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As Chair of the Advisory Board, I would like to extend the Board’s congratulations to the members of ARC Centre of Excellence in Cognition and its Disorders (CCD) for yet another successful year. CCD has continued to excel as a research hub, by bringing together many different disciplines, by providing world-class research training and by generating innovative research outcomes.

This year, the Australian Research Council (ARC) conducted a mid-term review of the performance of the Centre which included a visit by a Review Panel appointed by the ARC. As part of the comprehensive review of the CCD, several Advisory Board members were involved in an interview session with the ARC Review Panel. The Board members were asked some well-considered questions and the high level of engagement and interest shown by the Review Panel was consistent with feedback from other CCD representatives who also participated in the review process. The Board was later made aware of the Review Panel’s recommendations for ways the Centre might further enhance its efforts.

The Board was particularly pleased that Professor Stephen Crain received from the Review Panel strong affirmation of the quality of the Centre’s research environment; for the Centre’s successful placement of women in leadership roles, for the relationships developed with significant stakeholders and for nurturing a future generation of researchers in the cognitive sciences, from honours through to post-doctoral levels. As a result of this very positive review, the ARC has approved continued funding for the CCD through to 2017. We are confident that the recommendations from the Panel will be implemented by the Director, Chief Operations Officer and Program Leaders in order to maximise the achievements of the Centre over these next few years.

Engagement activities of the Centre were a continued focus this year, with successful outcomes including the Stakeholders’ Workshop and participation by members of the Reading Program at the Federal Minister for Education and Training’s policy roundtable on Students with Dyslexia. The Stakeholders’ Workshop provided an excellent opportunity for researchers to learn more about the practical needs of children and adults who face cognitive difficulties, as well as an opportunity for community and industry leaders to discuss the potential impact of evidence-based research findings and treatment protocols for meeting the needs of the people they serve. The event also proved to be a significant networking opportunity for researchers, community organisation members and industry representatives. The Advisory Board is looking forward to the continuation of this event next year.

There have been a number of changes to the Advisory Board during 2014, with three new members joining the Board from stakeholder organisations. The Board welcomed Dr Molly de Lemos, the President and Convenor of the Executive/Management Group and the Administration Committee of Learning Difficulties Australia; Ms Robyn Faine, the General Manager, Services with Alzheimer’s Australia NSW; and Mr Adrian Ford, the CEO of Autism Spectrum Australia. These new members bring a wealth of experience to the Advisory Board and I look forward to working with them over the life of the Centre. I would also like to acknowledge that Mr Glenn Rees, CEO of Alzheimer’s Australia, resigned in May 2014 and I would like to thank him for his contributions over the last three years.

On behalf of the Advisory Board, I take this opportunity to congratulate Professor Stephen Crain and all the researchers, postdoctoral researchers, higher degree research and undergraduate students, and the administrative staff of the CCD on another successful year. We look forward to the achievements of the Centre in 2015.
I am pleased to present this year’s Annual Report of the ARC Centre of Excellence in Cognition and its Disorders (CCD). The year was filled with achievements by Centre members. Our Centre membership has grown to 317, including 101 PhD candidates, 13 Centre research fellows, and 15 research support staff.

I begin this report by taking the opportunity to express my personal gratitude to those Centre members who participated in the successful Performance Review by the Australian Research Council (ARC). This review was an important milestone for the Centre. With confirmation of ARC funding until 2017, I look forward to the CCD’s continued growth and future successes.

I would also make special mention of the achievements of our leading female researchers: Professors Anne Castles and Katherine Demuth were both awarded the title of Distinguished Professor by Macquarie University; Professor Amanda Barnier was inducted as a Fellow of the US Society for Clinical and Experimental Hypnosis; Professor Lyndsey Nickels was named a Fellow of the Academy of the Social Sciences of Australia; Professor Dorothy Bishop was bestowed the honour of being named a Fellow of The Royal Society; and Associate Investigator Dr Muireann Irish received the NSW Young Tall Poppy Science Award. Our Centre is extremely fortunate to have women like these as role models for our future research leaders.

I also wish to thank our Advisory Board for another year of valuable guidance and for their active participation in Centre activities, including the CCD Stakeholders’ Workshop. Our Advisory Board Chair, Professor Laurent Rivory, is to be congratulated on his promotion to the role of Pro-Vice Chancellor (Strategic Collaborations and Partnerships) at The University of Sydney. I am delighted that the Centre will continue to benefit from his guidance as Chair of our Advisory Board.

The Centre’s international profile is continuing to expand. The CCD played a leading role in initiatives resulting in the signing of two Memoranda of Understanding, one with the Beijing Language and Culture University, China and the other with the National Central University, Taiwan. These agreements are in addition to Collaborative Agreements signed with Kanazawa University, Japan (the only other institution with a child magnetoencephalography (MEG) system in the world), and with the Kanazawa Institute of Technology, Japan. This last initiative led to a major technological advance - a real time head movement system for our child MEG system, to improve the accuracy in measuring brain responses in young children.

The CCD continued to benefit from the interactive and collaborative research projects that are made possible by the CCD Cross Program Support Scheme. In 2014, we funded six cross program projects across a range of research areas including meditation and language remediation, letter position dyslexia, hypnotic suggestibility and the brain, prosopagnosia (face blindness) in semantic dementia, gaze processing and delusions, and agency and body representation. The Centre has increased the funding available for this scheme in 2015 and we look forward to the research outcomes from these projects.

I continue to be impressed by the quality of our newest colleagues at the CCD, our students and higher degree research candidates. This year we congratulate Mirko Farina, who was recognised with the Macquarie University Award for Excellence in Higher Degree Research – Social Sciences, Business and Humanities; Emma Nile, who was granted funding through the AMP Tomorrow Makers 2014 scheme; and our two Annual Workshop poster winners Sicong Tu and Amy-Lee Sesel, who also presented their research at the Annual Workshop. The success of our student training is evident, as many have secured positions at internationally renowned institutions.

I close this report by expressing my thanks to all Centre members, for your enthusiasm and for the support you have shown to the CCD throughout the year.
vision

The ARC Centre of Excellence in Cognition and its Disorders will be recognised as a world-leading cognitive science centre, where scientists from across disciplines collaborate in order to link theoretical models and basic research findings in the cognitive sciences with outcomes focused on people with cognitive disorders.
The mission of the Centre is to coordinate research in five areas of cognition: belief formation, language, memory, person perception and reading.
centre overview

ARC Centres of Excellence are prestigious research hubs in which experts from across the nation work in collaboration to extend Australia’s international standing in areas of national priority. The ARC Centre of Excellence in Cognition and its Disorders (CCD) offers unique opportunities for interdisciplinary and international collaborative research in the study of cognition and its disorders. The five CCD research areas, belief formation, language, memory, person perception and reading, were chosen because they are well understood from a theoretical point of view and because Australia has outstanding researchers in these areas. The five research programs will directly inform the assessment and interventions for a range of cognitive disorders, including dyslexia, specific language impairment, autism, dementia and schizophrenia.

The CCD brings together an extensive network of Australian and international research institutions. The central node of the CCD is Macquarie University, with additional nodes at The University of New South Wales and at The University of Western Australia. There are two other Australian institutions, University of New England and The University of Sydney, plus nine international partner institutions associated with the CCD during 2014: Cardiff University, UK; INECO Foundation, Argentina; Institute of Education, University of London, UK; Royal Holloway, University of London, UK; University of Kansas, USA; University of Oxford, UK; The University of Auckland, New Zealand; The University of Cambridge, UK; and The University of York, UK.

governance | management

The Director, Professor Stephen Crain, is responsible for scientific leadership and strategic direction. The Chief Operations Officer, Dr Lisa Yen, is responsible for the operational management of the CCD. The Research Management Committee comprises the Director, the Chief Operations Officer and the Program Leaders. This Committee is responsible for the Centre’s goals, policies and performance indicators. The progress, future directions and outreach activities of the CCD are reviewed by an international Scientific Committee composed of eminent scholars in cognitive science, and by an Advisory Board with representatives from academia and key community/advocacy organisations.

advisory board

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The two-factor theory of delusional belief: Advancing understanding of normal belief formation and revision

Robyn Langdon, Max Coltheart, Ryan McKay, Ryan Balzan, Emily Connaughton and Michael Connors

For the past 15 years, researchers in the Belief Formation Program have been developing and applying a cognitive-neuropsychiatric approach to study the normal cognitive system for belief formation. Our work with delusional patients has demonstrated that the processes that initially generate the contents of a belief interact with, but differ from, the processes that revise or change beliefs. Our two-factor theory of delusional belief proposes that two distinct questions must be answered to explain the presence of a particular delusional belief. First (factor one): What caused the implausible content to arise in the first place? Second (factor two): Why does the patient persist in believing that the content is true even when the patient’s family, friends and clinicians insist that it is false and offer contradictory evidence? This year we have been contrasting this account with alternative one-factor accounts of delusional belief. We have extended our previous work to consider the range of misidentification delusions that can arise, such as the delusional belief that objects have been replaced by replicas. These monothematic delusions often occur in the context of known brain damage. So, this year we have conducted novel empirical investigations to extend our two-factor theory to explain delusions that are characteristic of schizophrenia, in particular, referential delusions.

Hypnosis research

Rochelle Cox, Amanda Barnier, Michael Connors, Vince Polito, Robyn Langdon, Max Coltheart and Emily Connaughton

This research uses hypnosis to study normal and abnormal processes of higher-order cognition. In particular, we use hypnotic suggestions to model the breakdowns of normal higher-order cognition that manifest as delusions and hallucinations. Clinical patients with these breakdowns are difficult to study experimentally because the symptoms of interest cannot be produced on demand and often co-occur with other cognitive impairments. We can address this challenge by using hypnotic suggestions with healthy participants to model delusions and hallucinations in the laboratory. We modelled different factor-one processes in mirrored-self misidentification delusion. We first developed a hypnotic suggestion designed to model a face processing impairment, where we told subjects that they would be unable to recognise faces. We then compared this with a suggestion designed to model a disconnection between face recognition and emotional response. We then told subjects that they would see a person in the mirror who looked just like them but would not feel like them. Both suggestions led to the belief that the person in the mirror was a stranger. The findings of this study help us understand the normal processes of mirrored-self recognition and raise the possibility of different ‘factor one’-pathways to the generation of the content of mirrored-self misidentification delusions. We also used hypnosis to investigate olfactory hallucinations.

The Belief Formation Program aims to advance understanding of the normal processes of higher-order cognition, with a specific focus on belief formation and revision. To meet this aim, we use a range of methodologies (e.g., cognitive neuropsychiatry, hypnosis, experimental psychology) with a range of normal and clinical populations, and we encourage cross-disciplinary perspectives that bring together cognitive scientists, philosophers and psychiatrists. We acknowledge the contribution of our many collaborators to this work.
We found that high, but not low, hypnotisable individuals could hallucinate odours with similar intensity to a real odour, and experienced impaired odour detection when we suggested they would smell nothing and then presented them with a real odour. These findings demonstrate the value of using hypnosis to study less prevalent patient symptoms.

**Prediction error processing and belief formation**

**Richard Morris, Melissa Green and Mike Le Pelley**

Many of our normal beliefs about the world result from associative learning. For example, a traumatic event experienced during a flight might result in a belief that flying is dangerous. Given that associative learning is an important source of our normal beliefs about the world, it seems possible that dysfunctions of fundamental associative learning processes might contribute to the formation and maintenance of delusions. Our research team has developed new procedures to provide an empirical test of the relationship between disruptions to prediction error signalling and delusional beliefs in schizophrenia. Our initial research investigated individual differences in prediction errors made by healthy people as a function of varying levels of schizotypal traits (measured using self-report questionnaires). We have since investigated the role of prediction-error in belief formation and evaluation in people with varying levels of severity in delusional thinking. To investigate whether positive prediction-errors, negative prediction-errors, or both, can disrupt normal belief formation in delusional patients, we are conducting further research using reinforcement learning modelling. This will determine if there are separate learning rates for positive and negative prediction-errors, and consider the relation of these learning rates to the severity of delusional thoughts.

A social cognitive training program for people with schizophrenia

**Pamela Marsh, Vince Polito, Max Coltheart and Robyn Langdon**

Social cognition refers to the abilities that sustain our understanding of the actions, intentions, thoughts and feelings of other people. These abilities underpin successful social interactions that rely on social cognitive abilities for understanding what others might be thinking or feeling. People with schizophrenia (and their carers and clinicians) report that difficulties in social interactions are a significant disruption to their lives. This year, we continued to promote ‘SoCog’, which is a psychosocial group intervention to help people with schizophrenia overcome their profound social difficulties. SoCog is comprised of two programs that use a suite of games and activities focusing on the specific social cognitive problems experienced by people with schizophrenia. One program is emotion recognition training (SoCog-ERT), to improve the recognition of others’ facial expressions of emotion. The second is mental-state reasoning training (SoCog-MSRT), to encourage flexible thinking about others’ likely thoughts, the tolerance of ambiguity, and thoughtful consideration of other people’s perspectives. We were also awarded funding from Schizophrenia Fellowship NSW to develop a web-based version of SoCog (eSoCog). This online-administered treatment program has the potential to reach people in rural locations, with cheaper administration costs than face-to-face treatments, and to serve as an important bridge between early intervention services for young people into standard care and, thus, preventing loss of treatment benefits and increasing the likelihood of ongoing engagement with mental health services. SoCog is now being run as part of standard care in three Sydney hospitals (Concord, Prince of Wales and St Vincent’s).
Normal and abnormal beliefs and experiences of one’s own body

Glenn Carruthers, Hannah Morgan, Vince Polito and Regine Zopf

This research focuses on the ways in which we develop a normal sense of controlling our own actions and thoughts. We have been using the rubber hand illusion, a technique in which people come to experience an artificial hand as if it were their own hand. This technique was used to investigate the relationship between individual differences in multisensory processing and individual susceptibility to the rubber hand illusion in healthy participants. Another aspect of this research has considered cognitive disorders involving unusual experiences of one’s body. For example, a delusion called somatoparaphrenia arises when stroke patients come to believe that a part of their body (e.g., their left arm) is not their own arm but, in fact, someone else’s. Investigation of spontaneous bizarre experiences of one’s own body in healthy participants has highlighted difficulties in distinguishing subjects’ actual experiences from the explanations they construct in an attempt to make sense of their bizarre experiences. This unexpected state of affairs, we argue, is consistent with a particular theory of consciousness known as ‘functionalism’. A final stream of this research uses a combination of direct reports from participants about their thoughts and experiences during self-generated actions, and indirect behavioural measures of the perceived timing of different events. We have been mapping out similarities and differences between various contexts where the usual sense of agency seems reduced. This work contributes to a better understanding of the cognitive basis of the sense of agency.

Auditory verbal hallucinations

Simon McCarthy-Jones and Melissa Green

People sometimes hear voices that other people cannot hear, formally termed ‘auditory verbal hallucinations’. We have been studying the nature and causes of such experience through a diverse research program, in order to understand typical cognitive processes and disruptions to typical cognitive processes in auditory verbal hallucinations. At the biological level we have examined how white matter changes to specific neural pathways in the brain may be associated with the experience of hearing voices, which will then form the basis for an examination of whether environmental and genetic factors contribute to such changes. At the cognitive level this has involved developing a hyper-vigilance model and examining what factors mediate the relationships between experiences of child abuse (which are often reported in people with auditory verbal hallucinations), the development of hyper-vigilant monitoring, and hearing voices. This work has involved other national collaborators from The University of New South Wales, and international collaborators from the University of Cambridge, Newcastle University and Durham University in the UK.
Cognitive neuropsychology of language

Lyndsey Nickels, Britta Biedermann, Saskia Kohnen, Karen Smith-Lock, Shiree Heath, Karen Croot, Catherine Mason, Nora Fieder, Danielle Colenbrander, Trudy Krajenbrink, Anastasia Romanova, Vishnu Nair, Solène Hameau, Polly Barr and Margaret Ryan

Language can be impaired as a result of stroke, traumatic brain injury, or dementia. These acquired language impairments are known as aphasia. Similarly, language and literacy may fail to develop normally. Cognitive neuropsychology uses these language impairments to inform theoretical models of language processing, and uses these models to increase our understanding of the nature of language impairments and to enable more effective treatment. We use cognitive neuropsychological methods to investigate many different aspects of language, with a focus on the way spoken and written words are learned, represented and processed in monolingual and bilingual speakers. One recent project has focused on the difference in how common nouns (e.g. house) and proper nouns (e.g. The White House) are represented in our minds. Proper nouns usually seem harder for people to recall than common nouns. However, we found that for newly learned nouns, where proper and common nouns are equally (un)familiar, proper nouns are not harder. This suggests that proper and common nouns may be less different in their representation than some authors have claimed.

