the NeuRA magazine

Issue 19
Summer 2016

NeuRA
Discover. Conquer. Cure.

Neuroscience Research Australia • neura.edu.au

Pressure DOWN
THE BRAIN'S ROLE IN HYPERTENSION

page 3

01

welcome

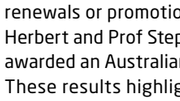
Message from our EXECUTIVE DIRECTOR

The National Health & Medical Research Council (NHMRC) recently announced the award of Research Fellowships for 2017 and NeuRA performed exceptionally with five of our six applicants awarded Fellowships. These prestigious 5-year awards are designed to support leading health and medical researchers and are awarded to outstanding scientists across all disciplines. Our recipients included two new appointees: Assoc Prof Danny Eckert and Assoc Prof Murray Cairns and three renewals or promotions, Prof Cyndi Shannon Weickert, Prof Rob Herbert and Prof Stephen Lord. In addition, Dr Muireann Irish was awarded an Australian Research Council (ARC) Future Fellowship. These results highlight that NeuRA's researchers can, and do, compete successfully for funding with our applicants holding international status and conducting research programs of major impact and benefit to Australia.

These successes have justifiably led NeuRA to be regarded as one of the nation's 'Centres of Excellence' in neuroscience research. However, to grow our capacity to tackle disorders of the brain and nervous system we need to identify and develop young research leaders who will be able to be funded by NHMRC and ARC Fellowships. To underpin our work we recently established the NeuRA Discovery Fund, which will allow us to attract and develop emerging researcher leaders and their teams through 5-year awards. In creating this fund, we are demonstrating our vision and a commitment to attract the best research talent possible. In achieving this, we will greatly enhance the quality of life of future generations.

We held the Sydney launch of the NeuRA Discovery Fund in the atrium of our wonderful Margarete Ainsworth Building with around 100 guests visiting six labs and hearing first hand from researchers about their current work. We also launched the fund in Melbourne with great success, with a recent function at the home of the NeuRA Foundation Chair, Dr Nikki Williams. Gifts, grants and donations to the NeuRA Discovery Fund will support vital work into Alzheimer's disease and other dementias and debilitating brain diseases such as schizophrenia, Parkinson's, motor neurone disease and bipolar disorder.

Philanthropy, in support of bold plans such as the NeuRA Discovery Fund, is a key way to ensure the boundaries of science continue to be expanded. Can you imagine a future without dementia or Parkinson's disease or mental health issues? We can, with your help.



Prof Peter R Schofield *FAAHMS PhD DSc*
Executive Director and CEO

news

IN BRIEF

02

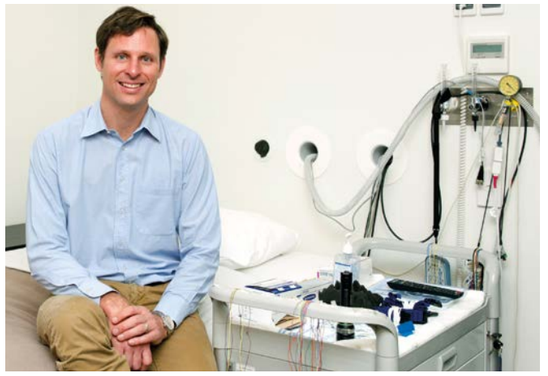
NEW MEASURE OF COGNITION MAY PREDICT LIKELIHOOD OF FALLING

Fall risk assessment in older adults has taken a step forward thanks to a new measure that can more accurately assess underlying physical and neurocognitive disturbances that may predict future falls. Over a third of older adults experience a fall each year, with more than half falling multiple times. Predicting who is likely to experience a fall is an effective way to identify who will benefit from fall prevention programs such as step training. A recent study found that high intraindividual variability (IIV) could predict the likelihood that someone would fall. IIV refers to the differences in reaction times an individual may display across several test trials. The findings of the study suggest that IIV measures can provide useful insights for clinicians to identify possible neurobiological disturbances that could lead to an increased falls risk. "Measuring IIV is fast, accurate and requires very little neuropsychological training, so it is appropriate for many clinicians to use," says Dr Kim Delbaere.

03

RESEARCHERS RECOGNISED

The Australian Academy of Health and Medical Sciences welcomed Prof Simon Gandevia and Prof Rob Herbert as new fellows, in recognition of their outstanding achievements in research. They were inducted at a ceremony in Brisbane's Custom House along with 48 other researchers in the health and medical sciences field. They join current AAHMS fellows from NeuRA, Profs Peter Schofield, Glenda Halliday and Steve Lord. Dementia researcher Dr Muireann Irish received the prestigious 2016 NSW Early Career Researcher of the Year, which was awarded at the NSW Premier's Prizes for Science and Engineering. She also received the Paul Bourke Award for Early Career Research by the Academy of Social Sciences. The award and medallion was presented to Muireann at the Academy's Annual Fellows Dinner on 8 November 2016.



