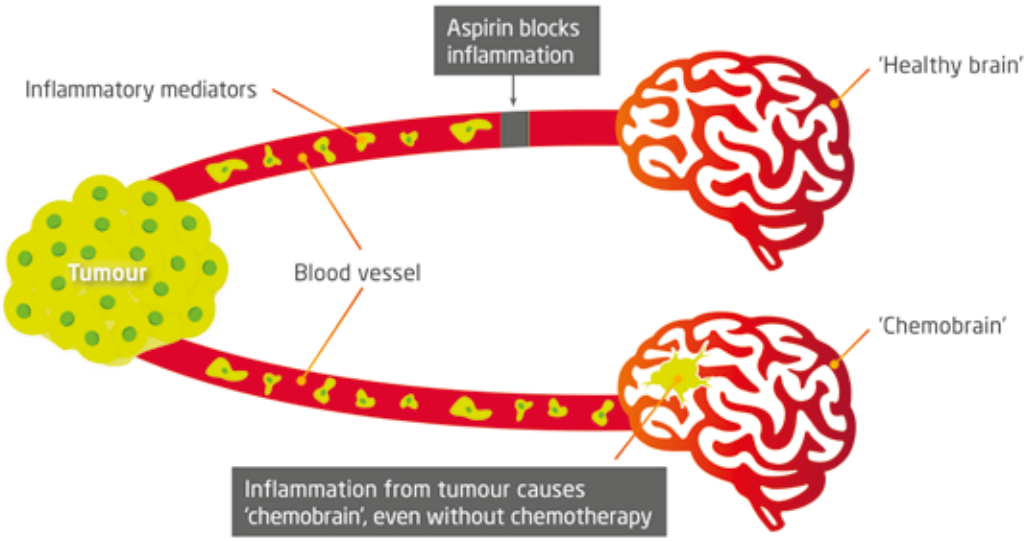
He found a low dose of anti-inflammatories completely blocked breast cancer cells from causing memory loss without affecting other aspects of the disease.

"This suggests **the tumour itself can actually hijack the brain via inflammation** to cause cognitive impairment, but we can use anti-inflammatories to block this process.

"Interventions to treat cancer-induced cognitive impairment have so far focused on behavioural therapies such as brain training, which don't tap into the biological processes of tumour-to-brain communication," says Dr Walker.

"This is the first study to show that we can potentially disrupt that communication using anti-inflammatory agents such as aspirin to reduce the inflammation that causes cognitive impairment."

NEW FINDING: ASPIRIN CAN PREVENT 'CHEMOBRAIN'



CEO of NeuRA Professor Peter Schofield said this innovative new research has the potential to transform how cancer patients view and manage their treatment.

"This work represents a new frontier for neuroscience in cancer research," says Professor Schofield.

"Our ultimate goal is to eradicate the negative side effects of cancer treatment, so that quality versus quantity of life decisions no longer need to be made."

"Chemobrain has long been an issue for breast cancer patients who have been treated with chemotherapy," says Dr Chris Pettigrew, NBCF Director of Research Investment.

"This new development is a big win for research and for the 68,824 Australians living with breast cancer."

The next phase of Dr Walker's work is to look at how anti-inflammatories might block other aspects of chemobrain like learning and concentration difficulties, and will be followed by clinical trials.

"We think anti-inflammatory drugs could be a potentially cheap and safe intervention to prevent and treat chemobrain, but we need to learn more about who should take them and when during the cancer journey," says Dr Walker.

Video Story Online
neura.edu.au/magazine/neura-magazine-28

Debora Rothmond

NeuRA's Schizophrenia Research Laboratory in action

Debora Rothmond is the laboratory manager of NeuRA's Schizophrenia Research Laboratory (SRL), which supports researchers and scientists in their endeavours to discover, conquer and cure schizophrenia. Debora began her tenure at NeuRA in July 2007 and manages a wide range of activities for SRL.

"One of the things I love about my work is that it never stays the same. There are always new discoveries, new research, new people and new challenges," says Debora.