The relative function of vowels and tones in Mandarin processing

Weiyi Ma, Peng Zhou, Stephen Crain and Liqun Gao
( Beijing Language and Culture University, China)

Studies on Indo-European language processing suggest that segments (vowels, consonants) constrain word recognition more efficiently than tones. However, it is unclear whether the finding applies to tonal languages, which rely on both segments and tones in distinguishing word identity. Mandarin, the most widely spoken language in the world by population, is a tonal language that has four tones. This cross-linguistic difference offers an important case to test the relative function of segments and tones in constraining word recognition. The present study examines the relative function of vowels and tones in Mandarin-speaking 2- to 3-year-olds. We examined the influences of tone and vowel change on children’s recognition of familiar words and learning of novel words. The target words were either correctly pronounced or mispronounced with tone change or vowel change. Results showed that both vowel and tone mispronunciations hindered children’s ability to recognize the words efficiently. Furthermore, vowel change hindered word recognition accuracy more than tone change, revealing a functional primacy of vowels. Finding that vowel changes were a greater disruption than tone changes in recognition, even in a tonal language like Mandarin, supports the functional primacy of segments in constraining word recognition.
The development of prosody in comprehension and production

Katherine Demuth, Nan Xu, Ivan Yuen, Gretel Macdonald, Rebecca Holt (Macquarie University), Amy German (Macquarie University), Elaine Schmidt and Mili Mathew (Macquarie University)

It is known that children take some time to learn to use phrasing and contrastive stress in appropriate ways. This has implications for effective communication. This project explores how children and adults learn to use appropriate prosodic organisation, including the use of contrastive stress (the RED dog), the use of phrasing (e.g. chocolate biscuits and cake versus chocolate, biscuits and cake), and the prosodic use of gesture. Both comprehension (eye-tracking) and production (elicited production tasks, explanation tasks) tasks are used to explore 6-year-olds use of prosodic cues in the speech they hear, and how they put this to use in their own speech production. The findings have important implications for understanding how and when speech prosody can be exploited by children during everyday discourse situations.

The acquisition of eventive and stative passives in typically developing children

Loes Koring, Nina Sengers (Utrecht University, The Netherlands) and Ken Wexler (Massachusetts Institute of Technology, USA)

An important question in the acquisition literature is when children acquire passive sentences such as ‘John was kissed by Mary’. Certain types of passives, in certain languages, seem to be acquired much earlier than others. Especially, children seem to acquire stative passives that have a finished or completed action interpretation (the door has been closed) much earlier than eventive passives that have an activity or in progress interpretation (the door is being closed). English passives like ‘the door is closed’ are ambiguous between a stative and an eventive interpretation, but in Dutch, different words are used to express the different types of passives. In an experiment we examined how Dutch 4- and 5-year-olds interpret the two different Dutch passives. In a picture selection task children were presented with two pictures, one indicating an event (John is being shaved) and one indicating the result of the event (a shaved John). The results showed that Dutch 5-year-olds distinguish perfectly well between these two Dutch passives, but 4-year-olds do not. Dutch 4-year-olds understand the eventive passive in 50% of the cases to refer to the result of the event instead of the event itself. A next step is to find out if children can produce the different passives in the right contexts. In addition, what does their on-line processing of these phrases look like? This will not only provide insight into the development of children’s syntax and processing strategies, but will also provide insight into the syntax and semantics of passives.

Reduced sensitivity to emotional speech prosody in a group of individuals with congenital amusia

William (Bill) Thompson, Manuela Marin (University of Vienna, Austria) and Lauren Stewart (University of London, UK)

It has been proposed that sensitivity to emotion in speech prosody derives from the capacity to process music. In a collaboration with colleagues from the University of Vienna and the University of London, we examined this relationship between emotion and music through a study investigating the sensitivity to emotion in speech prosody in individuals with congenital amusia, and a neurodevelopmental disorder characterised by deficits in processing acoustic and structural attributes of music. Individuals with congenital amusia and matched control participants judged the emotional expressions of 96 spoken phrases. Phrases are semantically neutral but prosodic cues (tone of voice) communicate each of six emotional states: happy, tender, afraid, irritated, sad and no emotion. Individuals with congenital amusia were significantly worse than matched controls at decoding emotional prosody, with decoding rates for some emotions up to 20% lower.
than that of matched controls. Our participants also reported difficulty understanding emotional prosody in their daily lives, suggesting some awareness of this deficit. Our findings support speculations that music and language share mechanisms that trigger emotional responses to acoustic attributes.

How tense and negation interact in children with specific language impairment

Rosalind Thornton, Stephen Crain, Kelly Rombough, Jasmine McKenzie and Linda Orton (Speech Pathology and Project Services)

English-speaking children with SLI often leave off word endings that express tense (past, present, future). These children might say ‘He walk to school’, whereas normally developing children at the same age would say ‘He walks to school’ or ‘He walked to school’. Typically developing children produce the same kinds of ‘errors’ as children with SLI, but these errors occur at a much earlier age. We examined children’s use of tense in negative statements and in negative questions. Negation introduces complexities beyond those introduced by tense. For example, ‘He doesn’t walk to school’ requires the verb doesn’t, with do, plus the present tense marker ‘s’, plus the negative ending ‘n’t’. Typically developing children take considerable time to figure out how the word doesn’t is composed. Before they figure this out, they often leave off the tense marker and say ‘He not walk to school’, and they may try out a range of alternative negative sentences including ‘He not walks to school’, ‘He don’t walks to school’ as well as ‘He’s not walk to school’. Our experimental studies found that 5-year-old children with SLI make exactly the same errors as typically developing children, but they take much longer to acquire the adult form doesn’t. Even at 7 years of age, children with SLI have not perfected this part of English grammar.

Grammatical aspect and event recognition in child sentence comprehension

Peng Zhou, Stephen Crain and Likan Zhan

This project investigates whether children can use the temporal information encoded in grammatical morphemes (e.g., -ed, -ing) to facilitate event recognition during on-line sentence comprehension (e.g., -ed indicates a completed event, but -ing indicates an ongoing event). The development of this ability requires children to establish the mapping between grammatical morphemes and the temporal structures of events (completed vs. ongoing). For example, children will need to understand that the morpheme -ed refers to a completed event, whereas the morpheme -ing refers to an ongoing event. The development of this ability also involves the development of the concept of time - one of the fundamental domains in human cognition, as well as the knowledge of how linguistic devices (e.g., grammatical morphemes) are used to encode time.

We tested 35 Mandarin-speaking 3-year-olds, 32 Mandarin-speaking 4-year-olds and 32 Mandarin-speaking 5-year-olds using eye-tracking equipment. The results showed that even the 3-year-olds are able to use the temporal reference encoded in grammatical morphemes as rapidly as adults to facilitate event recognition during on-line sentence comprehension. This is evidence that typically developing children by age 3 already know how time is encoded using grammatical morphemes.
Episodic memory: Mechanisms and brain circuitry

Michael Hornberger, Muireann Irish, Glenda Halliday (The University of New South Wales), Rachel Tan (Neuroscience Research Australia), Marshall Dalton, Stephanie Wong, Sicong Tu, Jillian Kril (The University of Sydney), Greg Savage, Olivier Piguet and John Hodges

Our memories are rich with perceptual, emotional and conceptual information. Creating and remembering these episodes is crucially dependent upon the brain’s ability to integrate perceptual information and to create meaningful associations between the elements we perceive. Depending on the type of information to be linked and remembered, this binding process relies on brain structures within the medial temporal lobes such as the hippocampus and the perirhinal cortices. Memory function is also supported by the ‘circuit of Papez’ (hippocampus, mammillary bodies, fornix, thalamus, cingulate cortex), as well as by the prefrontal cortices. Current projects combine neuroimaging technology and post-mortem tissue investigations of these brain structures in healthy and clinical populations. We have been investigating memory performance and brain activation in healthy young and older adults during various memory tasks using functional magnetic resonance imaging (fMRI) at the time of encoding and at the time of retrieval of information. Our findings support the view that specific regions within the medial temporal lobes and thalamus contribute to different types of associative memory retrieval. We have also demonstrated a specialisation within these brain regions during memory when processing semantic (verbal) and non-semantic stimuli. Concurrent projects have examined memory circuits in the dementias, such as Alzheimer’s disease, semantic dementia and frontotemporal dementia. Our neuroimaging work indicates that the hippocampus and other medial temporal lobe structures crucial to optimal episodic memory functioning are affected in these disorders. The pattern of brain changes also explain the relative preservation of episodic memory in patients with semantic dementia. Investigations of the patterns of memory deficits and associated changes in the brain have led to a better understanding of the brain circuitry involved in normal memory processes.

Emotions and memory

Fiona Kumfor, Muireann Irish, John Hodges and Olivier Piguet

Emotional events like weddings, funerals or accidents are typically remembered with greater details and more vividly than non-emotional events. This phenomenon is labelled emotional enhancement of memory, and is thought to depend on brain regions in the frontal and temporal lobes, including the amygdala, hippocampus, insula and prefrontal cortices. Although the brain regions that contribute to emotional memory enhancement are the same as those that undergo atrophy in the common dementia syndromes, there have been few studies investigating how emotional enhancement of memory is affected in patients with Alzheimer’s...
disease and frontotemporal dementia. In patients with Alzheimer’s disease, episodic memory is profoundly impaired, yet emotional functioning remains relatively intact. In contrast, early impairments in emotional and social functioning are observed in frontotemporal dementia. We have demonstrated for the first time, that emotional enhancement of memory is compromised in frontotemporal dementia, whereas the effect is present in Alzheimer’s disease. Using neuroimaging we found that this loss of emotional enhancement of memory is associated with atrophy in the orbitofrontal cortex.

Memory in the dementias
John Hodges, Michael Hornberger, Greg Savage, Sicong Tu, Stephanie Wong, Muireann Irish and Olivier Piguet

Deficits of episodic memory are early and prominent symptoms of Alzheimer’s disease. In a series of studies, we have demonstrated that patients with frontotemporal dementia, the second most common form of younger-onset dementia, also have significant impairments in episodic memory. Memory deficits are also observed in other dementia syndromes including Parkinson’s disease. These findings have clinical relevance for the accurate diagnosis of these disorders. These projects aim to elucidate the nature of the memory problems in patients with dementia of different aetiology (Alzheimer’s disease, frontotemporal dementia, Parkinson’s disease) as well as in individuals at risk of developing dementia (Mild Cognitive Impairment). We are developing a range of memory tests to differentiate these diseases based on the specific aspects of memory that are impaired and the neural structures known to be affected in these disorders. This approach has improved our ability to characterise memory dysfunction in various disorders and to assess the risk of developing dementia in people with emerging memory problems.

Autobiographical memories, imagining the future and prospective memory
Muireann Irish, Michael Hornberger, Michael Gascoigne, Suncica (Sunny) Lah, Laurie Miller, Greg Savage, Christopher Butler, Adam Zeman, John Hodges and Olivier Piguet

The episodic memory system enables us to remember personal events both from our recent past and from our distant past. These memories are essential for our sense of self and continuity over time. Our work has demonstrated that the brain’s semantic memory system (our memory for facts and general knowledge) provides the scaffolding necessary for the construction of future events, including prospective memory. Prospective memory supports our capacity to carry out intentions at a future time point, enabling us to “remember to remember”, so we can remember to keep appointments, to take medication and to pick up milk on the way home. Several processes are required for successful prospective memory performance, including retrieval of an appropriate action (episodic memory), but also maintenance of a timetable indicating when to carry out this action in the future. We are exploring the neurocognitive mechanisms essential for successful prospective memory performance by studying its breakdown in neurodegenerative disorders. Prospective memory is seriously compromised in patients with frontotemporal dementia, however different types of impairment are seen depending on the location of brain atrophy. In the behavioural variant of frontotemporal dementia, characterised by marked frontal lobe atrophy, deficits in time-based and event-based prospective memory are evident. In semantic dementia, however, the degeneration of the lateral temporal lobes results in an exclusive impairment of event-based prospective memory. Our findings suggest that dissociable mechanisms underpin prospective memory lapses in each dementia syndrome.

Prospection: A developmental perspective
Suncica (Sunny) Lah, Chloe Gott (The University of Sydney), Natalie Phillips (The University of Sydney), Louise Parry (Sydney Children’s Hospital Randwick), Carly Black (The University of Sydney), Michael Gascoigne, Anna Mandalis (Sydney Children’s Hospital Randwick), Adrienne Epps (Sydney Children’s Hospital Randwick), Suzanne Benson (Children’s Hospital at Westmead), Angie Morrow (Children’s Hospital at Westmead), David Shum (Griffith University), Muireann Irish and Olivier Piguet

Research on prospection (episodic thinking and prospective memory) has focused largely on preschool children and healthy adults, providing important insight into developmental changes that take place at the opposite ends of the life spectrum. Little is known about development of prospection from childhood to adulthood, a period during which cognitive skills and brain networks that underpin these skills undergo marked developmental changes, and little is known about the impact of acquired brain damage on development of prospection. We have investigated age-related change in prospection in typically developing children and adolescents, and compared prospection of typically developing children and adolescents to their
peers who had sustained traumatic brain injury. Our work with typically developing children has revealed marked developmental gains in episodic thinking from childhood to adolescence, which were largely related to increases in relational memory. In children and adolescents who had sustained traumatic brain injury, we have found significant deficits in episodic thinking, relative to their peers. We are extending this line of research to examine developmental changes in prospection from childhood to older age and to evaluate the functional correlates of deficits in prospection.

**Clinical interventions of memory deficits**

John Hodges, Sharon Savage, Laurie Miller, Suncica (Sunny) Lah, Kylie Radford (Neuroscience Research Australia), Elise van den Hoven (University of Technology, Sydney) and Olivier Piguet

Findings arising from our research projects are used to design better tests of memory and develop interventions that target specific memory deficits. For example, in translating our research findings we have focused on patients with semantic dementia. Patients with this disorder have major problems with naming and comprehension of word meaning. This deficit occurs against a background of well-preserved memory for recent events, and good attentional and problem solving skills. These preserved skills make them ideal candidates for rehabilitation strategies. Our word-retraining program has been found to be effective in patients with semantic dementia. We were able to demonstrate improvements within three weeks of simple, repetitive practice of word-picture pairings. These improvements were observed in patients with mild and severe deficits, demonstrating that such re-learning can take place regardless of the duration and severity of the disease. We were also able to show that this approach can lead to long-term improvements and can generalise to produce everyday benefits to language production and comprehension. Separately, we are developing electronic tools to help with the assessment of memory and language. These tools aim to facilitate test administration and promote data collection. The first test to be developed is the electronic version of the Sydney Language Battery, which is currently designed as an app for tablets. This test, which will be freely available to clinicians, examines aspects of language (naming, comprehension, repetition) in an interactive environment. In the next phase, we will be developing a web-based version of the Everyday Memory Training Program designed by Drs Laurie Miller, Kylie Radford and Sunny Lah. This will allow individuals with memory deficits to go through the different modules of the program individually and at their own pace. We are also exploring options to develop an electronic version of the word-retraining program used in semantic dementia patients. Finally, our collaboration with the School of Design at the University of Technology, Sydney aims to develop and trial prototype devices for improving the lives of people with memory impairment.