04

WEIGHT MAY AFFECT SLEEP APNOEA TREATMENT

A new study has found that just over half of people with obstructive sleep apnoea (OSA) aren't obese, even though obesity is a strong risk factor for sleep apnoea. While obese patients respond well to continuous positive airway pressure (CPAP) therapy, normal weight and overweight people often do not, presenting a challenge to clinicians. The study found that the majority of non-obese patients suffer from a low respiratory arousal threshold, which means they have a greater tendency to wake easily. This may be a factor that limits their tolerance for CPAP therapy. "Non-obese OSA patients are a challenging group to treat with existing therapies as they are less adherent and compliant with CPAP therapy compared to obese patients with sleep apnoea," says study author Assoc Prof Danny Eckert.

05

NEW GUIDELINES TO IMPROVE HIP FRACTURE CARE

Experts called on Australian and New Zealand hospitals to adopt uniform standards of quality and care for hip fracture patients. A report released highlights considerable variation between hospitals in a number of aspects of hip fracture care. The Australian and New Zealand Hip Fracture Registry (ANZHFR) Annual Report provides evidence there is considerable room for improvement in the care of hip fracture patients in hospitals. "The timing of surgery, management of pain and post-operative care were areas that were highlighted as needing improvement," says Professor Jacqui Close, Geriatrician and Co-Chair of the ANZHFR. "Lives can be dramatically improved by applying best practice principles through timely, coordinated care that considers the ongoing needs of each patient."

About NeuRA

Neuroscience Research Australia (NeuRA) is a not-for-profit research institute based in Sydney, Australia. Our goal is to prevent, treat and cure diseases, disorders and injuries of the brain and nervous system through medical research. Find out more at neura.edu.au or call 02 9399 1000.

Subscribe

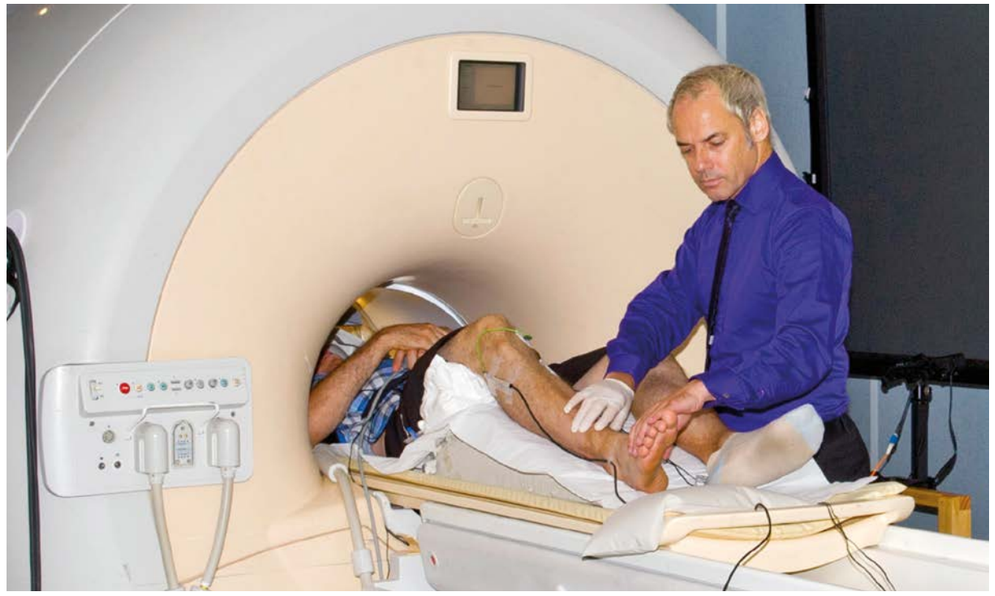
If you would like to subscribe to our magazine, go to neura.edu.au/subscribe/mag. You can also email your details to magazine@neura.edu.au or call 02 9399 1000.

Credits

Editor: Chelsea Hunter **Photography:** Anne Graham
Writers: Chelsea Hunter, Anne Graham **Designer:** Kristian Molloy

feature story

TAKE *the pressure* DOWN



01

A new experimental technique using functional magnetic resonance imaging has improved our understanding of how the brain controls blood pressure.

People with high blood pressure caused by chronic pain, obstructive sleep apnoea, anxiety or kidney disease all stand to benefit from the new studies coming out of Prof Vaughan Macefield's lab.

One of the central questions that Prof Macefield and his team (PhD student Sophie Kobuch, Dr Rachael Brown and Assoc Prof Luke Henderson) hope to address is how the brain is involved in increasing or decreasing blood pressure. Until now, it hasn't been clear which particular areas of the brain are involved in this process. Macefield's team suspect that "higher centres" of the brain are involved – that is, the centres that process sensory information, analyse information and experience emotion.

New sets of studies hope to answer how these areas bring about changes to blood pressure. "It's important to know this when you consider that chronic mental stress and anxiety can lead to high blood pressure," Prof Macefield explains.