"One of the most memorable events from the past 11 years was Professor Cyndi Shannon Weickert's discovery of neuroinflammation and immune cells in the brains of people with schizophrenia. I am particularly excited about this remarkable research because we're now finding the greatest proportion of patients with inflammation is in the midbrain region. This is the region I studied at the start of my research career.

"The midbrain is home to neurons that produce the neurotransmitter dopamine, which has been implicated in causing hallucinations, cognitive impairment and other symptoms associated with schizophrenia. These new insights into the possible role of the immune system in the brain are taking schizophrenia research in a new direction."

Speaking of new directions, Debora is taking on the iconic El Camino trail in Spain this coming May to raise much-needed funds for mental health and schizophrenia research at NeuRA. Stay tuned for updates about Debora's journey alongside other inspiring NeuRA supporters as they embark on a 10-day adventure through Spain's most famous pilgrimage trail.

If you would like to support Debora's efforts to help raise funds for thousands of Australians struggling with mental illness please visit www.neura.edu.au/donate

Testing smart garment technology to prevent falls in Parkinson's disease

Associate Professor Kim Delbaere and Dr Matthew Brodie

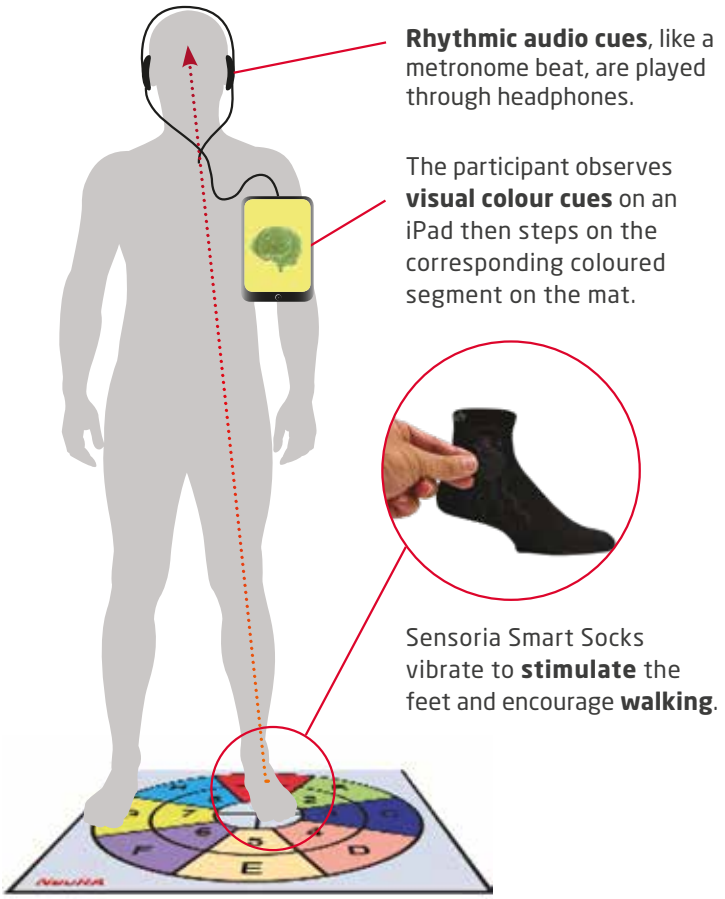
A team of researchers from NeuRA has received a grant from The Michael J. Fox Foundation and the Shake It Up Australia Foundation for Parkinson's Research, to test smart garment technologies to help prevent falls in people living with the disease.

Falls are a common and often devastating event in the lives of people with Parkinson's disease. They are frequently caused by gait impairments, postural instability and freezing-of-gait, a brief absence of forward momentum of the feet despite the intention to walk.

The grant will be used to develop the *StandingTall-PD Study*, a neuro-rehabilitation program that aims to prevent freezing-of-gait and falls, and enhance participants' independence.

The program uses visual, audio and sensory cues to help rewire the parts of the brain that control walking in people with Parkinson's and involves **Sensoria Smart Socks** with haptic feedback and core microelectronics.

INNOVATIVE TECHNOLOGY PROGRAM SUPPORTS PARKINSON'S DISEASE



How does it work?