**Accelerated long term forgetting**

Laurie Miller, Greg Savage, Christopher Butler, Adam Zeman, Mary Lou Smith and Suncica (Sunny) Lah

Some patients with neurological conditions (primarily those involving epilepsy) show impairments in memory, days or weeks after encoding, in spite of having normal recall initially. We have been exploring the variables contributing to this deficit in longer-term consolidation across paediatric and adult patient populations in order to understand typical memory processes. Thus far, our investigations indicate that although the hippocampus plays an important role in memory retention for up to 24 hours, its role in longer-term retention is less evident. Instead, epileptic discharges seem to cause a longer-term erosion of memories. In other studies, we have investigated the relationships between accelerated long-term forgetting and autobiographical memory in these patients. We have begun to trial interventions that might prevent this type of decay.
Memory systems in paediatric clinical populations

Suncica (Sunny) Lah, Mary Lou Smith, Michael Gascoigne, Louise Parry (Sydney Children’s Hospital Randwick), Robyn Tate (The University of Sydney), Naomi Brookes (Sydney Children’s Hospital Randwick), Rachael Briggs (Australian National University), Pamela Davis (The University of Sydney), Anna Mandalis (Sydney Children’s Hospital Randwick), Jasmin Grayson-Collins (The University of Sydney), Belinda Barton (Children’s Hospital at Westmead), Richard Webster (Children’s Hospital at Westmead), Deepak Gill (Children’s Hospital at Westmead), Adrienne Epps (Sydney Children’s Hospital Randwick), Suzanne Benson (Children’s Hospital at Westmead), Angie Morrow (Children’s Hospital at Westmead), David Shum (Griffith University), Lyndsey Nickels, Anne Castles and John Hodges

We are currently investigating four central questions related to memory functions in children: 1) How do semantic and episodic memory relate to each other and develop during childhood? 2) What are the functional implications of memory deficits in children and their impact on other cognitive skills such as reading, future thinking and social problem solving? 3) Are tools for assessing memory functions in children sensitive and developmentally appropriate? 4) How can we enhance memory development and promote functional outcomes in children with memory deficits? Our investigations have uncovered a number of novel findings. We were the first to demonstrate a selective or combined deficit of semantic or episodic memory and a gradual impairment of autobiographical memory in children with temporal lobe epilepsy. We have further shown that semantic and episodic memory deficits have differential functional implications in these children: semantic memory deficits are strongly related to poor literacy skills compared to episodic memory deficits. We have also identified that children with epilepsy experience accelerated long-term forgetting. This memory deficit remains undetected by standardised memory tests. Further, we have devised a novel classification of skill recovery during post-traumatic amnesia following traumatic brain injury, based on skill acquisition during childhood. Finally, we are investigating the potential of computerised interventions for rehabilitation of working memory deficits in children following traumatic brain injury.
Person perception in autism spectrum conditions

Louise Ewing, Gillian Rhodes, Frances Caulfield, Eleni Avard, Ainsley Read, Libby Taylor, Linda Jeffery, Romina Palermo, Mel Rutherford, Jennifer Walsh, Elizabeth Pelliccano, Michael Ewbank (MRC Cognition and Brain Sciences Unit, UK), Chiara Fiorentini, Daphne Maurer, Raliza Stoyanova (MRC Cognition and Brain Sciences Unit, UK) and Mark Vida

Individuals with autism spectrum conditions often experience face-processing difficulties. Our overarching research goal is to understand the mechanisms that underlie the face- and person-processing atypicalities associated with autism. We are also investigating whether these person perception atypicalities might extend to “unaffected” individuals, who do not have a clinical diagnosis of autism but present with subtle traits of the disorder, e.g., family members of individuals with autism and other typical individuals with high levels of autism-like traits. Together, this research should provide an evidence base for researchers and clinicians to develop targeted interventions to enhance person perception, and ultimately, to enhance social functioning and quality of life in individuals with autism. One recent focus of our work has been how individuals with autism attribute trustworthiness from faces. Typical individuals make rapid and reliable evaluations of trustworthiness from facial appearances, which can powerfully influence behaviour. It is not clear whether the same is true for children and adults with autism. Investigations of the typical and atypical development of these important social judgements have revealed striking between-group similarities in the cues that modulate the appearance of trustworthiness (e.g., emotional expressions, such as happiness or anger). Our findings suggest that children with autism selectively fail to use these cues to guide behaviour in an ecologically valid context (e.g., in a behavioural economics trust game).

The development of person perception during childhood

Linda Jeffery, Romina Palermo, Marianne Peters (The University of Western Australia), Vanessa Tan, Xujia Wang, Ellen Bothe, Kate Crookes, Anita Smith (The University of Western Australia), Samantha Bank, Nichola Burton, Ainsley Read, Gillian Rhodes and Libby Taylor

Faces convey rich social information that guides our social interactions. Adults have little difficulty reading this information from thousands of faces, despite their apparent similarity as visual patterns. This exquisite expertise with faces emerges slowly during development, with performance on many face perception tasks improving throughout childhood. However, the source of improvement is controversial. A question of particular interest is whether improvements in face perception during childhood reflect changes in visual processing mechanisms that are specific to face perception. A related question is the degree to which the improvement in face perception can be explained by more general cognitive development that leads to improvement on all kinds of cognitive and perceptual tasks. To answer these questions, we have commenced a unique longitudinal study of how children’s person perception skills improve...
as they get older. We will measure the same children’s face recognition and expression recognition skills over three years. We will also measure visual processing mechanisms that are thought to be crucial for face perception, to determine whether these mechanisms strengthen with age. Further, we will measure a variety of more general cognitive abilities (e.g., attention, IQ) to determine how strongly these contribute to improvement in face perception skills during childhood. Intriguing preliminary findings suggest that general cognitive ability may contribute more strongly to children’s performance on face perception tasks, relative to adults’ performance.

Coding ensembles for face groups

Markus Neumann, Romina Palermo, Meg Purton, Sarah Griffiths (University of Bristol, UK), Sina Hahn (Heinrich-Heine University of Düsseldorf, Germany), Stefan Schweinberger and Gillian Rhodes

A face conveys an abundance of information about a person, such as his or her gender, current emotional state and identity. Such information can be efficiently extracted in a glance, and with little effort, when viewing a single face. Theory on face recognition has commonly treated faces as distinct entities. However, humans are often confronted with multiple faces, for example when interacting with a group of people. These situations may require a different style of information processing. Specifically, one might be interested in gaining information about characteristics for an entire group at once, for example the average emotion of the crowd at a given moment (the current “vibe”). This project examines how such ensemble information of a face group can be coded, and whether or not these ensemble representations interact with the coding of information about the individual faces of the group. Specifically, we tested the hypothesis that the mean expression of a group of faces might influence our perception of the individual faces in the group. We found that the same faces (regardless of expression) were perceived as happier when seen within a group of faces, compared to when seen alone. However, we also established that the effect of the face group is not indicative of a systematic bias towards the mean expression of a group. While confirming that expression is indeed perceived differently when faces occur in a group, rather than individually, our results also suggest that the ensemble representation may not have caused the observed bias. We are currently planning further research to identify processes involved in the processing of group expression. In a separate line of research, we have started to investigate the neural correlates underlying the processing of individual and ensemble information.

How does race affect face processing?

Kate Crookes, William Hayward, Gillian Rhodes, Elinor McKone, Nadine Kloth, Louise Ewing, Jemma Collova and Stephen Pond

People are generally better at recognising faces from their own ethnic group than faces from other groups with which they have less experience. This “other-race effect” is well established and has been widely replicated across different countries and ethnicities. However the processes that underlie this effect are still much debated. An understanding of this phenomenon and how it might be overcome will inform theories of face recognition more generally and may have practical implications for our increasingly global society. This year we have continued to investigate possible differences between own- and other-race faces in experience, attention allocation, motivation and social categorisation that may be driving this effect. In addition to this work, we have investigated whether race also affects the perception of other social communicative signals from the face. We focused on the perception of information from the eye region, which contains a wealth of socially relevant information that we usually perceive and interpret very accurately. We found that both sensitivity to gaze direction and the ability to infer mental states from the eyes can be impaired for other-race faces. This result suggests that, on top of the well-established identification difficulties, it may also be more challenging to successfully interpret subtle social signals in encounters with people from other ethnic backgrounds.

Insights into face processing mechanisms from congenital prosopagnosia

Romina Palermo, Linda Jeffery, Markus Neumann, Gillian Rhodes, Matthew Robson, Laura McLaughlin-Engfors, Andrew Young, Shahd Al-Janabi, Fiona Kumfor, Olivier Piguet, Muireann Irish, Christopher Benton, Andy Skinner and Nichola Burton

People with congenital prosopagnosia have failed to develop adequate face identity recognition mechanisms, and often report severe, recurring, everyday face recognition difficulties, such as failing to recognise their child at day care or having difficulty following the plot of movies because they cannot differentiate the actors. Our recent work has focused on discovering the perceptual mechanisms that may be disrupted in this developmental form of prosopagnosia. Holistic coding, in which information is integrated across a face, is a key face-specific mechanism. We found that a
group of adults with congenital prosopagnosia showed reduced holistic coding of facial identity, suggesting that this perceptual mechanism is compromised. Adaptive face coding is another key face-specific perceptual mechanism, in which identity is coded relative to an average or ‘norm’ face, and is reflected by face aftereffects. We found that a group of adults with prosopagnosia displayed a significant face identity aftereffect. However, their impression of the identity of the neutral average face was not significantly shifted by adaptation, suggesting that adaptive coding of identity is abnormal in prosopagnosia. There are many different types of face aftereffects which code different face attributes, such as eye gaze, expression or head direction. We are currently investigating the specific types of face aftereffects that are impaired in people with congenital prosopagnosia. We also investigate whether the perceptual mechanism of ensemble coding, where an average of simultaneously presented faces is formed, is disrupted in congenital prosopagnosia. Finally, we are systematically investigating how people with congenital prosopagnosia code facial expressions, to determine how similar the processing of facial expression is to the processing of facial identity. These studies help us to understand how the perceptual mechanisms involved in face processing are organised.

Adaptive processes in person perception

Gillian Rhodes, Linda Jeffery, Nichola Burton, Nadine Kloth, Stephen Pond, Colin Clifford (The University of New South Wales), Elinor McKone, Andy Skinner, Christopher Benton, Michael Webster, Daphne Maurer and Libby Taylor

In everyday life, we use a wealth of social cues from faces to guide our interactions with others. This research investigates the perceptual foundations of our ability to “read” these cues and to distinguish among thousands of faces despite their perceptual similarity. Our work with face aftereffects suggests that faces are coded relative to perceptual norms or averages that are adaptively tuned by experience. Exposure to a face updates the norm, shifting it temporarily towards characteristics of that face, and selectively biases perception towards an identity with opposite characteristics. Norm-based coding may allow us to see past the shared structure of all faces, to those characteristics that define individuals and those variations in their appearance associated with different emotional and attentional states. We are investigating the scope, implementation and function of adaptive, norm-based coding in person perception. With regards to scope, our results indicate that face dimensions related to identity, expression, gender and age, as well as body dimensions related to identity, are norm-based coded. Our investigations of neural implementation indicate opponent coding of these dimensions. In this form of coding, each dimension is represented by activation in two pools of neurons, tuned to low and high dimension values, respectively. Equal activation in the two pools signals a neutral point, or norm, and the coding is “norm-based” because the channels are tuned to deviations from this point. A long-standing question is whether adaptation plays any functional role in perception. In the case of faces, we have asked whether face adaptation is linked to face recognition ability. Our results suggest that it is. First, face adaptation, measured using identity aftereffects, is linked to face-selective recognition ability in typical adults. Second, face adaptation is reduced in a range of populations with face recognition difficulties, including congenital-cataract-reversal patients, congenital prosopagnosics, individuals with autism and neurotypical men with high levels of autistic traits. Taken together, the findings suggest that adaptive coding of faces plays an important functional role in our ability to recognise faces.

Reading social cues from faces

Nadine Kloth, Gillian Rhodes, Linda Jeffery, Lindsey Short (Brock University, Canada), Eleni Avard, Ainsley Read, Libby Taylor and Sina Hahn (Heinrich-Heine University of Düsseldorf, Germany)

Faces provide us with a variety of social cues. The fast and accurate perception of this information helps us to successfully navigate the many social interactions we encounter every day. We can usually identify familiar people from their faces quickly and accurately, allowing us to recognise those we have met before and, ultimately, to establish social relationships with others. However, even if a person is completely unfamiliar to us, their face provides a wealth of meaningful information that can help us tailor our behaviour to the requirements of the social situation at hand. We can easily tell young from old and men from women. We can instantly decide whether we find a face attractive or not, whether it is looking at us or not, and whether it is smiling or frowning at us. While all these signals are very valuable individually, they are particularly meaningful when evaluated in combination. The present project investigates the mechanisms that underlie the perception of social cues in faces, both individually and in combination. Specific research questions include whether particularly attractive faces bias our attention. We further study whether variations in eye gaze direction, which can signal social interest and relevance, differentially affect the excitability of face-sensitive neurons in the visual system and modulate the processing of other signals in the face. Finally we investigate how variations in one facial signal can affect our perception of other signals. We have studied these and related questions using classic behavioural experiments and eye tracking. An important new direction is to extend this research to examine the neural correlates of face perception using event-related brain potentials.
Computational modelling of reading

Max Coltheart, Serje Robidoux, Stephen Pritchard, Anne Castles, Eva Marinus, Ami Sambai, Derek Besner (University of Waterloo, Canada), Kathleen Rastle, Claudio Mulatti, Steven Saunders, Lisa Ceccherini and Anastasia Ulicheva (University of Hong Kong, Hong Kong).

One focus of this ongoing project has been on the second version of the Dual Route Cascaded (DRC) computational model of reading: DRC 2.0. Programming of DRC 2.0 has been completed and we continue to test the model against data from published experimental studies of reading aloud and visual word recognition. A second focus of the project aims to extend the success of DRC in modelling the Roman alphabet to the development of DRC-style computational models of reading aloud and visual word recognition in languages that are not written with the Roman alphabet: Japanese, Russian and Greek. Japanese represents a unique challenge for modelling because it uses three different writing systems; Russian (written in the Cyrillic alphabet) is also challenging because it differs greatly from English with respect to the type of alphabetic writing it employs. DRC-style computational models of reading aloud and visual word recognition have been constructed for Japanese, Greek and Russian. The neural basis of both normal and impaired reading can be investigated using brain-imaging techniques such as event related potentials.

Orthographic learning in dyslexia and the hearing-impaired

Anne Castles, Eva Marinus, Hua-Chen Wang, Lyndsey Nickels, Kate Nation, Malin Wass, Teresa Ching (National Acoustic Laboratories) and Linda Cupples

This ongoing research project explores how children acquire representations of individual written words, and how this may be impaired in children with different developmental disorders. Although it is known that phonological decoding skills are a key foundation of learning to read, children must ultimately move beyond this to recognising individual words fluently and automatically, which we refer to as orthographic learning. In collaboration with the National Acoustic Laboratories, we have been exploring orthographic learning in two groups of children who often experience phonological problems, namely children with hearing impairments and children with dyslexia. This year, we carried out orthographic learning experiments in a group of children with reading difficulties. We found that children with relatively good phonological skills were not necessarily better at orthographic learning than children with poorer phonological skills, suggesting...
that factors beyond phonological decoding skill are required for successful orthographic learning. We also found that cognitive abilities such as learning paired-associations are a strong predictor of orthographic learning in these children. In the group of children with hearing impairments, we found orthographic learning to be strongly related to measures of working memory and paired-associate learning, a finding which we will further explore in future studies.