Currently, we know that blood pressure is altered when blood vessels that serve our skeletal muscles are constricted, and that this is controlled by muscle sympathetic nerve activity (MSNA). Studies emerging from Prof Macefield's lab are looking at how the brain is involved in this process by using fine microelectrodes, inserted through the skin into a nerve at the side of the knee, to record bursts of MSNA going to the blood vessels.

"MSNA originates in the brain then travels down the spinal cord and out to all the nerves in the body, supplying all the muscles," he explains. "We're recording that signal using a needle in a nerve cluster at the side of the knee.

While we're doing that, we're also recording brain activity, via functional magnetic resonance imaging (fMRI), so that we can identify where in the brain these bursts of nerve activity are occurring."

The fMRI studies have shown that areas of the brain such as the insula, the dorsolateral prefrontal cortex, the dorsomedial and ventromedial hypothalamus, the precuneus, and structures in the cerebellum all contribute to the generation of MSNA. Some of these areas, such as the prefrontal cortex, are involved in higher-order emotional and cognitive functions, including reasoning, problem solving, planning, some aspects of memory and controlling emotional responses.

These are also areas that are involved in modulating chronic pain or anxiety. "Many people who experience chronic pain often go on to develop hypertension," Prof Macefield explains, "but we haven't yet been able to use physiological or psychological factors to predict who is likely to do so. Understanding the underlying neural cause of these different responses to pain opens up a whole new avenue of research to explore."

More recently, the lab published a study that looked at the parts of the brain that regulate blood pressure to see how they behave during pain.

> *"It also explains why anxiety and blood pressure are related."*

"For this we used two groups; one who show an increase in MSNA and blood pressure during pain and the other who show a decrease. We measured their brain activity and MSNA while infusing sterile, salty water into their leg muscle for an hour to simulate long-term pain."

Initially, it was thought that these different reactions may have been caused by differences in pain tolerance, attitudes to pain, resting MSNA levels, or levels of anxiety. However, none of these were shown to have a significant correlation with MSNA response. Instead, it had to do with a part of the brain – the dorsomedial hypothalamus – that plays a key role in creating physiological responses to stress.

"We also found the executive areas of the brain were involved, which are responsible for our higher order processing. So the fact that they were upregulated supports the conclusions from our earlier work, that these higher-order structures of the brain are indeed involved in blood pressure regulation.

"It also explains why anxiety and blood pressure are related. Australia was the first country to recognise anxiety as a cause of hypertension. So there are all these executives and various people who have work-related stresses that end up with high blood pressure."

The team will go on to further explore the link between anxiety, chronic pain and blood pressure in future studies to understand how to better treat hypertension. These studies will also improve our understanding of the neural factors that increase blood pressure in people with renovascular hypertension, and extending the work they have recently published on changes in the brains of people with obstructive sleep apnoea.

"Now that we have these experimental tools where we can look at the generation of MSNA using fMRI in real time we can address these various questions, which will ultimately increase our understanding of how the brain controls blood pressure."

01 Prof Vaughan Macefield

news

New ways to SEE TAU PROTEIN IN THE BRAIN

A NEW WAY TO VIEW A PROTEIN ASSOCIATED WITH COGNITIVE DECLINE IN ALZHEIMER'S DISEASE WILL BE USEFUL FOR RESEARCHERS INVOLVED IN THE DIAN STUDY.

Being able to visualise deposits of abnormal proteins in the brains of living people is giving researchers a much better idea of how Alzheimer's disease begins and progresses. The two hallmarks seen under the microscope in the brains of people who have died with Alzheimer's disease are plaques and tangles. The main component of the plaques is the amyloid-beta peptide, whereas the tangles are formed of a protein called tau.

The Dominantly Inherited Alzheimer Network (DIAN) study was set up to find biomarkers for Alzheimer's disease that are detectable before the symptoms begin. Participants are from families where some members inherit the condition as the result of a faulty gene. They undergo brain scans and clinical assessments and provide blood and spinal fluid for research.

Since 2004, amyloid deposits have been detectable in people with Alzheimer's disease by positron emission tomography (PET) scans of the brain using special radioactive tracers. In the DIAN study, these scans showed that amyloid begins to be deposited in the brain 15-20 years before symptom onset.

Recently, new tracers have been developed to detect tau deposits and neurofibrillary tangles on PET scans. Since the tau deposits are believed to begin much later than the amyloid deposits, and continue during the years when people have symptoms such as memory loss, researchers expect that tau PET scans will help them to understand the time course and pattern of spread of the Alzheimer's process in relation to the symptoms experienced by people with the disease.

02

Tau PET scanning has now been introduced in Sydney for participants in the DIAN-TU clinical trial and is in the process of being introduced for the continuing DIAN observational study.