Participants will receive a NeuRA training mat with colour-coded stepping targets, a pair of Sensoria Smart Socks, an iPad and phone. Participants train daily, stepping on coloured targets on the mat that match a series of colours displayed on their iPad. At the same time, they will listen to rhythmic auditory cues like music or a metronome beat that are synchronised with the vibrating Smart Socks. The Smart Socks buzz to engage the feet when they detect an altered pattern in walking that suggests a fall is about to take place.

The combination of visual, audio and sensory elements helps to form new connections in less affected parts of the brain, leading to improved walking ability. Participants can self-manage and monitor their own progress via an app on their phone. The app can also trigger stimuli during everyday activities, such as vibration in their Smart Socks, if they are in danger of experiencing freezing-of-gait, falls or if they show signs of shuffling feet.

Clinicians can also monitor participants' progress remotely and adjust the program to provide ongoing and personalised continuity of care.

Improving quality of life for people with Parkinson's

Associate Professor Kim Delbaere says The Michael J. Fox and Shake It Up Foundation's grant gives hope to people with Parkinson's.

"*StandingTall-PD* could transform the management of gait impairments for those with the disease," says Associate Professor Delbaere, adding, "the global uptake of mobile technology makes our user-friendly product suitable for widespread community application."

To learn more about the study and find out the eligibility criteria please email standingtall-pd@neura.edu.au

Watch the Channel 9 news story:
neura.edu.au/magazine/neura-magazine-28

Heads at Work eBook – supporting mental wellbeing

Why does one person behave differently to another?

How do neurons, brainwaves and receptors in the brain really work?

How can we best look after our brain?

Does lifestyle, workload and experience shape the functionality of our brain?

In our new **Heads at Work eBook** we take you through NeuRA's research that has identified a range of tools and tips to help you maintain mental wellness, particularly in the workplace.

One thing we discovered by working on this eBook is there are many positive actions we can take to support the health of our brain, and in doing so, improve our mental wellness in our personal lives and at work. **Get your FREE Heads at Work eBook: NeuRAtalks.org**

Global collaboration drives new blood test to predict genetic Alzheimer's disease

As part of the **Dominantly Inherited Alzheimer Network** (DIAN) NeuRA has collaborated on a publication in *Nature Medicine,* that details evidence for a blood test that can predict familial Alzheimer's disease 16 years before clinical symptoms appear.

The DIAN study which has been running since 2008, received support funding for this phase of research from the National Institute of Ageing and the German Centre for Neurodegenerative Diseases. It involves a global network of researchers, led by Professors John Morris and Randall Bateman at Washington University, St Louis, Missouri with study sites in the USA, England, Germany and three research teams in Australia based at NeuRA, The Florey Institute, and the Edith Cowen University in WA. Together, researchers have been working with the rare families who carry the inherited Alzheimer's disease genes to identify the biomarkers for potential predictive **testing** in the future.

"The DIAN study has allowed us to track families with the rare inherited Alzheimer's gene," says CEO of NeuRA, Professor Peter Schofield, who leads the Sydney site of the DIAN study.

This research has provided critical insight into the biomarkers for Alzheimer's.

"Being able to identify a particular signature in the blood is the first step in the early detection and treatment of this devastating disorder of the brain," says Professor Schofield.

The current collaborative research study, led by Professor Mathias Jucker of the German Centre for Neurodegenerative Diseases (DZNE) and the University of Tubingen Germany, has provided encouraging results that will drive the development of an early detection program for Alzheimer's disease.