**Reading Fluency Training project:**
Factors involved in the development of reading fluency and informing treatment options for poor reading fluency

Eva Marinus, Hua-Chen Wang, Saskia Kohnen and Genevieve McArthur

Research has shown that it is very difficult to improve reading fluency in poor readers, perhaps because it is largely unknown which cognitive changes underlie the development of reading speed. We have conducted training studies in which we systematically manipulate different training elements: If children improve their reading fluency more efficiently under a certain condition we can make conclusions about factors that are involved in the development of reading fluency. This can inform the implementation of these factors in remediation programs. In our first study, we trained 20 children using our computerised training program ‘Text-highlighter’. Our aim was to investigate if making children aware of syllables would accelerate their reading fluency progress. All participants trained at home with their parents. There were two training conditions, each consisting of 20 sessions of 15-20 minutes over 4 weeks. In the first condition (“syllable training”), readers were made aware of the syllabic structure of words by dynamically highlighting syllables in texts. The children were encouraged to read along with the speed of highlighting, which was increased as they practiced. To find out whether potential improvements in reading fluency were caused by improved awareness of syllable structure or just by external encouragement to read faster, we compared the outcomes of the syllable training to a second training condition (“letter training”). Half of the participants started with the syllable training, the other half started with the letter training. Results demonstrated significant training effects on three outcome measures: (1) reading fluency (average increase of 6 months in reading level within 3 months of training), (2) regular and irregular word reading accuracy and speed, and (3) rapid naming of letters. Improvements on standardised word reading speed, text reading accuracy and comprehension assessments did not exceed test-retest effects. Therefore, reading fluency increased in these poor readers, but this did not seem to depend on increased awareness of the syllabic structure of words. We are currently in the process of implementing the Reading Fluency Training program in the Macquarie University Cognition Clinic for Reading and looking into potential means of converting the program into a web-based application.

**Attentional deficits in dyslexia**

Nicholas Badcock, Genevieve McArthur, Anne Castles, Saskia Kohnen, Naama Friedmann, Eva Marinus, Hanli Uys, David Badcock (The University of Western Australia), Kathryn Preece, Kate Glenn, Yvette Kezilas, Linda Larsen, Kristy Jones, Joanna Kidd and Sieu Khuu (The University of New South Wales)

We have been examining multiple aspects of attention in dyslexia, including temporal attention, crowding, and attentional dyslexia. Our research suggests that the preparation of attention may be slower in some children with dyslexia. This is consistent with a meta-analysis of the ‘attentional blink’ research focused on dyslexia and follow-up experiments manipulating preparation time in the attentional blink in typical readers. Our research has also examined the affect of text spacing (i.e., crowding) on reading accuracy and fluency. Finally, we have studied the phenomenon of attentional dyslexia. People with attentional dyslexia swap letters between words. For example, “dark part” may be incorrectly read as “park dart” or “dart park”.

| Members of the Reading Program | 29 |
**Self-esteem and socio-emotional abilities in poor readers**

Genevieve McArthur, Nicholas Badcock, Erin Banales, Saskia Kohnen, Anne Castles and Mark Boyes (Curtin University)

One strand of this project is investigating, for the first time, if there are specific associations between different types of poor reading (phonological decoding, sight word reading, reading comprehension) and different types of poor self-esteem (academic, general, social, parent-home) when potentially confounding associated deficits (spoken language, attention, intelligence) are taken into account. Poor phonological decoding and poor sight word reading were found to be specifically associated with poor academic self-esteem. We also found that a large minority (one-quarter to one-third) of children with poor phonological decoding or poor sight word reading had poor academic self-esteem. We suggest that resilience training might be used to protect these children from, or treat them for, poor academic self-esteem. A second strand project explores why individuals with reading difficulties have poor mental health outcomes. This project focuses on coping and resilience as protective factors, with a future goal of developing interventions targeting these abilities with respect to reading difficulties.

**Reading and spelling training studies**


We continue to carry out a range of training studies focused on informing the development of effective treatments for reading disorders. An ongoing project investigates how to train oral vocabulary skills, and to assess whether this training assists children in overcoming specific comprehension difficulties. We have completed a replication study to ascertain the reliability of phonics and sight word training on remediating poor reading, and we have used orthographic learning tasks to investigate the effect of training lexical skills and phonics on children's ability to learn novel words. We have also carried out a spelling training study with individuals who have severe spelling problems following stroke, due to problems in holding letters in memory before writing them. In addition, we have started to explore the profiles of children who do and do not respond to the reading intervention to try and identify what factors may influence treatment success.

**Spatial attention in reading**

Serje Robidoux, Derek Besner (University of Waterloo, Canada) and Derek Rauwerda (University of Waterloo, Canada)

For the last 10-15 years, there has been conflicting results in the literature around whether or not skilled readers can process letter strings without ever attending to them. The conflict arises because experiments using Stroop-like tasks (where subjects have to name a colour, say red, while ignoring a different word, say blue or sky) seem to show that we don't need to attend to letter strings to process them, even as far as accessing semantic information. Conversely, unattended words do not seem to have an influence when the primary task is reading based (e.g., making word/nonword judgements, assigning semantic categories, or reading aloud). In a series of experiments published this year, we first demonstrated that colour naming doesn't require as much spatial attention as reading does, suggesting that colour naming experiments may not be controlling attention appropriately. We have further demonstrated that when the colour stimulus is designed to be more difficult (in order to better capture attention), unattended words no longer influence the colour naming processes. This reconciles the conflict and leads to the conclusion that we can only read words that we attend to.
have used a single case study approach with patients experiencing misidentification delusions to investigate the normal system of person identity processing. This is a complex skill, requiring integration of information from multiple sources, including face, voice and gait. Connaughton, Langdon and Coltheart have developed a battery of tasks to study unconscious processing of person identity from both face and voice cues. Our tasks assess unconscious processing of familiarity via changes in skin conductance and pupil size. This year, we have been combining these tasks with tests of conscious person identification to study patients with Capgras delusion and other misidentification delusions. In another line of research led by Barnier, we have been developing laboratory models of the transmission of beliefs based on memory paradigms that index the transmission of (true and false) knowledge. These techniques help us understand potential mechanisms and parameters of the social transmission of normal and abnormal beliefs.

The generalisation of a perceptual anchoring deficit in dyslexia

Nicholas Badcock, Louise Ewing, Gillian Rhodes, Genevieve McArthur and Linda Jeffery

This project examined the domain specificity of a ‘perceptual anchoring’ deficit in developmental dyslexia. Perceptual anchoring involves developing internal representations of perceptual entities (e.g., speech sounds) and is considered to be deficient in individuals with reading difficulties. Despite the theory proposing that perceptual anchoring is a domain general skill, research to date has only investigated the auditory domain, so we looked for this deficit in vision. We used an auditory frequency discrimination task and a visual face adaptation task to examine perceptual anchoring in groups of children with and without developmental dyslexia. This combination of tasks drew directly on the knowledge and expertise of the Reading and Person Perception Programs. We collected data from children with and without dyslexia. Overall, the results indicated a perceptual anchoring deficit in the group of children with dyslexia in the auditory task but not the visual task. Therefore, the results did not support the notion that perceptual anchoring is a general deficit in children with dyslexia. In addition to this major finding, the data suggested that auditory perceptual anchoring deficits were only present in individuals with both poor phonological decoding (i.e., non-word reading) and poor phonological processing (i.e., non-word repetition) skills. Difficulties with either phonological decoding or phonological processing in isolation were not associated with an auditory perceptual anchoring deficit. The direction of causality cannot be inferred through this study but it seems that auditory memory links phonological abilities with auditory perceptual anchoring.

Cross program support scheme

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Memory for faces

Fiona Kumfor, Muireann Irish, Romina Palermo, Gillian Rhodes and Olivier Piguet

Despite the incredible similarity across faces, humans are able to discriminate between friends, families and strangers very easily and automatically. This ability to use facial information to recognise an individual’s identity is thought to depend on an extended brain network encompassing the occipital and temporal fusiform face areas and the prefrontal cortices. The extent that memory for faces is compromised in dementia syndromes is variable: In frontotemporal dementia difficulty recognising individuals may be an early clinical feature, whereas in Alzheimer’s disease, recognising others tends to become increasingly difficult with disease progression. Researchers from the Memory and Person Perception Programs are investigating the cognitive and neurobiological mechanisms underpinning memory for faces in frontotemporal dementia and Alzheimer’s disease. This approach will, for the first time, enable us to understand how this integral ability to recognise others is affected in neurodegenerative disorders and will improve our understanding of how humans undertake this complex task with apparent ease.

Cognitive-neuropsychiatric research on disorders of belief, person perception and memory

Robyn Langdon, Max Coltheart, Amanda Barnier and Emily Connaughton

The cognitive neuropsychiatric approach we use here aims firstly to develop models of the normal cognitive processes involved in belief and memory, and secondly to test these models by determining how well they can explain the profiles of psychiatric and related symptoms seen in individual patients. In recent research, we have used a single case study approach with patients experiencing misidentification delusions to investigate the normal system of person identity processing. This is a complex skill, requiring integration of information from multiple sources, including face, voice and gait. Connaughton, Langdon and Coltheart have developed a battery of tasks to study unconscious processing of person identity from both face and voice cues. Our tasks assess unconscious processing of familiarity via changes in skin conductance and pupil size. This year, we have been combining these tasks with tests of conscious person identification to study patients with Capgras delusion and other misidentification delusions. In another line of research led by Barnier, we have been developing laboratory models of the transmission of beliefs based on memory paradigms that index the transmission of (true and false) knowledge. These techniques help us understand potential mechanisms and parameters of the social transmission of normal and abnormal beliefs.

Cross program

Our Cross Program research projects bring together researchers from different Programs to encourage innovation and advances in cognitive science research. We have developed the CCD Cross Program Support Scheme to provide funding to support these collaborative, cross program research projects within the Centre. Applications bring together researchers and students from across the five CCD research programs: Belief Formation, Language, Memory, Person Perception and Reading.

Cross program support scheme

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The historical present in past and future narratives

Muireann Irish, Stephen Crain, Rosalind Thornton, Blake Johnson, Donna Rose Addis (The University of Auckland, NZ), Jody Kamminga (Neuroscience Research Australia) and Olivier Piguet

This project conducted a retrospective analysis of tense use during autobiographical memory retrieval in the neurodegenerative conditions of semantic dementia and Alzheimer’s disease. The original aim of the study was to investigate the use of one specific aspect of tense (the historical present), however the incidence of this form of tense during autobiographical memory retrieval, even in healthy older individuals, was extremely low. The project therefore focused on the correct use of past and present tense within autobiographical narratives, and their neuroanatomical correlates, involving researchers from the Memory and Language Programs. The retrospective analysis revealed that correct use of the past tense is disrupted in neurodegenerative disorders. Notably, patient groups displayed a striking reduction in use of the past tense, even when controlling for their total verbal output. This deficit in correct past tense usage was offset by a significant elevation of off-target present tense usage, pointing towards a possible compensatory mechanism. Neuroimaging analyses revealed that disruption of episodic past tense was related to different neural substrates in each patient group. Regions important for language and semantic processing were implicated in semantic dementia, whereas in Alzheimer’s disease tense disruption was related to regions crucial for episodic memory retrieval.

Memory and reading in children with temporal lobe epilepsy

Suncica (Sunny) Lah, Mary Lou Smith, Lyndsey Nickels, Anne Castles and John Hodges

Children with temporal lobe epilepsy are at risk for deficits in episodic memory and reading. Semantic memory deficits and double dissociations between episodic and semantic memory have recently been found in this population. Also, semantic (but not episodic) memory is an integral part of cognitive models of reading and impairments are associated with a loss of reading skills (surface dyslexia) in adults with temporal lobe pathology. In a series of studies, we investigated whether the memory systems for episodic and semantic memory relate differently to reading in children with temporal lobe epilepsy whose brain connectivity and cognitive skills are still developing. We found evidence for a different relationship between semantic memory and reading, versus episodic memory and reading, in children with temporal lobe epilepsy. Our findings are important for understanding memory in children with and without temporal lobe epilepsy because semantic memory is associated with reading, and temporal lobe surgery carries a risk of a mild drop in semantic memory and thus reading. Finally, we have identified an urgent need for studies examining efficacy of treatments for reading deficits in children with temporal lobe epilepsy. Overall, these studies furthered collaborations between the Memory, Language and Reading Programs.

Characterising disorders of auditory-based communication skills

William (Bill) Thompson, Blake Johnson, Sachiko Kinoshita, Genevieve McArthur and Yanan Sun

Congenital amusia is a disorder of music perception characterised by impaired sensitivity to pitch and pitch direction, and difficulty recognising and appreciating music. Dyslexia is an impairment of reading, and the implications of dyslexia for auditory processing is the topic of research and theory. As music listening requires rapid processing of sound, it is often claimed that musical interventions improve reading skills. More generally, congenital amusia and dyslexia are both related to auditory-based communication, but there is little understanding of their distinctive and overlapping characteristics. The goal of this project was to characterise and compare these auditory-based disorders using behavioural and electrophysiological measures, allowing us to identify sources of convergence and divergence between music and language, evaluate music-based intervention for language impairments and develop a framework for understanding auditory-based communication disorders. For this study, we recruited monolingual English participants with congenital amusia, as well as adults with dyslexia and matched controls, and we assessed their language and musical skills. Finally, we developed a connection with a Chinese research team at Shanghai Normal University and ran a related study with Chinese participants with amusia and matched controls. Preliminary data support our hypothesis that musical deficits are related to difficulties in language skills and vice versa. In general, rhythmic skills were associated with phonological skills. Results for English speaking amusics are promising, and we plan to publish our data once the investigations are completed. In our Chinese study, amusics were found to have impaired sensitivity to musical syntax and tonality and these data have been submitted for publication.
Measurement of hippocampal theta rhythm in aged adults

Blake Johnson, Brian Cornwell (Swinburne University of Technology) and Yi Pu

The hippocampal formation is a brain region that is affected early and prominently in Alzheimer’s disease and other dementias, and the learning and memory functions mediated by this structure are the earliest and most severely affected by dementia. The hippocampal theta rhythm is a conspicuous oscillation of neuronal or brain activity first discovered in the rat brain and has very recently shown to be detectable from the human brain with non-invasive MEG brain imaging. This opens a new opportunity for the development of highly sensitive and clinically applicable methods to study how and when the function of the hippocampal formation is affected in Alzheimer’s disease, other dementias, and normal aging. Since the theta rhythm is a dominant operational mode of the hippocampus, we hypothesise that the changes taking place in the brain during the development of Alzheimer’s disease will be reflected by changes in the theta rhythm at the very earliest stages of the disease.

Using MEG to study brain processing of emotion in anxious children

Jennifer Hudson (Macquarie University), Blake Johnson, Suzanne Broeren (Macquarie University), Lauren McLellan (Macquarie University), Quincy Wong (Macquarie University), Helen Dodd (Macquarie University), Wei He and David Meng

Anxiety disorders are a very common, but understudied and under-diagnosed, problem in children. An important risk factor for these disorders is a bias to threatening information. However, little is known about the development of these biases and the exact role they play in childhood anxiety dysfunction. This collaborative project, with the Centre for Emotional Health at Macquarie University, uses innovative, child-friendly tasks and the cutting-edge MEG brain imaging technique to clarify these issues. This will advance our understanding of the nature, development and neural underpinnings of these biases, and will reveal their role in the onset and maintenance of childhood anxiety at different stages of development through childhood. Outcomes will have direct implications for prevention and treatment of child anxiety.