"This is a major development that will give us the other half of the picture of what happens in the brain during Alzheimer's disease," says Dr Bill Brooks. "Tau imaging is at the stage that amyloid imaging was at 10 years ago. As it develops, we will have a much more detailed understanding of how symptoms relate to brain changes. We will also have a new objective marker to monitor the effects of treatments that could potentially delay or prevent the disease process."

NeuRA is one of 26 sites worldwide participating in the DIAN-TU-001 prevention trial. All of our participants have now completed their first year. An analysis at the end of 2017 will look at the effect of the study drugs on amyloid deposition measured by PET scan and tau levels measured in spinal fluid. Provided that the results are favourable, the study will continue for another two years to see if an effect on preventing memory symptoms can be established.

02 Dr Bill Brooks

Research

IQ change *related to* BRAIN VOLUME

01

Understanding the difference in IQ before and after the onset of schizophrenia could lead to more tailored treatments down the line.

Cognitive deficits in schizophrenia, although they can differ from person to person, are one of the core symptoms of the disorder. Earlier work from Associate Professor Tom Weickert's lab proposed an IQ-based classification system, centred on IQ trajectories from before illness to after illness onset that could identify three distinct subgroups of schizophrenia.

These three subgroups included those who had a large and significant IQ decrease from before to after illness onset (called the deteriorated group); those whose IQ did not appear to change after illness onset staying around or above average before and after illness onset (called the preserved group); and those who displayed consistently low IQ levels before and after illness onset (called the compromised group).

New research from the Schizophrenia Lab, has built on their earlier classification work by establishing whether these different intellectual subgroups are associated with any structural changes in the brain. They examined differences in brain volume and were able to confirm that the IQ-based classifications are related to underlying neurobiological differences, and that distinct brain regions may be differentially affected in each subgroup.

The study found that the deteriorated group could be further divided into two subsets - moderately and severely deteriorated subgroups. The severely deteriorated subgroup had significantly reduced brain volume in regions of the brain important for memory, social cognition, language and visual processing, which correspond to more severe negative symptoms (reduced emotions, motivation and social interactions) in comparison to the preserved group.

Based on these findings, using current IQ ability relative to estimated IQ prior to illness onset to classify people with schizophrenia can aid in the understanding of the biological basis of the illness and how it affects different people. This should help direct us to more personalised treatments for individuals with schizophrenia such as which brain regions in can be targeted with remedial training, perhaps combined with mild and safe brain stimulation treatments.

01 Shan Tsai
02 Dr Matthew Brodie adjusts a wearable device to track movement
03 Research assistant Jessica Turner conducts falls and balance research
04 Dr Justine Gatt takes a participant through a study

VOLUNTEERS NEEDED

Would you like to be involved in research happening at NeuRA? As a research participant you will play a critical role in helping us advance the treatment and understanding of many diseases and conditions. By donating your time, you will help us provide excellence in the care of others.

Research groups currently looking for participants:

02

03

James McAuley Group

BACK PAIN

The purpose is to investigate the mechanisms underlying the development and persistence of chronic low back pain. We hope to explain why some people get better after hurting their back while others do not. We are looking for healthy volunteers who do not have low back pain within the last 2 years as the control group. The participation in this study will involve 3 sessions of approximately 2 hours. The sessions will occur at baseline and again 3 and 6 months later.

Stephen Lord Group

STEP TRAINING

We are looking at training a participant's ability to respond to slips and trips while walking. The participant will experience perturbation (either a slip or trip) while walking along our walkway. They will be in a harness to prevent injury.

Lynne Bilston Group

BREATHING AND OBSTRUCTIVE SLEEP APNOEA

We aim to understand how the function of the upper airway muscles, sensation in the airway, and the brain all control breathing muscles and how these things contribute to obstructive sleep apnoea. We hope this will lead to personalised treatments of sleep apnoea in the future. This study requires two overnight visits in the sleep laboratory and an MRI appointment. Participants may be compensated up to $220.

Jane Butler Group

BREATHING AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

People with chronic obstructive pulmonary disease (COPD) have difficulty performing simple physical tasks such as walking from one room to the next. These tasks require effort and causes breathlessness (comparable to a normal person performing strenuous exercise). We perform electroencephalography (EEG) in our study to determine if a cortical contribution is present during quiet breathing in people with COPD. We would like to recruit participants of similar age (+-2 years), BMI and same gender as our COPD participants.

Stephen Lord Group

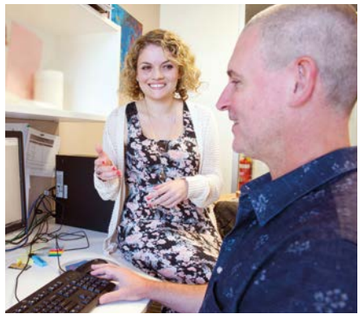
UNDERSTANDING UPPER LIMB FUNCTION IN THE YOUNG AND OLD

Motor impairments are common and occur in many diseases and disorders, and also with ageing. We aim to understand motor impairments and to devise strategies to reduce their deleterious effects. To do this, an approach of 'physiological profiling' for lower limb performance has been used by Professor Lord and colleagues to reduce the risk of falls. We will undertake a similar approach to measure performance of the upper limb using simple inexpensive tests that can ultimately be widely used in research and clinical practice.