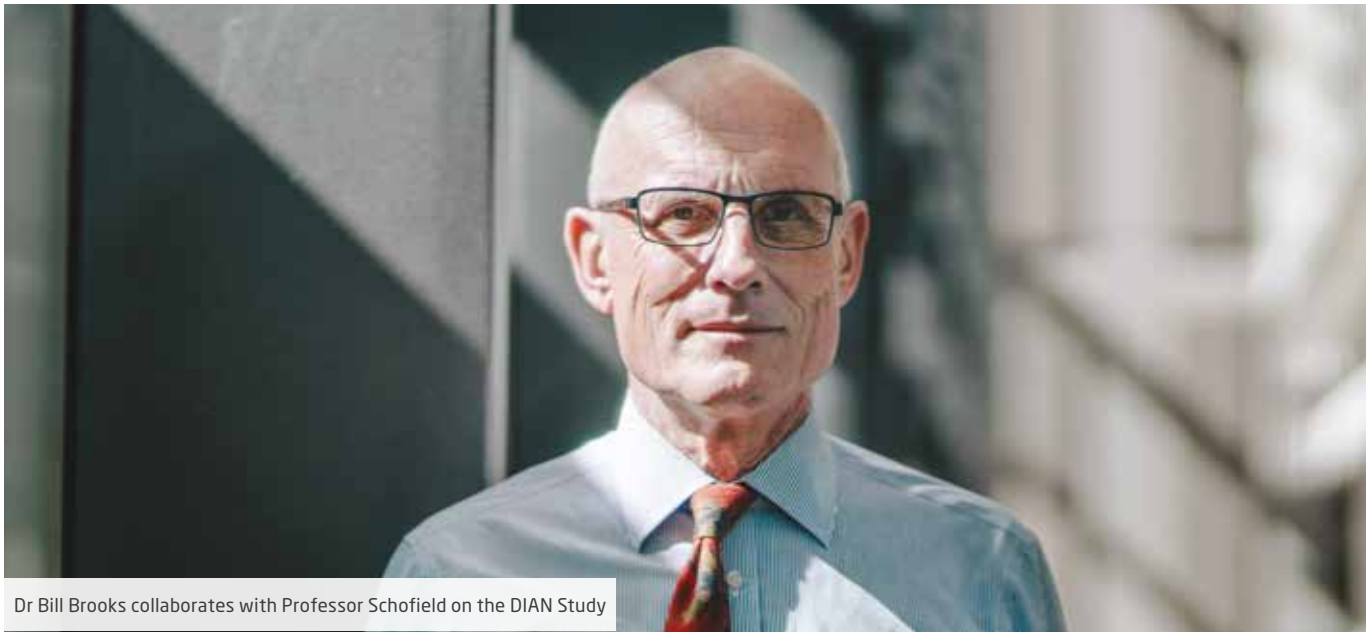
"We hope that a test could become part of a routine medical check-up in the future, providing a cost-effective and efficient early warning system for the disease," says Professor Schofield.

"The NfL blood test accurately predicted when members of a family with inherited Alzheimer's disease would begin to show symptoms," says Professor Colin Masters AO from the Florey Institute, who leads the Melbourne site of the DIAN study.

Neurofilament light chain, or NfL, is a crucial building block of brain cells. When these cells start to die in Alzheimer's disease, traumatic brain injury or in other neurodegenerative diseases, this building block is released into the bloodstream.

The period at which NfL showed the fastest build-up was a key time when patients converted from pre-symptomatic disease into cognitive and memory decline.

"NfL levels rise whenever the brain is damaged, and as Alzheimer's disease affects 30 per cent of people over the age of 80, we hope that NfL will



Dr Bill Brooks collaborates with Professor Schofield on the DIAN Study

become part of a GP's standard battery, like annual cholesterol testing. We would send patients off for more specific Alzheimer's tests if the results come back showing a cause for concern," says Professor Masters.

"Next steps for the test include replicating the results in sporadic Alzheimer's disease patients, who are older and often have other health issues," says Professor Schofield.

Amanda Ayliffe (with her granddaughter) research participant in the DIAN Study

"Being able to identify a particular signature in the blood is the first step in the early detection and treatment of this devastating disorder of the brain."

CEO Professor Peter Schofield AO

Nicole Ee

NeuRA researcher awarded Westpac Future Leaders Scholarship

Westpac Scholars Trust announced its 2019 Westpac Future Leaders Scholars, awarding over $2 million to 17 outstanding postgraduate students who are investigating solutions to some of Australia's most complex issues. Amongst this year's recipients is NeuRA researcher, Nicole Ee.

Nicole is a member of Professor Kaarin Anstey's multi-disciplinary ageing research team and plans to use her scholarship to explore the relationship between social engagement and dementia risk.

