

the NeuRA magazine

News and breakthroughs from Neuroscience Research Australia • neura.edu.au

Issue 45 | Summer 2024

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Bridging the gap

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and care*

**MEET OUR
NEW CEO
PROF MATTHEW
KIERNAN AM**



**Message from our new CEO
– Professor Matthew Kiernan AM**



**Happy New Year 2024!
Hopefully a year of great progress and scientific achievement ahead.**

In taking up the role of CEO at NeuRA, I would like to express my appreciation to Carole Renouf for her steadfast leadership as Interim CEO over the past year.

Prior to joining NeuRA, I was Bushell Chair of Neurology at Royal Prince Alfred Hospital for the past decade and Co-Director at the University of Sydney's Brain and Mind Centre.

With my background as a clinician-scientist, a key aspiration of scientific progress remains a strong commitment to translational research that has a real-world impact on improving patient care and clinical outcomes.

Add to this, an element of discovery, which has already driven transformational change, no more so than the fields of multiple sclerosis and stroke.

Dementia and neurodegenerative disease are now firmly on our horizon, and the promise of new therapies.

As I navigate NeuRA through a new phase of growth and opportunity, I want to extend my deepest gratitude to you, our valued donors. It is your generosity that fuels our continued pursuit of knowledge and unwavering passion to transform lives through medical research.

I am excited about what we can achieve together in 2024 and beyond, and I look forward to updating you on the progress that you help make possible.



Dr Tertia Purves-Tyson.

Welcome to the Summer edition of NeuRA Mag!

We invite you to discover our latest advancements and scientific discoveries.

In this issue, we bring you a range of updates from our dedicated research groups at NeuRA, showcasing advancements across a wide range of focus areas including hip fracture, mental health and road safety.

Our cover feature for this issue explores the scientific link between music and memories, and how this connection may unlock therapeutic benefits for people with dementia.

We also highlight a recent study on personalised treatments for schizophrenia – a world-first approach led by NeuRA researcher Professor Cyndi Shannon Weickert which could revolutionise how the illness is treated in future.

Another important topic we cover is the role of consumers in health and medical research. We speak to Antonio Vecchio, a passionate consumer representative, along with NeuRA researcher Dr Annie Palermo on how patient and public involvement can positively impact both research priorities and outcomes.

We hope this issue offers valuable insights into our research and as always, we look forward to your feedback. •



Congratulations to Concord Repatriation General Hospital NSW for winning the Golden Hip award.



Improving hip fracture outcomes for ageing Australians

Did you know that cases of hip fractures are projected to increase as our population ages? For this reason, ensuring high-quality hip fracture care is important. This is why NeuRA hosts the Australian and New Zealand Hip Fracture Registry (ANZHFR) as part of our Falls, Balance and Injury Research Centre.

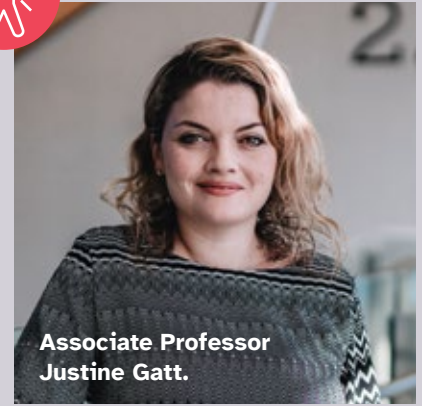
Each year, the team behind the ANZHFR analyses data from over 16,000 hip fractures from 117 hospitals and assesses performance against the Hip Fracture Clinical Care Standard.

“The latest registry data shows improvements in a number of aspects of care, such as preoperative assessment of cognition, screening for delirium,

and use of nerve blocks for pain, but there is still room for improvement for several key areas of hip fracture care,” says Professor Jacqueline Close, Co-Chair of the ANZHFR and Senior Principal Research Fellow at NeuRA.

The main recommendations of the report include increasing prescriptions of bone protection medication to prevent future fractures, decreasing operation wait times, and supporting patients to walk as early as possible.

Findings of the report are distributed back to participating hospitals, who are ranked on performance and the best performing hospital receives the ‘Golden Hip’ Award (see photo). •



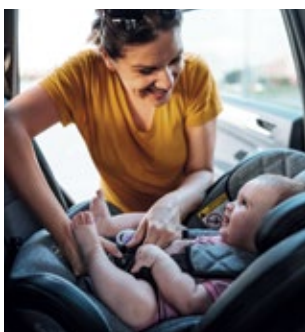
Associate Professor Justine Gatt.