Assessment of upper motor neuron function in early Amyotrophic Lateral Sclerosis using MEG and transcranial magnetic stimulation

Michael Lee (Neuroscience Research Australia), Matthew Kiernan (Neuroscience Research Australia) and Blake Johnson

Amyotrophic Lateral Sclerosis is a progressive and fatal neurodegenerative disease affecting the motor system. Diagnosis is based on clinical detection of upper motor
neuron and lower motor neuron dysfunction in the limbs and/or bulbar regions of the brain (brain stem and cerebellum) inexplicable by other diagnosis. However, upper motor neuron signs are difficult to elicit clinically when there is neurogenic weakness in the same limb (i.e., lower motor neuron lesions). Diagnostic uncertainty inevitably delays appropriate treatment. There is currently no reliable biomarker for upper motor neuron dysfunction and as such, the aim of this project is to investigate the sensitivity of MEG as a neural marker for upper motor neuron function in early stages of Amyotrophic Lateral Sclerosis.

Revision and repair in syntactic analysis: A MEG study
Michael Iverson, Stephen Crain, Graciela Tesan and Blake Johnson

This research project aims to establish a viable methodology using MEG to detect brain responses to syntactic anomalies in natural language processing, and to extend these methods to investigating linguistic processing in adult bilinguals. Research using electrophysiological measures (electroencephalography, or EEG) has found that there is a reliable neurological response around 600 milliseconds (i.e., the P600 component) for instances of human sentence processing in which ambiguous, ungrammatical, or complex sentences require syntactic revision or repair. However, identifying a similar response using MEG has received little attention in the literature, even though MEG provides comparable temporal resolution and superior spatial resolution to EEG methods. Our preliminary results with monolingual adults suggest that MEG methods are able to capture the brain’s response to anomalies in the syntax. A central issue in adult bilingualism research is whether a second language can be acquired in a native-like fashion, in both knowledge and use. Research in bilingualism has shown that while bilinguals can perform similarly to monolinguals in offline tasks, they may have deficits in online language use in the non-native language. Using the MEG methods mentioned above, this project will provide insight into adult bilinguals’ sensitivity to grammatical violations in a non-native language, and whether the neurological response involves the same brain regions and follows the same temporal path as that of monolinguals.

Motor control, language production and language perception
Stephen Crain, Maria Teresa Guasti, Blake Johnson, Paul Sowman and Elena Pagliarini

Both clinicians and scientists have observed that children with language problems tend to also have problems in motor control. For example, one recent study has reported that the writing by children with dyslexia tends to be less rhythmic than that of typically developing children. Moreover, children’s brains need to be able to deal with irregular timing functions in order to acquire language normally. These observations indicate that basic temporal control issues may be manifested across different cognitive and motor domains. This project is examining the hypothesis that both the motor and cognitive problems of some children stem from deficiencies in the ability to cope with irregularities in the timing of the flow of information in the brain. We are systematically studying this possibility using MEG, with a research strategy that ties together findings from the literature on language acquisition and on motor control.

neural markers training scheme

Contributions of frontal and temporal lobe structures to facial emotion recognition: A MEG study in frontotemporal dementia
Fiona Kumfor and Olivier Piguet

Emotion recognition plays a critical role in social interactions, with the ability to recognise how another person is feeling occurring rapidly and automatically. In frontotemporal dementia, the ability to recognise emotions, and remember what different facial expressions mean, is compromised. How frontotemporal dementia patients recognise faces in vivo and whether deficits in face analysis contribute to these difficulties remains unknown. This project will use MEG to examine the unfolding of face and emotion processing in frontotemporal dementia, and to determine the mechanisms contributing to emotion recognition impairment in this disorder.
How attention is deployed in dynamic environments

Anina Rich, Kiley Seymour, Nicolas Bullot and Todd Horowitz (National Cancer Institute, National Institute of Health, USA)

In daily life, our visual system is bombarded with information - some of which must be ignored in order for us to achieve the task at hand. Furthermore, to navigate in a dynamic world, we must often track multiple objects moving simultaneously about the environment. This research examines the types of events that cause the most distraction when we are performing tasks involving motion, and the way we can search for targets in moving displays. We are building on classical experiments that have used stationary displays, to examine attention in displays that more closely resemble real-world attentional demands.

Face processing and attention

Matthew Finkbeiner and Genevieve Quek

Of all the objects we encounter, faces are perhaps the most socially and biologically relevant. Accordingly, these stimuli hold a unique status within the human visual system, eliciting activation in specific brain regions and capturing our attention in complex visual scenes. One unique characteristic of faces is their capacity to be processed by the brain and affect human behaviour in the near-absence of attention. Our research in this area aims to further clarify our understanding of the role attention plays in face processing, and how this varies under different conditions. To answer these questions, our lab uses a novel version of the Reach-to-Touch paradigm. Participants indicate their response to a target (e.g., "Is it a male or female face?") by reaching out to touch a response button on the left or right edge of the screen. The advantage of this behavioural measure is that it is capable of revealing the gradual emergence of experimental effects in stimulus processing (by tracking the trajectory and moment of the participant’s finger). Our experimental paradigms for this project incorporate aspects of masked priming, manipulations of attention and visual search.

Brain mechanisms underpinning flexible human behaviour: The brain that adapts itself

Alexandra Woolgar, Anina Rich, Mark Williams, Jade Jackson, Soheil Afshar, Erin Goddard, Nadene Dermody and John Duncan (MRC Cognition and Brain Sciences Unit, UK)

How do humans - characterised above all animals for the diversity and flexibility of their behaviour - cope so effortlessly in the ever changing world around us? How does the brain achieve such flexible control? How can the neural system drive coordinated focus on our current task, and yet flexibly reconfigure when mental focus changes? Non-invasive neuroimaging techniques (e.g., functional Magnetic Resonance Imaging; magnetoencephalography) afford a unique opportunity to...
investigate the processes adopted by human brains to process and respond to sensory information. New brain imaging methodologies allow us to investigate not only which brain areas respond to particular tasks but also what information is coded in different brain regions. We have been developing novel methods for neuroimaging analysis that enable new insights into how the brain processes information from the world and integrates it with internal representations of our goals. We use these methods to investigate the cognitive processes that occur in the frontoparietal brain regions, which have proven to be critical for the modulation and cognitive control of information processed in the visual cortex.

Seeing sounds and hearing odours: Synaesthesia @ Macquarie University

Anina Rich, Marguerite Rowe, Lina Teichmann and Marina Butko

Do you see colours when you think of letters? Or remember music by the visual patterns you see? Do you smell sounds, feel tastes, or hear colours? If the answer to any of these questions is ‘yes’, you may have synaesthesia. This fascinating phenomenon can link any of the senses, although most commonly it is seen in vision and audition. Synaesthesia provides a unique opportunity to explore how we perceive the world. By looking at the way synaesthetes’ unusual experiences arise, we can find out more about how the brain processes incoming information from the senses, and puts together our conscious experience of the world. Synaesthesia may also provide insights into the role of learning and experience in our perception. Here at Macquarie University, we have the largest database of synaesthetes in Australia and our ongoing work has been featured in numerous media outlets.

Sensorimotor interactions in speech production

Paul Sowman, Andrew Etchell, Leidy Castro-Meneses, Paul Tawadros (Australian Catholic University) and Jordan Wehrman (Macquarie University)

This research program investigates motor control processes that enable fluent speech and the sensorimotor interactions that enable rhythmic motor performance. We have a particular interest in how predictive signals that arise in the motor cortex constrain and modulate auditory responsiveness to self-generated afference. We are also interested in inhibitory control of motor action, in particular vocalisation. We have an interest in special populations such as people who stutter and people who have Tourette syndrome, and we use electrophysiological techniques such as EEG, MEG and non-invasive brain stimulation (TMS/tDCS) in our research.

Neural mechanisms of object recognition/perception

Thomas Carlson, Mark Williams, Niko Kriegeskorte (MRC Cognition and Brain Sciences Unit, UK), Steve Dakin (The University of Auckland, New Zealand), Brendan Ritchie (Macquarie University) and Steve Most (The University of New South Wales)

Humans can effortlessly recognise thousands of objects in a fraction of a second. This essential capacity is an integral part of our daily lives that allows us to recognise our keys, our car, our friends and family. This program of research aims to elucidate how humans recognise objects by investigating the relationship between behaviour and the neural representation of objects in the brain.

The representation of limb position for reaching in the posterior parietal cortex

David Kaplan

In order to plan and control a reaching movement, the brain must compute the difference between the location of the target object and the current position of the limb. This computation requires information about both target and limb position. Most studies to date have focused on the neural representation of target, yet the equally important question of how limb position is represented remains poorly understood. In this research, we use electrophysiological and psychophysical methods to investigate how visual and proprioceptive information about limb position is represented and used for reach planning in the posterior parietal cortex.

Hosted events

The Perception in Action group coordinated a series of lectures and workshops throughout 2014 focused on their research area. These events included: a lecture “Perception of shape and depth: Combining cues across space and time” by Professor Julie Harris, St Andrews University, UK; a workshop with Professor Sid Kouider, École Normale Supérieure, France; a lecture “Modelling the honey bee brain” with Associate Professor Andrew Barron, Macquarie University; a lecture on “The structure of integrated information correlates with the contents of consciousness” with Associate Professor Nao Tsuchiya, Monash University; and a public lecture “Reading into faces: What reading and face recognition can tell us about the brain” combined with a research workshop with Professor Marlene Behrmann, Carnegie Mellon University, USA. This research group conducts a number of active discussion groups, including the Perception in Action Lab Meeting, the Action Lab Group Meeting, the Object Recognition Reading Group, and the MEG Decoding Discussion Group.
research training
research training

Our Centre celebrates another outstanding year in postgraduate training with 29 graduations from our PhD, Doctoral, Masters and Honours students. Two Macquarie PhD graduates received the Vice Chancellor’s Commendation for Academic Excellence and one of our Combined students from The University of Western Australia was on the Dean’s List of outstanding graduating students. The CCD takes immense pride in all our students, whether they are undertaking Honours, Clinical Masters, Masters of Philosophy, the new Masters of Research or Doctoral programs. Our student enrolment spans a variety of disciplines, including linguistics, psychology, philosophy, cognitive science and computing. Our students come from all around the world and are a vital part of what makes the CCD such a diverse and unique Centre.

Scholarships are available at Macquarie University, The University of New South Wales and The University of Western Australia to support CCD higher degree research candidates. We provide our students with an outstanding research environment that includes access to world-class research facilities, exposure to high calibre visiting academics, plus research training opportunities to develop professional skills. As part of our Centre, we are fortunate to have the opportunity to provide our research candidates with additional workshops and training sessions to increase their professional skills and training, and equip them for their research projects and future employment.

student awards

The CCD has sought ways to acknowledge the significant contributions of our students in research projects undertaken within our Centre. In recognition of outstanding achievements by the next generation of researchers, we have developed two Centre award schemes:

- Excellence in Research Student Awards (5 x $1,000) are offered for outstanding student publications. The winners were provided with the opportunity to present their research at the 2014 Annual Workshop:
  - Mirko Farina, Macquarie University
  - Michael Gascoigne, The University of Sydney
  - Robert Ross, Macquarie University
  - Sharon Savage, The University of New South Wales
  - Leslie van der Leer, Royal Holloway, University of London, UK

- Excellence in Research Student Awards (2 x $500) were offered for best student posters (1 PhD and 1 Masters/Honours) at the 2014 CCD Annual Workshop:
  - Best PhD Poster: Sicong Tu ‘Accelerated forgetting of contextual details due to focal medio-dorsal thalamic lesion’, The University of New South Wales
  - Best Honours/Masters Poster: Amy-Lee Sesel ‘Remembering Together’, Macquarie University

graduates | alumni

Congratulations to our 2014 PhD graduates:

- Dr Fabrice Bardy, Cortical auditory evoked responses to rapidly occurring acoustic stimuli using least-squares deconvolution;
- Dr Yao-Ching (Rocco) Chiou, The influence of language experience on synaesthesia: Evidence from psychophysics and cross-language comparison;
- Dr Marshall Dalton, Characterisation of episodic memory deficits in frontotemporal dementia;
- Dr Bianca De Wit, A fresh look on semantic priming effects;
- Dr Nora Fieder, The representation of nouns in the mental lexicon: Evidence from brain-impaired and normal speakers;
- Dr Wei He, Development of face processing in the human brain;
- Dr Richard Heersmink, The varieties of situated cognitive systems: Embodied agents, cognitive artifacts, and scientific practice;
- Dr Linda Larsen, Grapheme-phoneme correspondence knowledge in typical and atypical reading development;
- Dr Lars Marstaller, Co-speech gestures and cognition;
- Dr Vincent Polito, Sense of agency and hypnosis; and
- Dr Likan Zhan, The interpretation of conditionals in natural language. Also we congratulate our Combined PhD/Masters graduates, Dr Michael Gascoigne, Long term memory in children with epilepsy; and Dr Michelle Marneweck, Emotion perception in Parkinson’s disease.

Left to right: 2013 student publication winners: Sharon Savage, Mirko Farina, Michael Gascoigne and Robert Ross
Left: 2014 student poster winner: Sicong Tu
We also extend our congratulations to our Doctoral graduate students: Dr Frances Caulfield, Judging trustworthiness from faces: The contribution of emotional cues for typically developing children and children with ASD; Dr Meryn Lechowicz, Remembering the past and constructing the future in patients with temporal lobe epilepsy. Our Masters graduates: Thushara Anandakumar, Belief bias reasoning in the maintenance of delusional beliefs; Fleur Le Marne, The diagnostic utility and prognostic value of semantic memory measures in prodromal Alzheimer’s Dementia; Lois MacCullagh, Learning experiences of university students with dyslexia; Alena Rahmanovic, Belief bias reasoning in the maintenance of delusional beliefs; Hans Receveur, The role of semantic function in the transition from mild cognitive impairment to Alzheimer’s Disease; and David Rodwell, Memory in temporal lobe epilepsy - the impact of aetiology. Our Honours graduates: Ellen Bothe, Jemma Collova, Alyssa Dyball, Tamara Paulin, Meg Purton, Amy-Lee Sesel, Vanessa Tan, and Xujia Wang.

This year, many of our students went on to take up postdoctoral research fellowships all around the world: Dr Shahd Al-Janabi, University of Wisconsin, USA; Dr Marshall Dalton, Institute of Neurology, University College London, UK; Dr Sharpley Hsieh, MND Brain & Mind Institute, The University of Sydney; Sharon Savage, Medical School, University of Exeter, Exeter, UK; Dr Shu Hui Yau, Marie Curie Fellowship, University of Birmingham, UK; Dr Likan Zhan, Beijing Language and Culture University, China; and Dr Lars Marstaller, The University of Queensland.

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Fabrice Bardy
PhD, Macquarie University
Associate Professor Catherine McMahon,
Dr Bram Van Dun (National Acoustic Laboratories),
Associate Professor Harvey Dillon (National Acoustic Laboratories) and Associate Professor Blake Johnson
Cortical auditory evoked responses to rapidly occurring acoustic stimuli using least-squares deconvolution.

Polly Barr
PhD, Macquarie University
Dr Britta Biedermann and Professor Lyndsey Nickels
Speech production in language impaired speakers.

Cory Bill
PhD, Macquarie University
Professor Stephen Crain and
Associate Professor Rosalind Thornton
What’s in an inference: Exploring the nature of scalar implicatures and presuppositions.

Benjamin Börschinger
PhD, Macquarie University
Professor Mark Johnson and Professor Anette Frank
(Heidelberg University, Germany)
Exploring human lexical acquisition using Bayesian modelling.

Laura Bos
PhD, University of Groningen
Professor Lyndsey Nickels
Investigation of the neural correlates of time reference.

Catherine Browning
PhD, Macquarie University
Dr Celia Harris and Professor Amanda Barnier
The effect of collaboration on prospective memory performance.

Nichola Burton
PhD, The University of Western Australia
Professor Gillian Rhodes and
Dr Linda Jeffery
The structure of expression-space: How do we visually represent facial expressions?

Ann Carrigan
PhD, Macquarie University
Associate Professor Anina Rich and
Associate Professor Claudia Mello-Thoms (The University of Sydney)
The perceptual and cognitive attributes of medical experts: A study of radiologists.