Nicole's research is focused on whether early intervention and increased social engagement may mitigate the onset or progression of dementia.

"I'm delighted to be a part of the Westpac Future Leaders Scholarship program," says Nicole.

"The scholarship will provide me with exciting collaborative networks, global opportunities for learning, mentorship and a platform to advocate for and disseminate my research."

The Westpac Future Leaders Scholarship is a prestigious scholarship program attracting some of Australia's brightest and most innovative young leaders.

Hope for Parkinson's disease

The Hon. John Watkins and Professor Caroline Rae

The NeuRA Foundation would like to thank you for your generous support of our Christmas appeal. Your support fuels hope for thousands of men and women affected by Parkinson's disease including The Hon. John Watkins. There is no shortage of worthy causes to give to, and we are humbled you have once again chosen to support the passionate researchers at NeuRA.

Thank you for contributing to the next major research breakthrough in Parkinson's disease. Your generosity has helped to raise over $100,000 – a wonderful and inspiring effort!

By the time a single symptom of Parkinson's disease presents itself, up to 70 per cent of the part of the brain that controls movement is already irreversibly damaged. Early detection is key.

Your precious gift will be used to enhance the early identification, treatment and cure of this degenerative disease.

NeuRA would also like to publicly recognise and thank The Hon. John Watkins for sharing his personal story. Read more **foundation.neura.edu.au/parkinsons**

Run for NeuRA this year

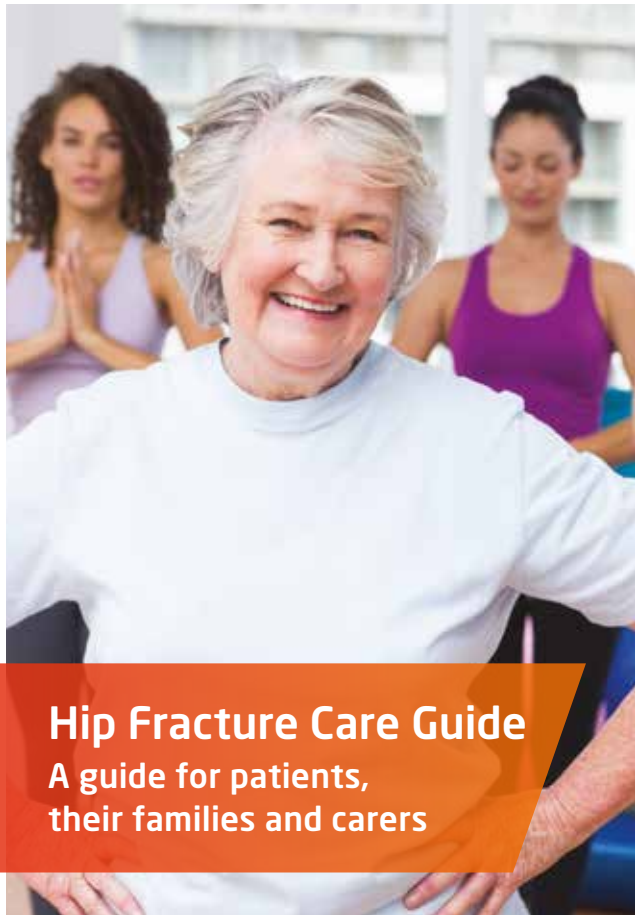
NeuRA supporters

Still trying to keep up your New Year's resolutions to be fitter, stronger and healthier in 2019?

Why not join the NeuRA marathon team this year? We're offering 'Superstar' places (previously known as Gold places) for the City2Surf and Sydney Half Marathon running events. Superstar runners are given the rare opportunity to **start in the Superstar wave,** ahead of 57,000 other runners. They receive a **special race bib** with their first name printed on the front, and are sent a **NeuRA running singlet** to wear.

Superstar places are FREE! All we ask is that you commit to fundraise a minimum of $1,000.

If you wish to take up one of these places, please visit foundation.neura.edu.au/challenge-events or email events@neura.edu.au. Your efforts will help move today's breakthroughs into tomorrow's cures.