NeuRA joining forces in a Centre of Research Excellence

NeuRA is set to join forces with the University of Melbourne and other leading academic institutions to form an innovative new research centre. Co-investigator Associate Professor Justine Gatt says that this unique research initiative aims to advance our understanding of the genetic and environmental determinants of major health challenges, including mental health and overall wellbeing.

“I am very excited to be part of this world-leading team of genetic epidemiologists and population health scientists from world-class institutes across Sydney and Melbourne,” said A/Prof Gatt.

The new Centre of Research Excellence (CRE) and Expertise in Genetic Epidemiology for Precision Population Health, made possible thanks to a grant of \$2.5 million from the National Health and Medical Research Council (NHMRC), will bring researchers together to collaborate on diseases and disorders including cancer, mental health and asthma. •



New recommendations for car restraints will help children with disabilities and their carers

Children with physical disabilities often require extra padding or foam supports to feel comfortable in a car seat. However, little

is known about the effects such modifications have in the event of a crash. Researchers at NeuRA tested the most common modifications, such as foam pads and rolled or folded towels. They found that such modifications increase the chance of head injury and chest injury, but firm EPS foam, when used inside the restraint cover to provide body and head side support, had minimal effects on increasing risks.

This important research, conducted at the Transurban Road Safety Centre here at NeuRA, led to updated guidance on the safe use of child restraint postural support padding for children with disability or medical conditions. •



A new harmony: The role of music in shaping memories and dementia care

Ever wondered why we can recall the lyrics to our favourite song from decades ago but struggle to remember what we had for lunch yesterday? Or why, no matter how much time has passed, we never forget the jingles to the most popular ads of our childhood?

According to Dr Craig Sinclair, Senior Research Fellow at NeuRA and UNSW, the powerful relationship between music and memories is well known. “Often, our first exposure comes in our early years, with the lullabies or nursery rhymes that are sung or played to us. In early childhood education, children will typically be taught the letters of the alphabet or names for body parts while pairing with a familiar tune, such as ‘Twinkle twinkle little star.’” Also known as ‘musical mnemonics’, these special tunes act as memory aids that help them

remain firmly embedded in our memories well into adulthood.

The science behind music and memories

According to Dr Sinclair, who is also a singer-songwriter, there is good evidence that learning and memory are improved when music is involved. “We know that engaging actively in arts-based activities, such as playing music, leads to activation in areas of the brain that are also active for other cognitive tasks such as focusing attention and organising behaviour.” And while we don’t yet

understand exactly why music has this profound effect, Dr Sinclair says researchers believe it’s because music provides a ‘scaffold’ for the cognitive processes of establishing memories. Other theories suggest that the mood-enhancing effects of music enable us to be more alert when memories are formed, allowing us to remember things more easily.

Therapeutic effect on dementia

In recent times, there has been a rapid increase in research seeking to understand the impact of music on different types of dementia. “Intriguingly, this work has tended to show that in conditions like Alzheimer’s disease, the most common form of dementia, procedural musical memory, or the ability to play an instrument or sing a piece of music, is typically



“The fact that existing musical skills are typically preserved in many forms of dementia has prompted researchers to use music-based activities as a way of engaging people with dementia,” said Dr Sinclair.”



Dr Craig Sinclair.

preserved even though other memory systems like the ability to recall words are impaired,” says Dr Sinclair. Perhaps one of the most compelling examples of this is American jazz legend Tony Bennett, who famously continued to grace the stage well into his late nineties, even after being diagnosed with Alzheimer’s.

“The fact that existing musical skills are typically preserved in many forms of dementia has prompted researchers to use music-based activities as a way of engaging people with dementia,” said Dr Sinclair. He adds that exposure to music alone could have therapeutic benefits, with a recent review of music-based interventions among people with mild cognitive impairment and dementia revealing positive effects on both cognition and memory.

Music-evoked autobiographical memories

If you have ever found yourself transported back in time by a familiar melody, you’ve experienced the phenomenon of “music-evoked autobiographical memories.”

“This is when a familiar piece of music can trigger connections to memories from earlier in a person’s life – with sometimes startling results,” said Dr Sinclair. “For example, the music played at a graduation, wedding or funeral can continue to trigger experiences and feelings associated with the event when it is heard at a later time. That could suggest that music is particularly potent in facilitating the retrieval of positive memories, leading some researchers to suggest that this may have therapeutic applications.”