Nathan Caruana
PhD, Macquarie University
Associate Professor Genevieve McArthur,
Dr Alexandra Woolgar and Dr Jon Brock
Brain mechanisms of attention and social cognition in autism.

Leidy Janeth Castro-Meneses
PhD, Macquarie University
Dr Paul Sowman and Associate Professor Blake Johnson
Temporal cortical dynamics in two disorders of childhood development: Specific language impairment (SLI) and developmental stuttering (DS).

Lisa Ceccherini
PhD, Macquarie University
Emeritus Professor Max Coltheart, Professor Anne Castles and
Dr Claudio Mello-Thoms
The effects of a concomitant distractor on word reading aloud and picture naming tasks.

Leone Chare
PhD, The University of New South Wales
Professor Glenda Halliday (The University of New South Wales), Professor John Hodges and Professor Jillian Krill
(The University of Sydney)
Clinical predictors for underlying pathology in frontotemporal dementia.

Hui Chen
PhD, Macquarie University
Professor Katherine Demuth and
Associate Professor Felicity Cox
Examining the acquisition of vowel length contrasts.

Yao-Ching (Rocco) Chiou
PhD, Macquarie University
Associate Professor Anina Rich and
Associate Professor Matthew Finkbeiner
The influence of language experience on synaesthesia: Evidence from psychophysics and cross-language comparison.

Danielle Colenbrander
PhD, Macquarie University
Dr Saskia Kohnen, Professor Lyndsey Nickels and
Dr Karen Smith-Lock
Understanding and treating the causes of reading comprehension difficulties.

Aline Cordonnier
PhD, Macquarie University
Professor Amanda Barnier and Professor John Sutton
From past to future and future to past: How we collaborate to remember, imagine and plan.

Vania Marisa Correia de Aguiar
PhD, Macquarie University
Professor Lyndsey Nickels and Dr Paul Sowman
Non-fluent aphasia rehabilitation from a linguistic perspective and the role of tDCS.

Marshall Dalton
PhD, The University of New South Wales
Dr Olivier Piguet and Dr Michael Hornberger
Characterisation of episodic memory deficits in frontotemporal dementia.

Benjamin Davies
PhD, Macquarie University
Professor Katherine Demuth and Dr Nan Xu
The effect of allomorphy on the acquisition of English plural morphology.
Amy Dawel  
PhD, Australian National University  
Professor Elinor McKone (Australian National University),  
Associate Professor Romina Palermo and Associate Professor Richard O’Keary (Australian National University)  
Face processing in children with callous unemotional traits.

Bianca de Wit  
PhD, Macquarie University  
Associate Professor Sachiko Kinoshita, Associate Professor Genevieve McArthur and Dr Nicholas Badcock  
A fresh look on semantic priming effects.

Sithembinkosi Dube  
PhD, Macquarie University  
Professor Katherine Demuth, Dr Jon Brock, Dr Mrudula Sharma (Macquarie University) and Dr Varghese Peter (The University of Western Sydney)  

Andrew (Andy) Etchell  
PhD, Macquarie University  
Dr Paul Sowman and Associate Professor Blake Johnson  
Brain dynamics and sensorimotor integration associated with speech.

Mirko Farina  
PhD, Macquarie University  
Professor John Sutton and Dr Richard Menary  
Extended mind, DST, neuroconstructivism, complementarity.

Nora Fieder  
PhD, Macquarie University  
Professor Lyndsey Nickels and Dr Britta Biedermann  
The representation of nouns in the mental lexicon: Evidence from brain-impaired and normal speakers.

Anna Fiveash  
PhD, Macquarie University  
Professor William (Bill) Thompson  
The role of syntactic working memory in shared resource networks between music and language.

Yong Zhi Foo  
PhD, The University of Western Australia  
Professor Gillian Rhodes and Professor Leigh Simmons  
Do facial sexual dimorphism and skin color signal good health in humans?

Vasfiye Geçkin  
PhD, Macquarie University  
Associate Professor Rosalind Thornton, Professor Stephen Crain and Professor Barbara Höhle (University of Potsdam, Germany)  
Acquisition of scope relations by monolingual and bilingual children.

Rebecca Gelding  
PhD, Macquarie University  
Associate Professor Blake Johnson and Professor William (Bill) Thompson  
Mental imagery of musical pitch and rhythm.

Katrina Grasby  
PhD, University of New England  
Dr William Coventry (University of New England), Emeritus Professor Brian Byrne and Dr Sarah Medland (Queensland Institute of Medical Research)  
A behaviour-genetic study of NAPLAN results.

Rimke Groenewold  
PhD, Macquarie University  
Professor Lyndsey Nickels, Professor Roelien Bastiaanse (University of Groningen, The Netherlands) and Dr Mike Huiskes (University of Groningen, The Netherlands)  
Fictive interaction in aphasic conversation.

Tijl Grootswagers  
PhD, Macquarie University  
Dr Thomas Carlson and Professor Mark Williams  
Decoding the neural representation of objects in the human brain.

Sana-e-Zehra Haidry  
PhD, University of Groningen  
Professor Anne Castles, Professor Lyndsey Nickels and Professor Ben Maassen (University of Groningen, The Netherlands)  
Early assessment of developmental dyslexia in Urdu language.

Solène Hameau  
PhD, Macquarie University  
Dr Britta Biedermann and Professor Lyndsey Nickels  
Neighbourhood density effects in spoken word production.

Wei He  
PhD, Macquarie University  
Associate Professor Blake Johnson, Dr Jon Brock and Professor Wei Wang (Zhejiang University, China)  
Development of face processing in the human brain.

Richard (Jan) Heersmink  
PhD, Macquarie University  
Professor John Sutton and Emeritus Professor Max Coltheart  
The varieties of situated cognitive systems: Embodied agents, cognitive artifacts, and scientific practice.

Haiquan (David) Huang  
PhD, Macquarie University  
Professor Stephen Crain, Associate Professor Rosalind Thornton and Dr Peng Zhou (The University of Newcastle)  
Retroflexion in Punjabi loanword phonology.

Qandeel Hussain  
PhD, Macquarie University  
Professor Katherine Demuth, Associate Professor Felicity Cox and Dr Mark Harvey (The University of Newcastle)  
Retroflexion in Punjabi loanword phonology.

Jade Jackson  
PhD, Macquarie University  
Dr Alexandra Woolgar, Professor Mark Williams and Associate Professor Anina Rich  
The proficiency of the human brain in processing task-relevant information: Cognitive flexibility and its limitations.

Anne Jaeger  
PhD, Macquarie University  
Associate Professor Robyn Langdon and Emeritus Professor Max Coltheart  
Meta-cognitive features associated with schizophrenic delusion in obsessive compulsive disorders with and without delusional ideation.

Vishnu Kaleeckal Krishnankutty Nair  
PhD, Macquarie University  
Professor Lyndsey Nickels and Dr Britta Biedermann  
Effect of bilingualism on cognitive-linguistic abilities.

Neha Khetrapal
PhD, Macquarie University
Associate Professor Rosalind Thornton and Dr Jon Brock
Language acquisition in autistic and typically developing children.

(Janna) Trudy Krajenbrink
PhD, Macquarie University
Professor Lyndsey Nickels and Dr Saskia Kohnen
Generalisation effects in treatment of acquired language disorders.

Linda Larsen
PhD, Macquarie University
Associate Professor Genevieve McArthur, Dr Saskia Kohnen, Professor Lyndsey Nickels and Professor Anne Castles
Grapheme-phoneme correspondence knowledge in typical and atypical reading development.

Samantha Leivers
PhD, The University of Western Australia
Professor Leigh Simmons and Professor Gillian Rhodes
How do men judge and respond to perceived female infidelity?

Yu Li
PhD, Macquarie University
Professor Anne Castles and Associate Professor Sachiko Kinoshita
The development of brain connections between ventral occipito-temporal cortex and the other language regions and its dysfunction in dyslexic children.

Min (Maggie) Liao
PhD, Macquarie University
Associate Professor Rosalind Thornton and Professor Stephen Crain
Children’s acquisition of “shenme” in Chinese.

Xuejing Lu
PhD, Macquarie University
Professor William (Bill) Thompson and Associate Professor Blake Johnson
Visual information affects auditory experience in amusics.

Oksana Lyalka
PhD, Newcastle University, UK and Macquarie University
Professor David Howard (Newcastle University UK) and Professor Lyndsey Nickels
Mechanisms underpinning semantic inhibition and facilitation in spoken word retrieval.

Cassandra Lyne
PhD, Macquarie University
Associate Professor Sachiko Kinoshita and Dr Nicholas Badcock
Visual word recognition: An in-depth consideration of orthography in silent reading process models.

Pragati Rao Mandikal Vasuki
PhD, Macquarie University
Dr Mridula Sharma (Macquarie University), Professor Katherine Demuth and Dr Joanne Arciuli (The University of Sydney)
Role of statistical learning and auditory processing in understanding reading and speech perception in noise.

Lars Marstaller
PhD, Macquarie University
Associate Professor Blake Johnson and Dr Paul Sowman
Co-speech gestures and cognition.

Tina Marusch
PhD, Macquarie University
Professor Lyndsey Nickels and Dr Frank Burchert (University of Potsdam, Germany)
Language production of verbal inflectional morphology in healthy and impaired adult speakers of German and English.

Christopher McCarroll
PhD, Macquarie University
Professor John Sutton and Dr Richard Menary
Point of view in personal memory: A philosophical investigation.

Laura McLaughlin Engfors
PhD, The University of Western Australia
Associate Professor Romina Palermo and Dr Linda Jeffery
Do individual differences in social motivation contribute to face recognition ability?

Kiri Mealings
PhD, Macquarie University
Professor Katherine Demuth, Dr Robert Mannell, Dr Jörg Buchholz (Macquarie University) and Associate Professor Harvey Dillon (National Acoustic Laboratories)
An investigation into the effects of open plan and enclosed classroom acoustics on speech perception in kindergarten children with and without hearing impairments.

Manjunath Narra
PhD, Macquarie University
Associate Professor Matthew Finkbeiner and Professor Lyndsey Nickels
Effect of bilingualism on response conflict tasks: Evidence from temporal measures.

Emma Nile
PhD, Macquarie University
Professor Amanda Bamier and Dr Celia Harris
Can you hold my memory? Applying the collaborative recall paradigm to those in residential care.

Katya Numbers
PhD, Macquarie University
Professor Amanda Bamier, Professor John Sutton, Dr Celia Harris and Associate Professor Michelle Meade
Do ageing stereotypes moderate false memories in younger and older adults?

Naomi Oliver
PhD, Macquarie University
Associate Professor Robyn Langdon and Dr Pamela Marsh
The effects of meta-cognitive training program on delusion symptom outcomes and violent behaviour in a forensic psychiatric setting.

Elena Pagliarini
PhD, University of Milano-Bicocca, Italy
Professor Maria Teresa Guasti and Professor Stephen Crain
The temporal organisation of language: Reading, writing and comprehending in typically developing dyslexic children.
Mehdi Parviz  
PhD, Macquarie University  
Professor Mark Johnson and Dr Diego Mollá Aliod (Macquarie University)  
Using machine learning to understand the causes of neural responses.

Sarah Pini  
PhD, Macquarie University  
Professor John Sutton and Associate Professor Doris Mcllwain (Macquarie University)  
Dancing bodies, shaped minds: An ecological approach to kinesthetic intelligence.

Vince Polito  
PhD, Macquarie University  
Professor Amanda Barnier, Emeritus Professor Max Coltheart, Associate Professor Robyn Langdon, Dr Rochelle Cox and Dr Erik Woody (University of Waterloo, UK)  
The function of theta oscillations in the hippocampus and parahippocampus in a spatial navigation task.

Valerie (Yi) Pu  
PhD, Macquarie University  
Associate Professor Blake Johnson and Professor Stephen Crain  
The function of theta oscillations in the hippocampus and parahippocampus in a spatial navigation task.

Monica Ricci  
PhD, Macquarie University  
Associate Professor Greg Savage, Associate Professor Genevieve McArthur and Dr Laurie Miller  
Learning and forgetting in patients with focal epilepsy.

Matthew Robson  
PhD, The University of Western Australia  
Associate Professor Romina Palermo and Dr Linda Jeffery  
Investigation into the perceptual capabilities of congenital prosopagnosics.

Adria Rofes Sanchez  
PhD, Macquarie University  
Professor Lyndsey Nickels, Professor Gabriele Miceli (University of Trento, Italy) and Professor Roelien Bastiaanse (University of Groningen, The Netherlands)  
Word class effects on representation and processing in non-brain-damaged speakers and people with aphasia.

Kelly Rombough  
PhD, Macquarie University  
Associate Professor Rosalind Thornton and Dr Peng Zhou  
The verb BE and the linguistic constraints on contraction in children with specific language impairment.

Robert Ross  
PhD, Macquarie University  
Associate Professor Robyn Langdon, Emeritus Professor Max Coltheart and Dr Ryan McKay  
Cognitive and evolutionary foundations of culture and belief.

Marguerite Rowe  
PhD, Macquarie University  
Associate Professor Anina Rich  
Synaesthesia and associate learning.

Margaret Ryan  
PhD, Macquarie University  
Dr Paul Sowman, Professor Linda Cупpel and Professor Lyndsey Nickels  
Moved nouns in experiencer-verb sentences: Syntactic and semantic stages in sentence comprehension.

Sharon Savage  
PhD, The University of New South Wales  
Professor John Hodges, Associate Professor Olivier Piguet and Dr Michael Homburger  
Cognitive retraining in frontotemporal dementia (FTD) and related disorders.

Tamara Schembri  
PhD, Macquarie University  
Professor Katherine Demuth and Professor Mark Johnson  
Exploring the learning of Arabic stress.

Xenia Schmalz  
PhD, Macquarie University  
Professor Anne Castles, Emeritus Professor Max Coltheart and Dr Eva Marinus  

Amanda Selwood  
PhD, Macquarie University  
Professor Amanda Barnier, Professor John Sutton and Dr Celia Harris  
Autobiographical memory and collaborative remembering in twins and siblings.

Usha Sivarajani Sista  
PhD, Macquarie University  
Professor Mark Williams and Dr Jason Friedman  
The involvement of mirror systems in mimicking learning.

Felice Smith  
PhD, Macquarie University  
Professor Mark Williams and Dr Thomas Carlson  
The neural representation of objects in cortex.

Yanan Sun  
PhD, Macquarie University  
Professor William (Bill) Thompson and Associate Professor Blake Johnson  
Music and specific language impairment: From music processing to music intervention.

Niina Tamura  
PhD, University of Oxford, UK  
Professor Kate Nation  
Orthographic and semantic learning via reading.

Huizhen (Joann) Tang  
PhD, Macquarie University  
Professor Stephen Crain, Dr Jon Brock and Dr Michael Proctor  
The functional role of brain oscillations for the perception of speech rhythm in adults and preschool aged children.

Marie (Misia) Temler  
PhD, Macquarie University  
Professor Amanda Barnier, Professor John Sutton and Associate Professor Doris Mcllwain (Macquarie University)  
Social contagion of autobiographical memory.

Ekaterina Tomas  
PhD, Macquarie University  
Professor Katherine Demuth and Associate Professor Rosalind Thornton  
The acquisition of grammatical morphology: Crosslinguistic and cross-population considerations.
Marina Trakas
PhD, Macquarie University
Professor John Sutton and Professor Jerome Dokic
(École des Hautes Études en Sciences Sociales)
Theories of memory implications for metacognition.

Sicong Tu
PhD, The University of New South Wales
Dr Michael Hornberger and
Associate Professor Oliver Piguet
Brain connectivity biomarkers predict specific memory consolidation deficits across dementia subtypes.

Leslie van der Leer
PhD, Royal Holloway, University of London, UK
Dr Ryan McKay
The causes and consequences of systematic deviations from rational belief formation.