Hip Fracture Care Guide

A guide for patients, their families and carers

This month NeuRAtalks.org is featuring a wonderful seminar on healthy hips, and hip fracture prevention with Professor Jacqueline Close.

Professor Close is a consultant in Orthogeriatrics at the Prince of Wales Hospital in Sydney and Clinical Director of the Falls, Balance and Injury Research Centre at NeuRA. Her primary research area is falls in people with cognitive impairment and dementia and particularly the relationship of cognitive function to postural stability, falls and fractures.

Professor Close sits on a number of state and national committees in relation to aged health and is Co-Chair of the Australian and New Zealand Hip Fracture Registry (ANZHFR), Chair of the ACSQHC Clinical Care Standards Working Group for Hip Fracture and the President of the Australian and New Zealand Society of Geriatric Medicine.
To view her talk go to NeuRAtalks.org/speakers/professor-jacqueline-close-2

Download a FREE copy of NeuRA's Hip Fracture Care Guide at neura.edu.au/hipfracture

DONATION & RESEARCH VOLUNTEER FORM

All gifts over $2 are tax deductible

☐ Yes, I would like to donate to research at NeuRA

☐ Yes, I am interested in participating in research at NeuRA

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Step 1: How I choose to give my gift:

☐ Please accept this one-off gift to support research at NeuRA

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☐ $50 ☐ $100 ☐ $250 or

☐ A cheque payable to the NeuRA Foundation is enclosed OR

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☐ Visa ☐ Mastercard ☐ American Express ☐ Diners

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☐ Details about how I can support NeuRA in my Will

- Mail this coupon in the reply paid envelope
- Call us on **1300 888 019** to make a donation over the phone
- Make a secure online donation at **neura.edu.au/donate**

A message from the NeuRA Foundation: The NeuRA Foundation may co-operate with other like-minded reputable Australian charities to promote our work to our respective donors. If you'd prefer that NeuRA does not share your information with other charities, please phone us on **1300 888 019**, email us at **foundation@neura.edu.au** or write to us using the enclosed envelope.

Thank you for generously supporting our research into diseases of the brain and nervous system.

Neuroscience Research Australia Foundation, PO Box 1165, Randwick NSW 2031 ABN 57 008 429 961

Seat belts and seniors

Keeping drivers 75 years and older safe on our roads

NeuRA has developed an informative brochure on correct usage of seat belts for seniors, in partnership with the Transurban Road Safety Centre. This follows research that shows on average, around 250 Australians aged over 65 die every year in car crashes, and more than 4,000 are hospitalised after a crash. Injuries sustained by elderly drivers are more severe than those in younger age groups. It is estimated that injury risk is nine times higher per kilometre in drivers 85 years and older compared to drivers between 25 and 69-years-of-age.

"Cars are a primary means of transport for senior Australians. They provide independent living and enable social and community engagement and are particularly important where public transport is limited. Car safety is therefore a critical component of healthy ageing," says Associate Professor Julie Brown.

The Transurban Road Safety Centre, based at NeuRA, is equipped with state-of-the-art equipment that allows researchers to study the frailty of the ageing human body, and to understand how vehicles and equipment can best protect us from injury on the road.

"As we age, our body shape changes. Research shows that variations in body shape such as increased weight or obesity, which may occur as a result of ageing, can negatively influence seatbelt fit," says Ms Waller, from Transurban.

Car crashes and injuries are often preventable. Innovations designed to protect the occupant, such as airbags, vehicle structure and **seat belts**, have improved over the past 50 years.

"The vehicle structure and the airbags will work in a crash in the way they are designed to work regardless of any action by drivers and passengers. However, the seatbelt will only be effective if it is worn and it will be most effective when it is worn correctly," says Ms Waller.

Research shows that correct usage of the seat belt is critical to the occupant's safety, so the goal of the brochure for senior drivers is to **review how seat belts are designed to work, bring greater awareness to the importance of good seat belt fit and deliver tips on senior driver safety on the roads.**

To request a FREE copy of the Seniors and Seatbelts Brochure visit www.foundation.neura.edu.au/seatbelt

Thank you for your support

If you wish to update your preferred communications from NeuRA, please call 1300 888 019.

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