Janet Taylor Group

DOES LEARNING ABOUT PAIN CHANGE THE INFLUENCE OF EXERCISE IN PEOPLE WITH CHRONIC PAIN?

The purpose of this research project is to better understand how exercise affects pain in people with chronic pain. We are looking for volunteers with fibromyalgia or osteoarthritis of the hip or knee to take part in an experiment investigating the effect of exercise and pain education on pain thresholds. Volunteers would be required to visit the laboratory on one occasion for approximately 90 minutes. During this visit, participants would be asked to complete a short series of questionnaires, perform 20 min of low-moderate intensity aerobic exercise, and have their pain threshold measured before and after this exercise. The assessment of pain thresholds is non-invasive and produces only the minimum perceivable amount of pain. Participants will be offered $30 for their time.



04

If you would like to register or find out more, call 02 9399 1071 or email volunteers@neura.edu.au. You can also volunteer as a healthy research participant.

01

5 minutes with

DR JULIE **BROWN**

Dr Julie Brown works in the lab and in the field to understand what sort of injuries are most commonly suffered by Australian children, and how we can best prevent those injuries from occurring. Specifically, her group is studying how injuries occur in children when they are involved in crashes, and how changes to the types and design of restraints used by children can reduce serious injuries and death.

WHY IS CHILD INJURY PREVENTION RESEARCH SO ESSENTIAL?

Unintentional injury continues to be the leading cause of death and disability among children in Australia. And in NSW alone, around 60 children die every year from unintentional injury and a further 20,000 are hospitalised, so you can imagine nationwide and worldwide the numbers are quite staggering.

IN RESEARCHING WAYS TO KEEP KIDS SAFE, AND COMING UP WITH SOLUTIONS, ARE WE CREATING STRICT RULES FOR CHILDREN AT PLACES LIKE SWIMMING POOLS AND TRAMPOLINE PARKS THAT TAKE AWAY OPPORTUNITIES FOR FUN AND ADVENTURE?

We don't want to wrap our children in cotton wool, we really do want them to engage in activities that promote appropriate, healthy development. But what we really want is to find ways for children to do this while minimising the risk of serious injuries because the consequences can be really severe and lifelong. Head injuries can have significant impacts on the physical, cognitive, behavioural and even emotional development of children. We want to encourage children to participate in physical activities, to have fun, take part in developmentally appropriate activities, but not expose them to preventable risks of life-threatening or disabling injury.

ONE OF YOUR RECENT STUDIES FOUND THAT THERE HAS BEEN A SMALL INCREASE IN SPRAINS AND FRACTURES IN KIDS UNDER THE AGE OF 16 AS A RESULT OF INJURIES SUSTAINED AT TRAMPOLINE PARKS. TELL ME ABOUT SOME OF THE CHANGES YOU SUGGESTED AS RESULT OF THIS RESEARCH.

The Australian Trampoline Parks Association have been really fantastic in working with us as part of our research, and the outcomes of this is that, with Kidsafe Australia, we have seen the introduction of a new Australian standard that will govern the operation and management of these centres. That level of intervention will have a lot of impact on reducing the risk of injury to kids using these parks.

WHAT OTHER AREAS OF CHILD SAFETY DOES YOUR RESEARCH COVER AND HOW DO YOU IDENTIFY ISSUES AHEAD OF TIME?

We use epidemiological studies to identify problems and define the nature of child injury in Australia, then we use surveys, fieldwork and laboratory studies to identify risk factors for particular types of injury. Then we work with clinicians or industry bodies to develop real, tangible countermeasures that address the problems.

ARE THERE ANY MAIN AREAS OF CONCERN THAT YOU SEE?

For a number of years we've been studying the safety of children in cars because, although travelling in cars is a daily activity, it is a global problem. By 2030, the World Health Organization estimates that traffic injuries are likely to become the fifth leading cause of death and the seventh leading cause of disability among children across the world. So in the last decade or so we've really been focussing on getting children into the right type of restraint for their age. We've seen some great results with more and more children using appropriate types of restraint systems, but our more recent studies have shown that we still have some problems with the restraints being used correctly. About one in two children will have some error in how the restraint is being used. So this is our current focus; trying to reduce these errors.

We've been working with parents and others who use child restraints to develop better communication about how to use restraints correctly. We've also been developing, in the laboratory, new methods to study the interaction between children and the restraint system. Some of the errors are introduced when parents are installing the restraints, but children introduce others themselves. For example, taking their arms out of the harness.