Mark Vida
PhD, McMaster University, Canada
Professor Daphne Maurer
The development of sensitivity to the direction of gaze.

Jennifer Walsh
PhD, McMaster University, Canada
Dr Mel Rutherford
Examining face processing mechanisms in autism spectrum disorder.

Vana Webster
PhD, Macquarie University
Professor Amanda Barnier and Dr Penny Van Bergen
(Macquarie University)
Collective memory: The social context of remembering together.

Kimberly Weldon
PhD, Macquarie University
Professor Mark Williams, Associate Professor Anina Rich and Dr Alexandra Woolgar
Functional consequences of glaucoma for the human brain.

Nikolas Williams
PhD, Macquarie University
Dr Celia Harris and Professor Amanda Barnier
Collaboration and executive attention.

Kellie Williamson
PhD, Macquarie University
Professor John Sutton and Professor Amanda Barnier
On the nature of procedural memory.

Shu Hui Yau
PhD, Macquarie University
Dr Jon Brock, Associate Professor Blake Johnson and Associate Professor Genevieve McArthur
Cognitive and brain mechanisms of autism.

Astrid Zeman
PhD, Macquarie University
Associate Professor Kevin Brooks (Macquarie University), Dr Oliver Obst (CSIRO) and
Emeritus Professor Max Coltheart
Computational modelling of illusions in the visual ventral stream.

Likan Zhan
PhD, Macquarie University
Professor Stephen Crain, Dr Peng Zhou and
Associate Professor Drew Khentzos
The interpretation of conditionals in natural language.

Sophie Barkl
PhD/DClinPsych, The University of Sydney
Dr Suncica (Sunny) Lah, Associate Professor Anthony Harris (The University of Sydney) and Professor Lea Williams (Stanford University)
Social cognition in early-onset and first-episode psychosis.

Adam Bentvelzen
PhD/MClinNeuro, Macquarie University
Associate Professor Greg Savage, Associate Professor Genevieve McArthur, Professor William (Bill) Thompson and
Dr Nicholas Badcock
Hemispheric specialisation for nonverbal memory processing.

Rachel Briggs
PhD/DClinPsych, The University of Sydney
Dr Suncica (Sunny) Lah and Professor Robyn Tate
(The University of Sydney)
Post-traumatic amnesia: Sequence of recovery and prediction of outcome.

Emily Connaughton
PhD/MClinNeuro, Macquarie University
Associate Professor Robyn Langdon, Emeritus Professor Max Coltheart and Dr Nora Breen
(Royal Prince Alfred Hospital)
Delusions in traumatic brain injury.

Erika Contini
PhD/MClinNeuro, Macquarie University
Professor Mark Williams and Dr Thomas Carlson
Preventing depression and cognitive decline in the elderly: The effects of novel pharmacotherapies on white matter connectivity.

Michael Gascoigne
PhD/DClinPsych, The University of Sydney
Dr Suncica (Sunny) Lah and Dr Belinda Barton
(The University of Sydney)
Long-term memory in children with epilepsy.

Jo Lane
PhD/MClinPsych, Australian National University
Professor Elinor KcKone, Professor Ted Maddess
(Australian National University), Professor Jan Provis
(Australian National University) and Associate Professor
Nick Barnes (Australian National University)
Age-related macular degeneration and face recognition.

Shaun Markovic
PhD/DClinPsych, The University of Western Australia
Associate Professor Romina Palermo
Disturbance in positive emotion as an underlying mechanism of bipolar disorder.

Michelle Marneweck
PhD/MClinPsych, The University of Western Australia
Associate Professor Romina Palermo and Emeritus Professor Geoff Hammond (The University of Western Australia)
Emotion perception in Parkinson’s disease.

Colleen Murphy
PhD/MClinNeuro, Macquarie University
Associate Professor Robyn Langdon
Poor social functioning in schizophrenia: Understanding the role of automatic facets of social cognition.
Natalie Phillips  
PhD/DClinPsych, The University of Sydney  
Dr Suncica (Sunny) Lah and Dr Anna Mandalis (Sydney Children's Hospital)  
Computerised cognitive rehabilitation of working memory for children who have sustained traumatic brain injury.

Genevieve Quek  
PhD/MClinNeuro, Macquarie University  
Associate Professor Matthew Finkbeiner and Dr Paul Somman  
The role of attention in nonconscious processing: Comparing faces and non-faces.

Ben Tappin  
PhD/MSc, Royal Holloway, University of London, UK  
Dr Ryan McKay and Professor Dominic Abrams (University of Kent, UK)  
Biases in social belief formation.

Jasmina Vrankovic  
PhD/MClinNeuro, Macquarie University  
Associate Professor Veronika Coltheart and Dr Nicholas Badcock  
Selection by semantic category: Towards a model of iconic memory.

Sarah Watts  
PhD/DClinPsych, The University of Sydney  
Associate Professor Caroline Hunt (The University of Sydney), Dr Suncica (Sunny) Lah and Associate Professor Paul Rhodes (The University of Sydney)  
Understanding cross-cultural caregiving practices and testing the efficacy of an innovative evidence-based psychological intervention to improve child's development.

Stephanie Wong  
PhD/MClinNeuro, Macquarie University  
Associate Professor Greg Savage, Professor Amanda Barnier, Dr Michael Hornberger and Associate Professor Olivier Piguet  
Episodic memory deficits in bvFTD: Investigating the role of the prefrontal cortex.

Frances Caulfield  
DClinPsych, The University of Western Australia  
Professor Gillian Rhodes and Louise Ewing  
Judging trustworthiness from faces: The contribution of emotional cues for typically developing children and children with ASD.

Cliff Deyo  
DClinNeuro, Macquarie University  
Associate Professor Robyn Langdon and Associate Professor Edwin (Arthur) Shores (Macquarie University)  
Semantic memory deficits in pre-prodromal psychosis.

Kelly Jeng  
DClinNeuro/MPhil, Macquarie University  
Associate Professor Greg Savage  
Associative memory and the early detection of dementia.

Meryn Lechowicz  
DClinPsych/MSc, The University of Sydney  
Dr Suncica (Sunny) Lah and Dr Laurie Miller  
Remembering the past and constructing the future in patients with temporal lobe epilepsy.

ARC centre of excellence in cognition and its disorders

Sally Scott (née Finnie)  
MPhil/DClinNeuro, Macquarie University  
Associate Professor Greg Savage, Associate Professor Peter Schofield (The University of Newcastle) and Professor Dick Stevenson (Macquarie University)  
Specificity of an olfactory stress test performance in several neurological disorders.

Shelley Simpson  
DClinNeuro, Macquarie University  
Associate Professor Robyn Langdon and Dr Jennifer Batchelor (Macquarie University)  
A comparative neuropsychological evaluation of individuals aged >65 years who present with very-late-onset schizophrenia-like-psychosis, chronic schizophrenia and very-late-onset psychotic depression.

masters

Thushara Anandakumar  
MClinNeuro, Macquarie University  
Associate Professor Robyn Langdon  
Belief bias reasoning in the maintenance of delusional beliefs.

Amelia Ceslis  
MClinNeuro, Macquarie University  
Associate Professor Greg Savage  
Memory retrieval and amyloid in healthy controls and mild cognitive impairment.

Peter Clutton  
MRes, Year 1 coursework, Macquarie University  
Assessing memory and the early detection of dementia.

Caitlin Dawes  
MClinNeuro, Macquarie University  
Associate Professor Greg Savage and Associate Professor Sharon Naismith (The University of Sydney)  
Maximising memory: A tailored approach to addressing subjective memory impairment.

David Foxe  
MClinNeuro, Macquarie University  
Associate Professor Olivier Piguet, Dr Muireann Irish and Associate Professor Greg Savage  
The neural correlates of verbal and visuospatial span in logopenic progressive aphasia and Alzheimer's disease.

Luke Freeman  
MClinNeuro, Macquarie University  
Associate Professor Greg Savage  
Cognitive reserve and MCI.

Kate Hardwick  
MRes, Macquarie University  
Professor Mark Williams and Associate Professor Anina Rich  
The neural correlates of physical disgust and moral aversion using biographical memory and face perception.

Antonios Kaldas  
MRes, Macquarie University  
Dr Jeanette Kennett (Macquarie University)  
Consciousness.

Fleur Le Marne  
MClinNeuro, Macquarie University  
Associate Professor Greg Savage  
The diagnostic utility and prognostic value of semantic memory measures in prodromal Alzheimer's dementia.
Gretel Macdonald
MRes, Macquarie University
Professor Katherine Demuth
Child speech in classroom interactions in an Australian Indigenous language.

Lois MacCullagh
MHEd, Macquarie University
Dr Agnes Bosanquet (Macquarie University) and Dr Nicholas Badcock
Learning experiences of university students with dyslexia.

Annu Mothakunnel
MClinNeuro, Macquarie University
Associate Professor Greg Savage and Dr Laurie Miller
Examining the relationship between memory performance and self-reported memory abilities in epilepsy patients.

Katherine O’Lone
MSc, Royal Holloway, The University of London, UK
Dr Ryan McKay
Understanding scrupulosity.

Amelia Paterson
MClinNeuro, Macquarie University
Associate Professor Greg Savage
Practice effects in longitudinal cognitive assessment: Implications for predicting risk of dementia.

Alena Rahmanovic
MClinNeuro, Macquarie University
Associate Professor Greg Savage
Memory training for older adults with subjective memory complaints - a pilot study.

Hans Receveur
MClinNeuro, Macquarie University
Associate Professor Greg Savage
The role of semantic function in the transition from mild cognitive impairment to Alzheimer’s Disease.

David Rodwell
MClinNeuro, Macquarie University
Associate Professor Greg Savage
Memory in temporal lobe epilepsy - the impact of aetiology.

Beverley Witherington
MRes, Macquarie University
Dr Jon Brock
Bimanual coordination and its role in social cognition.

Damith Woods
MClinNeuro, Macquarie University
Associate Professor Greg Savage
Intellectual functioning and memory performance: Its correlation with beta-amyloid deposition in dementia.

Vanessa Zeleny
MClinNeuro, Macquarie University
Associate Professor Greg Savage
The “Fluency Flip”: Verbal fluency as a predictor of progression from MCI to AD.

honours

Ellen Bothe
Honours, The University of Western Australia
Dr Linda Jeffery and Dr Kate Crookes
The source of age-related improvements in face recognition tasks.

Jemma Collova
Honours, The University of Western Australia
Dr Kate Crookes and Professor Gillian Rhodes
A race-of-face effect for eye gaze perception.

Alyssa Dyball
Honours, Macquarie University
Dr Nan Xu, Professor Katherine Demuth and Dr Midula Sharma (Macquarie University)
Acoustic change complex as a measure of cross-linguistic speech perception.

Jamie-Lee Mazlin
Honours, Australian National University
Dr Jessica Irons, Professor Elinor McKone and Amy Dawel
Facial expression recognition in simulated prosthetic vision.

Tamara Paulin
Honours, Macquarie University
Dr Hua-Chen Wang
The role of sleep in the learning and consolidation of novel written words.

Meg Purton
Honours, The University of Western Australia
Dr Markus Neumann and Associate Professor Romina Palermo
Processing emotions in crowds: Investigating ensemble representation in sets of same and mixed identity.

Amy-Lee Sesel
Honours, Macquarie University
Dr Celia Harris
Collaborative recall in young adults.

Vanessa Tan
Honours, The University of Western Australia
Associate Professor Romina Palermo
Correlation between performance on expression recognition task and social anxiety in children.

Xujia Wang
Honours, The University of Western Australia
Dr Linda Jeffery and Associate Professor Romina Palermo.
Is face recognition ability in 8-year-old children associated with individual variation in face-coding mechanisms or general cognitive abilities?
centre activities
Research Training
IDEALAB Winter School

2-15 February | Macquarie University

Over 20 students from the 5 partner universities of the IDEALAB program (Macquarie University; University of Potsdam, Germany; University of Groningen, The Netherlands; University of Trento, Italy; and Newcastle University, UK) attended the Winter School hosted at the CCD, Macquarie University. Professor Lyndsey Nickels, Director of IDEALAB at Macquarie University, coordinated the two week intensive program. In the first week, CCD members’ research was highlighted in a series of lectures and discussion groups. The other directors of the IDEALAB program joined the second week of the Winter School where students gave individual presentations and received feedback on their progress from the panel of directors. The students and visiting directors also had the opportunity to see first hand the CCD’s state-of-the-art facilities including our world first CI MEG (magnetoencephalography for patients with Cochlear Implants) system.

The Winter School concluded with a 3 Minute Thesis competition and a debate regarding the extent to which neuroimaging can inform cognitive theories led by Emeritus Professor Max Coltheart and Associate Professor Greg de Zubicaray (The University of Queensland).

Lecture
A Core Brain System in Assembly of Cognitive Episodes

21 March | Macquarie University

Speaker
Professor John Duncan, University of Cambridge, UK

In this lecture, sponsored by the CCD and Macquarie University’s Perception in Action Research Centre (PARC), Professor John Duncan discussed the brain mechanisms of attention and control. How does the brain create human intelligence? This lecture focused on one insight that comes from brain imaging studies, revealing a distributed neural system within the frontal and parietal lobes of the brain that is active during all kinds of cognitive challenges, as if providing a general resource for effective cognition. Support for this idea comes from strong activity in this “multiple-demand” system in standard tests of fluid intelligence, important because success in these tests predicts success in all kinds of other activities, either in the laboratory or everyday life. Professor Duncan argued that all human cognition is controlled in a series of attentional episodes, breaking complex problems into simpler, more solvable sub-problems. Based on behavioural, neuropsychological, brain imaging and single neuron data, this picture proposed that the core function of multiple demand cortex is to produce this structure of attentional episodes, allowing complex cognition to be assembled from simple components and underpinning the flexibility and power of human intelligence.

Symposium
Hearing and the Brain: Translating Research into Practice

9 May | Macquarie University

Speakers
Associate Professor Blake Johnson, Macquarie University
Associate Professor Frank Lin, Johns Hopkins University School of Medicine and the Bloomberg School of Public Health, USA
Professor Kathy Pichora-Fuller, University of Toronto Mississauga, Canada
Professor David Ryugo, Garvan Institute and The University of New South Wales
Professor Kelly Tremblay, University of Washington, USA

Following the World Congress of Audiology held in Brisbane, this satellite symposium provided clinicians and researchers in fields of audiology, gerontology and cognitive science with current information on the interaction between aging, cognition and hearing loss. Opened by Professor Mary O’Kane, NSW Chief Scientist, this event brought together international experts in this field to present their research. Attendees then engaged in a panel discussion to consider what further information is needed in this research field, as well as the pathways to translation.
Workshop
Visual Word Recognition (Forsterfest ’14)

25 June | Macquarie University

Speakers

Professor Chris Davis, University of Western Sydney
Professor Ken Forster, University of Arizona, USA

“Forsterfest 14” continued a series of annual workshops on visual word recognition and masked priming. This year marked the 30th anniversary of the publication of the seminal masked priming paper by Professors Ken Forster and Chris Davis, “Repetition priming and frequency attenuation in lexical access”. Both authors gave an invited talk and Professor Forster also reviewed several findings related to the prime lexicality effect that are difficult to explain as competitive effects within interactive-activation models.

Sponsored Conference
The 12th International Conference on Cognitive Neuroscience (ICON)

27 - 31 July | Brisbane

ICON is a scientific meeting that has been held for more than 30 years (since 1980) and which focuses on the study of the neural basis of human cognition, especially through brain imaging methodologies. This year the CCD sponsored one of the keynote speakers - Professor Russell Poldrack, Director of the Research Imaging Centre at the University of Texas, USA. Professor Poldrack’s research uses neuroimaging to examine the brain systems involved in learning and memory, executive control, and decision making, centered around the questions of how new skills are acquired, how existing skills are expressed, and how people exert executive control during thought and behaviour. His research is strongly focused on translation of basic cognitive neuroscience into the clinical domain, with collaborations on studies of schizophrenia, ADHD, Tourette Syndrome, and drug addiction.