Where to from here?

Whether it’s to help us learn, relax, socialise or express ourselves, music features in almost every aspect of our lives. So, it is a natural progression that scientists continue to unravel the power of music and how it can be better used to improve brain processing and function. According to Dr Sinclair, the research still

has some way to go – but hope is on the horizon. “The future looks bright. Researchers will need to continue to explore how the brain responds and changes to music. We’ll also need to conduct further trials and population-based studies to determine if these effects apply more broadly across the population. Importantly, we’ll need to continue to focus on applied research to understand how best to implement programs in the real world.” •



Did you know?

Popular in the 1990s, the “Mozart Effect” stems from the idea that listening to classical music, particularly from classical composer Mozart, may temporarily boost cognitive abilities. While the science behind this is inconclusive, some studies have shown short-term improvements in spatial-temporal tasks e.g. solving puzzles and pattern recognition.

A new era in schizophrenia treatment

Motivated by a family member's struggle with schizophrenia, NeuRA's Professor Cyndi Shannon Weickert has dedicated her life to finding a better way to treat the illness with an interest in unlocking more personalised treatments for people with schizophrenia.

Around one per cent of Australians are affected by schizophrenia and are treated with antipsychotic drugs, but a third of people diagnosed are considered treatment resistant. Antipsychotic treatment shows limited improvement for cognitive and negative symptoms such as lack of motivation, difficulty experiencing pleasure, limited range of emotions, and speech challenges. The illness greatly disrupts the lives of those affected, with around 80 per cent of people diagnosed being unable to work.

Professor Weickert describes herself as “a biologist in a psychiatry field” with her aim of uncovering the biological basis of a major mental illness, schizophrenia. She recently led a clinical trial of anti-inflammatories for a subset of people with schizophrenia who also have elevated inflammation.

In the study, participants on antipsychotics were subsequently injected with one dose of an antibody known as Canakinumab. They discovered that inflammation biomarkers decreased due to the injection, and that psychotic symptoms such as hearing voices and paranoia subsequently decreased as well. The results were recently published in the journal *Brain, Behavior, and Immunity*.

“We saw the largest reduction in inflammation at four weeks and psychotic symptoms at eight

weeks after injection compared to the placebo group suggesting that the reduction in peripheral inflammation may precede functional brain improvement,” says Professor Weickert.

Deepening the brain-body connection

“In psychiatry, the thinking is that in order to improve brain function we have to aim our treatment at targets in the brain to see results in treatment of psychiatric illnesses,” says Professor Weickert.

“But in our study, we saw benefit from a drug that targets systems outside the brain (the circulating immune system) – rather than directly modulating the brain.”

Professor Weickert's research reinforces that what takes place in the body is not separate from what's going on in the brain, but in fact, bolsters the evidence the brain-body connection is key to unlocking better treatments for people with schizophrenia.

“We saw the largest reduction in inflammation at four weeks and psychotic symptoms at eight weeks after injection compared to the placebo group...”

The link between inflammation and schizophrenia

Around 40 per cent of people with chronic schizophrenia have inflammation at any given time.

Studies prior to Professor Weickert's showed varied and inconsistent results of the use of anti-inflammatories in people with schizophrenia. Her current study, however, took a new direction: it was the first to exclusively recruit people who are chronically ill with schizophrenia and have elevated peripheral blood markers of inflammation.

“Our approach in this study was unique compared to those conducted prior because we only expected anti-inflammatories to work for those people with schizophrenia who were experiencing inflammation.”

Professor Weickert attributes this targeted new approach as to why her team saw encouraging results.

What's next?

“Our research suggests that schizophrenia has multiple biological subtypes and this has provided us with at least two new directions in treatment of schizophrenia: one is to target the immune system and the other is hormone modulation,” says Professor Weickert.

This opens the exciting possibility of treating schizophrenia with a whole new class of medication that is based on biological changes that are happening in the body and the brain. •



**Professor
Cyndi
Shannon
Weickert.**

From left: Dr Annie Palermo (second from left) and Antonio Vecchio (centre) delivered a joint presentation at the International Spinal Cord Society Annual Scientific Meeting in 2023.



Bridging the gap between research and real life

In the world of health and medicine, the term ‘consumers’ refers to individuals who have personal experience with health conditions and who have used medical services for treatment. Consumers can be the patients themselves, or others indirectly touched by a condition such as carers, family members, friends and clinicians.