SO YOU'RE RECORDING REAL-WORLD EXAMPLES OF HOW CHILD RESTRAINTS ARE USED AND TRANSLATING THEM TO RESEARCH, RATHER THEN USING STUDIES TO INFORM PEOPLE AS TO HOW TO USE THE RESTRAINTS.

That's exactly right. We're watching kids in real cars and using methods to objectively identify the features of restraints that are more likely to be associated with errors in use. We're about to start a new program, using these methods, to define the specific features of the restraints that are important for children maintaining correct use while they're in cars.

01 Dr Julie Brown
02 Lewis Ingram and Mayna Ratanapongleka
03 Amanda Mazzoni

YOUNG **RESEARCHERS**

02

Improving movement after stroke

LEWIS INGRAM AND MAYNA RATANAPONGLEKA ARE WORKING WITH HEALTHY PARTICIPANTS TO CREATE BASELINE INFORMATION ABOUT HEALTHY HAND AND ARM FUNCTIONING, WHICH WILL HELP MOTOR IMPAIRMENT RESEARCH.

Impairments in the ability to move the hand and arms can result from many diseases and disorders, such as stroke or arthritis, or from normal ageing.

These impairments can range from mild to severe (for instance, paralysis). Unfortunately, although this is common and increasing due to our ageing population, there are no standard measures of normal hand and arm function to use as a baseline for documenting upper limb impairments.

In a new study, we are adapting the Physiological Profiling Assessment (PPA), so we can use it to assess upper limb impairments. Currently, the PPA, a widely used diagnostic tool, only quantifies lower limb impairments that cause people to fall.

The study involves measurement of functional performance in tests that, if defective, would impair ability in everyday tasks. The tests are inexpensive and simple to perform and cover the range of physical movements.

These include near-field vision, arm and hand strength, hand sensation, manual dexterity and coordination. We are currently recruiting people across the adult lifespan. That is, 20 men and 20 women per decade from 20 to 90+ years of age, so we can develop robust normative data.

Our research will produce simple tests that can be used in population studies and patient group clinics. The information will be valuable for documenting the type and severity of upper limb motor impairments and will enable us to develop strategies to improve function in ageing and disorders such as stroke, Parkinson's disease, arthritis and peripheral neuropathy.

The impact of early intervention on autism

PHD STUDENT AMANDA MAZZONI IS USING A NON-INVASIVE BRAIN IMAGING TECHNIQUE TO ASSESS THE BENEFITS OF EARLY LEARNING PROGRAMS FOR CHILDREN WITH AUTISM.

I'm currently working on a study that aims to find out whether an early intervention program for preschool-aged children with autism affects developmental changes in brain activity. The study will be the first in Australia to evaluate the impact of the behavioural program on brain activity.

A secondary aim of the study is to determine whether baseline brain activity measures can be used to identify groups of children most likely to respond to this intervention program. This is measured using functional near-infrared spectroscopy (fNIRS), which is a safe and innovative method of measuring brain activity by projecting light from outside the head into the cerebral cortex, and then measuring the properties of the light that is reflected back.

Since the light transmitters and receptors are both in a cap similar to those used for EEG, this provides a way of studying similar aspects of brain activity to those measured by fMRI, but without needing to be in an Magnetic Resonance Imaging scanner.

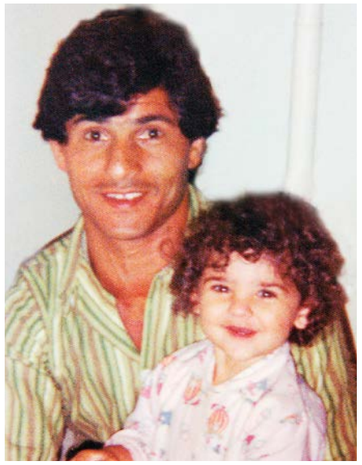
I enjoy being able to spend time speaking with parents and building rapport with children who will take part in my study. This relationship building helps in many ways. Firstly, being familiar to the children allows them to relax and increases the accuracy of the data we get, and speaking with parents shows them the value of research and what the importance of a project like this is to the autistic community.

03

I have started working on a review looking at the practicalities of using near-infrared spectroscopy in autism research and look forward to being able to share these insights with other researchers.

SHELLY
Sends her thanks

Making a difference



01

Although the prevalence of motor neurone disease (MND) in Australia is relatively low (about one in 11,434 people), the tragedy of it strikes deep. If you've known someone who has MND, you'll understand the utter desperation that it brings.

In August Shelly shared her family's story. Jim, her fit and strong father aged in his mid-50s was dealt the cruel blow of this relentless disease.

Her story is heartbreaking but sadly, not unique. Shelly sends her most heartfelt thanks for your kind donations, saying, "Your generosity will help discover a cure, or at the very least, effective treatments, which will mean that no one will suffer as my father did".

We join her in thanking you for your selfless support of motor neurone disease research.

2017 JOIN AN EVENT OR CREATE YOUR OWN TO SUPPORT NEURA

Date Of Event	Name Of Event	Location Of Event
January 7th	Portsea Twilight	Portsea
February 4th	SMH Sun Run	Dee Why-Manly
February 5th	Cole Classic Swim	Shelley Beach
February 23rd & 24th	ASX Thompsons Reuters Charity Golf Day	Sydney
February 24th	ASX Thompsons Reuters Gala Dinner	Sydney
April 9th	Gold Coast Triathalon	Gold Coast
April 8-9th	Canberra Running Festival	Canberra
May 1st -7th	Bridge For Brain Research Challenge	National
May 21st	SMH Half Marathon	Hyde Park Sydney
May 28th	Run Noosa	Noosa
May 14th	Mothers Day Classic	Brisbane
May 28th	HBF Run For A Reason	Perth
June 11th	Perth Marathon	Perth
July 30th	Run Melbourne	Federation Square Melbourne
August 13th	City2surf	Sydney
August 26th	ASX Thompsons Reuters Charity Race Day	Rosehill
August 27th	City2surf	Perth
August 27th	Pub2Pub Run	Dee Why To Newport
September 3rd	Canberra Times Fun Run	Canberra
September 17th	Blackmores Family Running Festival	Sydney
October 30th - November 9th	Conquer Kokoda Trek	New Guinea
November 5th	Noosa Triathalon	Noosa

CREATE YOUR OWN EVENT

Walk / Run / Swim / Bake / Sky Dive / Run A Morning Tea / Trivia Night / Host A Dinner / Bootsale Birthday4Charity / Open Your Garden / Memory Lunch / Colour Your Hair / Clothes Swap — Anywhere, anytime

WHAT DID YOU TAKE
for granted today?

When you live with Parkinson's disease, the simplest of tasks can become frustrating, if not impossible. The most mundane of life's pleasures – like making a coffee or reading a book – can become more and more difficult. When you consider life is full of these little things, you'll appreciate that living with Parkinson's disease is cruel.

02

That's what makes this photo so incredible.

Steve, pictured with his friend Nicky, was diagnosed with Parkinson's disease aged just 35. He completed the City2Surf to help research into the disease in 2014, which is such an inspiration.

There is much more to his story, which we've invited him to tell. Keep an eye out in February, as we share what life is like living with Parkinson's disease, and the research NeuRA is conducting to conquer it.

LEAVING A BEQUEST

A gift in your Will is a wonderful way to leave a legacy for a healthier future.

We at NeuRA are committed to preventing and curing diseases and disabilities of the brain and nervous system to enhance the quality of life for future generations.

A valid Will is important to ensure your assets are distributed according to your wishes and a gift to NeuRA in your Will is an easy process. Your legacy will contribute to the research that can find the answers and cures, ensuring better outcomes for future Australians. Every gift, large or small makes a positive impact on our research.

If you have any questions or would like to discuss, in confidence, this important decision, please contact NeuRA's Community Liaison and Bequest Manager on 1300 888 019 or visit our website at neura.edu.au to find out how you can leave behind a better future for all.

01 Shelly and Jim Demirov

02 Steve and Nicky

DONATION & RESEARCH VOLUNTEER FORM

- ☐ Yes, I would like to donate to research at NeuRA
- ☐ Yes, I am interested in participating in research at NeuRA

Title:

First Name:

Surname:

Address:

Suburb:

State:

Postcode:

Phone:

Best time & day to call:

Email:

Step 1: How I choose to give my gift:

- ☐ Please accept this one-off gift to support research at NeuRA
- ☐ I would like to make a regular donation of $ _____ on a monthly/ quarterly (please select one) basis deducted from my credit card until further notice to support research at NeuRA

Step 2: My gift:

☐ $50 ☐ $100 ☐ $250 or

- ☐ A cheque payable to the NeuRA Foundation is enclosed OR
- ☐ I wish to make my gift by credit card:

☐ Visa ☐ Mastercard ☐ American Express ☐ Diners

Card No:

Expiry Date:

Cardholder's Name:

Cardholder's Signature:

Please send me:

- ☐ Details about how I can support NeuRA in my will

Step 3: How to make a donation

- 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**
- Fax this form **(02) 9399 1082**

NeuRA
Discover. Conquer. Cure.

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.