In recent years, the involvement of consumers has grown to be increasingly vital in shaping the direction and focus of medical research. The unique insights gained from people with lived experience ensure that the needs and perspectives of those directly impacted by health issues are central to the research process.

Antonio Vecchio is one of the many consumers that NeuRA collaborates with. He is passionate about this work and first got involved in consumer engagement work 10 years ago.

“People like Antonio are so valuable to our research because they offer invaluable insights from their lived experience, helping us to shape our research to ensure it is not only scientifically sound, but highly relevant and impactful to those we aim to help,” says Dr Annie Palermo, Research Fellow at NeuRA and collaborator with Antonio on spinal cord injury research.

Antonio was studying commerce when he sustained a spinal cord injury, which in an instant changed his life and career direction. After playing wheelchair sports, he realised that he had an interest in people and decided to pursue a career in psychology and mental health.

Driven by a desire to bridge the gap between research and the community, Antonio took up the role of Community and Consumer Engagement Manager at the Spinal Research Institute in Melbourne.

“There’s a lot of misconception in the community around the benefit of research,” says Antonio. “When you talk to anyone about spinal cord injury research, they focus on curative research – that is, research that aims to get people walking again. But there are other important areas of work, including some that NeuRA is focused on such as pain management, bladder and bowel, respiratory function and

Antonio’s vision is clear: “Through my work in this field, I aim to help more people see the true impact research can have on their lives and inspire them to become more actively involved.”

sleep that aren’t being articulated well to the public. That’s what I try to get across.”

Dr Palermo agrees: “Consumer involvement is so helpful in informing the broader community about the breadth and depth of our research, as consumers provide a real-world context and importantly, help make our research and findings more approachable to non-scientists.”

Antonio also hopes to change public perceptions about the challenges faced by those with spinal cord injuries.

“People think that our biggest problem is not being able to walk, but in fact, for some, finding solutions to pain or bladder and bowel complications could lead to the biggest improvements in quality of life.”

In his role with NeuRA, Antonio leverages his personal experience and professional expertise to guide researchers in meaningful consumer engagement. He is currently working with Dr Annie Palermo, clinicians from Prince of Wales Hospital, and the Spinal Cord Injury Research Centre at NeuRA on a research project focused on exploring the use and effect of different forms of electrical stimulation in relation to breathing function in the early stages after injury.

Antonio’s vision is clear: “Through my work in this field, I aim to help more people see the true impact research can have on their lives and inspire them to become more actively involved.” ●



Two minutes with Professor Melissa Bauman



From left: Dr Tertia Purves-Tyson and Professor Melissa Bauman.

Based at the University of California, Davis, and a collaborator of schizophrenia researcher Dr Tertia Purves-Tyson here at NeuRA, Professor Melissa Bauman's research is focused on understanding how changes in the prenatal environment may increase the likelihood of autism, schizophrenia and other neurodevelopmental conditions.

Tell us about yourself.

I'm a neuroscientist by training and an autism researcher. About 20 years ago, I became interested in understanding how changes in a pregnant woman's immune system can shape fetal brain development and how in some cases those changes may increase the likelihood of neurodevelopmental disorders.

How are you currently collaborating with NeuRA?

I have a collaboration with Dr Tertia Purves-Tyson, whose research focuses on hormones and neuroinflammation. She and I met at a conference in 2019 and have a shared interest in understanding the prenatal immune environment.

My laboratory in the US is going to be sending biospecimens to Tertia to carry out new experiments that we wouldn't be able to do on our own. So it's a new collaborative opportunity. I'm excited by this collaboration with NeuRA because it will take our research in new directions. It's translationally relevant to human neurodevelopmental disorders. I'm really excited to see what outcomes emerge. ●

Thank you for your continued support

Thank you so much to all of you who have given so generously to support our work at NeuRA. Every donation, no matter the size, helps to advance our understanding of the brain to ultimately help all Australians lead healthier, more fulfilling, independent and connected lives as they age.

Leaving a gift in your Will can be a wonderful way to make an enduring contribution, positively impacting the lives of those living with brain and nervous system disorders for generations to come.



If you would like to discuss leaving a gift in your Will to NeuRA in confidence, please contact NeuRA Gifts in Wills Officer, Lauren Moore on 1300 888 019, 02 9399 1122 or email us at bequests@neura.edu.au



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