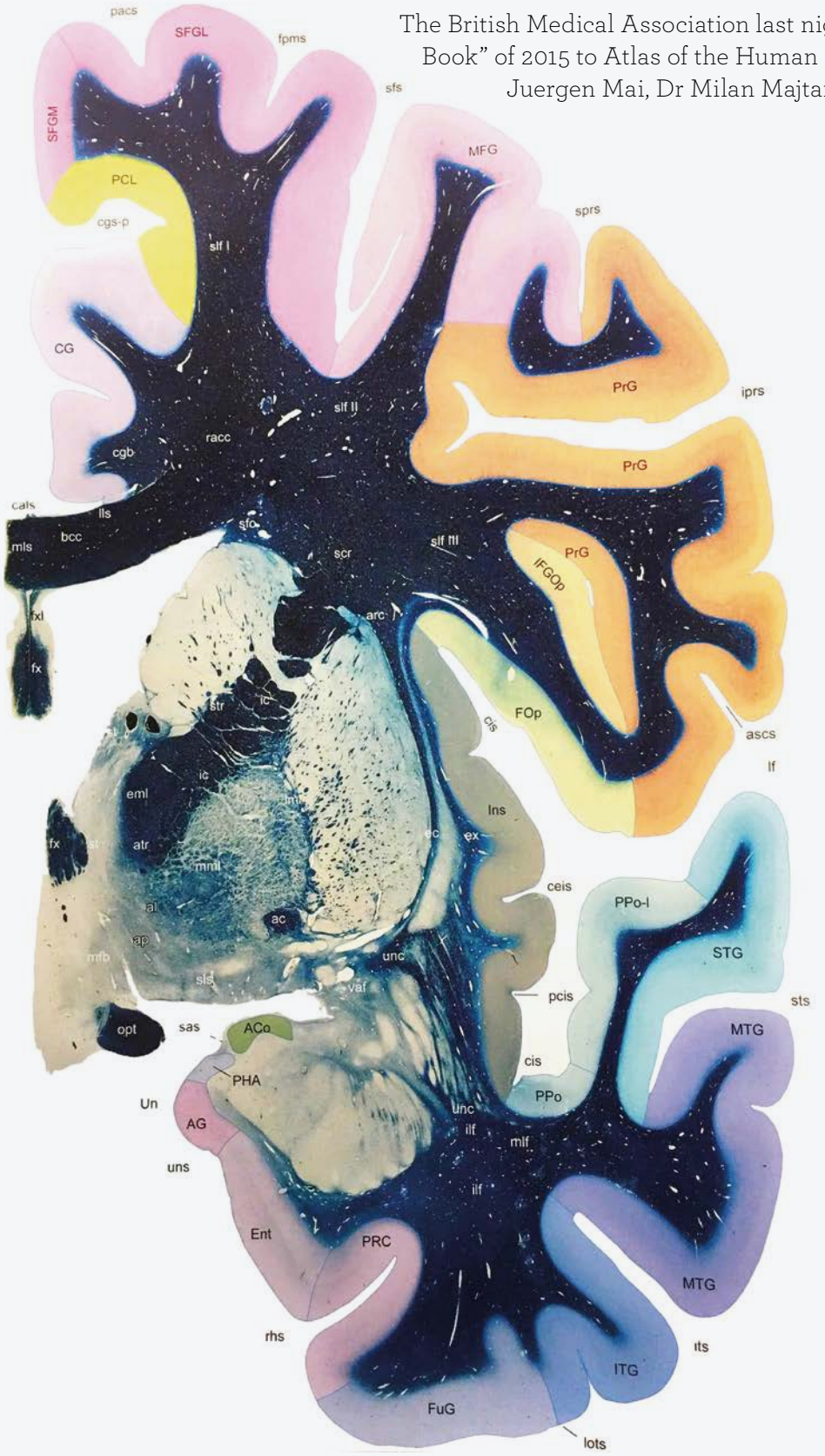
Thank you for generously supporting our research into diseases of the brain and nervous system.

Neuroscience Research Australia Foundation, PO Box 1165, Randwick NSW 2031 ABN 57 008 429 96

in focus

PUBLISHING
Best Illustrated Book

The British Medical Association last night gave the award for "Best Illustrated Book" of 2015 to Atlas of the Human Brain, Fourth Edition, authored by Prof Juergen Mai, Dr Milan Majtanik, and NeuRA's Prof George Paxinos.



The first edition of the book received The Award for Excellence in Publishing in Medical Science from the Association of American Publishers in 1997.

The awards take place annually to recognise outstanding contributions to medical literature.

The book presents the anatomy of the brain at macroscopic and microscopic levels, featuring different aspects of brain morphology and topography. This greatly enlarged new edition provides the most detailed and accurate delineations of brain structure available.

It was reviewed by Dr Alisdair McNeill, senior clinical fellow in genetics at the University of Sheffield who commented that, "this is a well-presented atlas with beautiful illustrations. It is a comprehensive and very well-illustrated macroscopic and microscopic atlas of human brain".

Scientists working on human neurological or psychiatric diseases such as Parkinson's disease, Alzheimer's disease and schizophrenia, use Prof Paxinos' brain atlases, widely considered the most accurate resources for the identification of structures and used in neurosurgical theatres around the world.

"It is a pleasant moment for a scientist when their peers recognise their work," Prof Paxinos said.

Click on the icons on our website to view.

Neuroscience Research Australia, Margarete Ainsworth Building, Barker Street, Randwick NSW 2031
Phone: 02 9399 1000 Email: info@neura.edu.au Website: neura.edu.au

To make a donation in support of our research, call 1300 888 019 or go to neura.edu.au/donate