Research Training
SR Research Eye Tracking Workshop

7 August | Macquarie University

A workshop on eye-tracking was conducted, where Macquarie PhD student, Nathan Caruana, arranged for Dr Marcus Johnson from SR Research Limited to present a one day workshop on an introduction to programming simple eye-tracking experiments using Experiment Builder, followed by one-on-one trouble shooting sessions for the more advanced students using MEG and MRI.

Professor Lyndsey Nickels (front row, third from left) with students from the IDEALAB Winter School
Workshop Bilingualism

8 August | Macquarie University

Speakers

Professor Viorica Marian, Northwestern University, USA
Professor Theo Marinis, University of Reading, UK
Professor Jason Rothman, University of Reading, UK
Professor Jyotsna Vaid, Texas A&M University, USA

This highly successful workshop, sponsored by the Centre for Language Sciences and the CCD and held at Macquarie University, was a forum for discussion of research relating to bi- and multilingualism. This workshop attracted over 80 CCD members and researchers, with presentations by leading international researchers, Centre postdocs and PhD students. The presentations covered topics ranging from projects dealing with non-linguistic benefits for cognition related to bilingualism, to issues relating to the acquisition and processing of language in the bilingual mind.

Annual Workshop Towards Transformational Research in Cognition and its Disorders

20-21 August | Macquarie University

Speakers

Professor Jason Mattingley, The University of Queensland
Professor Ovid Tzeng, Academia Sinica, Taiwan

This two day workshop focused on the research conducted by each of the CCD's five programs – Belief Formation, Language, Memory, Person Perception and Reading – as well as the Centre’s transformational research. Seventeen research talks were presented in addition to a highly successful poster session for PhD and Honours/MRes students at the end of the first day. To promote their significant contributions to their respective fields of research to the CCD community, the workshop showcased the winners of the 2013 Excellence in Research Student Award (Publications) and the 2014 Excellence in Research Student Award (Poster).

Research Training Annual Workshop Student Poster Session

20 August | Macquarie University

The student poster presentations during the CCD Annual Workshop showcased student research and winners were selected to present their research on the last day of the conference. The winner of the best Postgraduate Poster was Amy-Lee Sesel ‘Remembering Together’ and the winner of the best PhD Poster was Sicong Tu ‘Accelerated forgetting of contextual details due to focal medio-dorsal thalamic lesion’. Six other students received Highly Commended awards: Amy Dawel, Kiri Mealings, Manjunath Narra, Nathan Caruana, Sharon Savage and Vana Webster.

Left: Annual Workshop winners and highly commended awards: Amy Lee Sesel, Sicong Tu, Sharon Savage, Amy Dawel, Nathan Caruana and Vana Webster

Left to right: Professor Viorica Marian (Northwestern University, USA), Professor Stephen Crain, Dr Michael Iverson, Professor Jason Rothman (University of Reading, UK), Professor Jyotsna Vaid (Texas A&M University, USA), Professor Theo Marinis (University of Reading, UK) and Professor Katherine Demuth

Left to right: Dr Agustin Ibáñez with PhD candidate Nathan Caruana at the Annual Workshop Poster Session
Workshop
Steady State Visual Evoked Potentials
22 August | Macquarie University
Speaker
Professor Jason Mattingley,
The University of Queensland
This workshop, hosted by PARC and which was run adjacent to the CCD Annual Workshop, addressed how to use Steady State Visual Evoked Potentials on EEG data to look at cognitive functions. Professor Jason Mattingley is an active member of the CCD Scientific Committee and his work focuses on the neural and cognitive mechanisms that underlie selective attention.

Discussion
Women in Science
17 October | Macquarie University
Speakers
Associate Professor Anina Rich,
Macquarie University
Professor Lyndsey Nickels,
Macquarie University
Dr Karolyn White,
Macquarie University
Dr Lisa Yen,
Macquarie University
This ‘Women in Science’ event is an initiative of the PARC women. PARC and the CCD hosted this event over lunch in order to discuss the relevant issues for women in science. The discussion was open to Masters/PhD students, postdocs and academics, and was attended by 30 people. The speakers gave short presentations about their experiences as women in science, followed by discussions of the opportunities and challenges faced by women in research careers.

Research Training
CELEX Database Information Session
15 October | Macquarie University
The session conducted by Steven Saunders (CCD Research Analyst) was an introduction to the CELEX database. The CELEX database provides information about the lexical properties of words in English, German and Dutch, such as orthography (variations in spelling), phonology (phonetic transcriptions, variations in pronunciation, syllable structure), morphology (derivational and compositional structure), syntax (word class, argument structures) and word frequency (summed word counts). The group discussed layout and structure of the CELEX database, how to load the CELEX data into Microsoft Excel, the most important fields present in the database, how other important data, such as neighbour counts, is derived from it, and various caveats to be aware of when using it. This was a valuable training workshop for our students in the Language and Reading Programs.
Workshop
Memory in the Treetops

17 - 18 October | Avoca Beach

Speakers
Dr Christopher Butler, University of Oxford, UK
Dr Loren Mowszowski, The University of Sydney
Associate Professor Romina Palermo, The University of Western Australia

This Memory Program workshop provided an opportunity to hear eminent researchers, postdoctoral fellows and students presenting their work on aspects of memory. The two days combined research presentations using experimental psychology, neuroimaging and clinical approaches to examine theories of memory and its disorders, as well as avenues for remediation.

Workshop
The Interface between Language and Perception in Action

23 October | Macquarie University

Speakers
Professor Daniel Bub, University of Victoria, Canada
Professor Stephen Crain, Macquarie University

This one day workshop, hosted by the CCD Language Program and PARC at Macquarie University, addressed how language communicates with our motor system and the deep connections between language and action, including the possibility that motor representations associated with words or sentences play some role in language comprehension. Professor Crain opened the workshop by describing how children formulate an important mediating structure called a plan. The plan is devised in the child’s mind in response to the linguistic input, and guides the selection and execution of appropriate actions. Professor Bub then described in detail the systematic approach to the question: "What is the contribution of activated motor representations to word and sentence processing?".

Research Training
Writing Skills Workshop

24-26 November | Macquarie University

This course, sponsored by the Macquarie University Centre for Language Sciences and the CCD, was held over six sessions across three days. The aim of the course was to develop the writing, reading and critical thinking skills required by HDR students in order to deal successfully with the demands of postgraduate research. It started by looking at the principles of academic writing, before moving on to critical thinking and the construction of arguments in both reading and writing. This was followed by a focus on the sections of a journal article and also dealt with variables (independent, dependent and confounding), correlation, causation and survey questionnaires. Next was an analysis of literature reviews and finally a journal article was analysed from all of the above reading, writing and critiquing perspectives.

Research Training
Tobii Eye-Tracking Smorgasbord Workshop

3 December | Macquarie University

Coordinated by PhD candidate Benjamin Davies, CCD research candidates were able to attend a Tobii eye-tracker workshop run by the head Tobii certified instructor from Sweden, Tommy Strandvall. The format was a one day question and answer workshop, for intermediate to advanced users, where student questions about eye tracking and Tobii eye trackers were discussed. Discussion covered visual attention, use of Tobii eye trackers, issues when designing an eye tracking study and eye tracking data synchronization with other biometric data sources and software (e.g., E-Prime, Matlab, etc.).
Workshop
Memory Day 2014

3-4 December | Macquarie University

Speakers

Professor Norman Brown, University of Alberta, Canada

Professor Evelyn Tribble, University of Otago, NZ

Professor Harvey Whitehouse, University of Oxford, UK

Memory Day 2014 is the 7th workshop in a series hosted by Professors John Sutton and Amanda Barnier and Dr Celia Harris’ Collective Cognition Team at the Department of Cognitive Science, Macquarie University since 2007. The workshops have been funded by ARC Discovery Projects grants, the Department of Cognitive Science, Faculty of Human Sciences, and the CCD since the inception of the series. This workshop showcased researchers, projects and new collaborations that focus on the intersection of individual and social memories, histories, and rituals. This workshop brought together researchers from across the University, Australia and overseas allowing both speakers and audience members to discuss memory, history, ritual, and personal and social perspectives, to synthesize their distinct backgrounds and to consolidate plans for ongoing collaborative research.

Research Training
Commencement, Progression and Completion Workshops

Ongoing | Macquarie University, The University of New South Wales, The University of Western Australia

Across the participating organisations of our Centre, there are a range of workshops held to benefit our research training candidates in the successful commencement and completion of their degree programs. The CCD provides additional support at Macquarie University by offering sessions on the successful progression through the program, and on the final stages of completing a higher degree research program. Completion can be a stressful period for students, and so the workshop discussed the requirements for thesis layout, size, and style, to nomination of examiners, and responding to the corrections reports. Candidates were given tips on the post submission gap, as this can be a difficult transition period. Sessions were also held to support applications to the Macquarie University Postgraduate Research Fund, introducing the application form, budgets, and writing a 100 word summary in “plain English”. These applications build skills for future external competitive grant applications.

Research Training
Reading and Discussion Groups

Ongoing | Macquarie University, The University of New South Wales, The University of Western Australia

Across the CCD, there are 21 active reading and discussion groups that meet from each of our Programs:

Belief Formation
Belief Formation Group Meeting, Consciousness Reading Group, Body Representation Meeting Group, and SoCog Meeting Group

Language
Aphasia Research Group Meeting, Bilingual Research Reading Group, Child Language Lab Meeting, Cognitive Neuropsychology Research Group Meeting, Hearing Reading Group, Language Acquisition Lab Meeting, and Language Acquisition Meeting.

Memory
Collective Memory Meeting Group, Memory Frontier Lab Meeting, Frontier Journal Club, and Memory Processes Meeting Group.

Person Perception
Person Perception reading group, Person Perception Lab Meetings (with the PEPLab), and Person Perception Seminar Series.

Reading
Macquarie University Reading Disorders Research Group (MURDR) and Macquarie Cognition Clinic for Reading Meeting.

Neural Markers
MEG Laboratory Research Meeting.
Stakeholders’ Workshop
Sharing Vision for Future Research Impacts

29 April | Macquarie University

Speakers

Dr Trevor Clark,
Autism Spectrum Australia

Dr Molly de Lemos,
Learning Difficulties Australia (LDA)

Mr Bill Gye, OAM,
Schizophrenia Fellowship of NSW

Professor Greg Leigh,
Royal Institute for Deaf and Blind Children

Ms Alison McMurtrie,
Learning Difficulties Australia (LDA)

Mr Brendan Moore,
Alzheimer’s Australia NSW

Adjunct Professor Jim Patrick,
Cochlear Limited

Professor Leanne Togher,
The University of Sydney and Speech Pathology Australia

This inaugural workshop brought together community organisations providing support for people with autism, learning difficulties, schizophrenia, Alzheimer’s disease and speech difficulties, along with researchers at the CCD. The workshop provided a unique opportunity for researchers to learn more about the practical needs of children and adults with cognitive health issues, as well as the means to jointly discuss the potential impact of evidence-based research findings and treatment protocols.

Representatives from the CCD’s key stakeholder organisations outlined how their organisation supports the community, as well as highlighting focus areas for 2014 and beyond. CCD researchers also presented examples of the Centre’s translational research outcomes through demonstrations; including the Word-Retraining Programs for people with semantic dementia by PhD student Sharon Savage, person perception and face blindness by Associate Professor Romina Palermo, the Emotiv System by Dr Nicholas Badcock, and the SoCog program for people with schizophrenia by Dr Pamela Marsh. The event culminated with guided tours of the facilities at the CCD and Cochlear Limited.
Public Lecture
Mauve Mondays and Orange Odours: Synaesthesia and the Integration of Information in the Human Brain

1 May | Macquarie University
Speaker
Associate Professor Anina Rich,
Macquarie University

Last year, Associate Professor Anina Rich, an Associate Investigator of the Centre, was recipient of the prestigious Paul Bourke Award. She was invited to give the annual Paul Bourke public lecture on her research. At this well-attended event, jointly sponsored by the Academy of the Social Sciences in Australia, Macquarie University and the CCD, Associate Professor Rich discussed her research on synaesthesia – an unusual phenomenon that is often described as a ‘mixing of the senses’ – and how her research provides insights into the way the brain integrates information for conscious perception of the world.

Presentation
SoCog Social Cognitive Remediation Program

9 August | Macquarie University

The CCD held a lunchtime presentation for clinicians, consumer groups, government agencies and researchers on SoCog, a treatment program developed by Dr Pamela Marsh and colleagues to improve the social functioning of people with schizophrenia. Following the presentation, an informative discussion was held about how the current issues faced in the health sector in the areas of schizophrenia treatment and research can be addressed.

Workshop
Frontotemporal Dementia (FTD) Information and Support Day for Families and Support People

1 October | Neuroscience Research Australia

Speakers
Ms Rebekah Ahmed,
The University of New South Wales
Dr Emma Devenney,
The University of New South Wales
Ms Marie Gorman,
Alzheimer’s Australia NSW
Professor John Hodges,
The University of New South Wales
Ms Melissa Kettle,
The Australian Frontotemporal Dementia Association
Dr Fiona Kumfor,
The University of New South Wales
Associate Professor Olivier Piguet,
The University of New South Wales

This event, held by the Memory Program at Neuroscience Research Australia, was designed to provide specific information to family, friends and support people of those who have been diagnosed with frontotemporal dementia. Topics covered on the day were genetic advances, eating and physiological changes, and emotions and insights, as well as talks by stakeholders including Alzheimer’s Australia NSW and The Australian Frontotemporal Dementia Association.
Public Lecture
A Future Made Together: New Directions in the Ethics of Autism Research

27 October | The University of Western Australia

Speaker

Dr Elizabeth (Liz) Pellicano, Institute of Education, London, UK

Autism affects millions of people’s lives. There have been many legislative, policy and service initiatives in recent years aiming to improve the life chances and opportunities of autistic people. There has also been an explosion of autism research. But the focus of research is largely on the underlying biology and causes of autism rather than on services, treatments and interventions for autistic people and their families. How can we reduce this so-called “translational gap”, this gap between knowledge and practice? How can we ensure that our research focuses on issues of more immediate, practical concern, as prioritised by members of the autism community - autistic people, family members and practitioners?

In this public lecture, Dr Pellicano suggested that we not only need greater investment in currently under-researched areas and underserved populations but we also need radical new ways of doing autism research. Dr Pellicano raised issues about autism and autism research but also highlighted the broader issues about decision-making and accountability in research. Dr Pellicano gave similar invited presentations to the Wales Autism Research Centre, UK, and to the Autism Education Trust’s External Reference Group, UK.

Public Lecture
Our Intelligent Hands: The Role of Action in Language Comprehension

6 November | Macquarie University

Speaker

Professor Daniel Bub, University of Victoria, Canada

In this public lecture, jointly presented by the CCD, the Department of Cognitive Science and PARC at Macquarie University, Professor Bub discussed and critiqued the rebirth of the old theoretical language claim that the meaning of words refers to objects and is entirely based on stored traces of our sensory and motor experience. It is this combination of sensory and motor memories of all our experiences with the physical object, that provide us with the detail and complex meanings of words. Although modern linguistic theories have moved well beyond this early view, new evidence has emerged that appears consistent with the classical approach to word meaning. Professor Bub emphasised the possible role of hand actions in understanding words and sentences that refer to graspable objects that evoke interesting patterns of activity in the motor system. Professor Bub provided an alternative explanation, based on a theory of how planned actions are organised in the brain, and how language communicates with components of the motor system.

Workshop
Alzheimer’s Australia Younger Onset Dementia Key Workers

12 November | Neuroscience Research Australia

This was the second workshop organised by the Memory Program for Alzheimer’s Australia Younger Onset Dementia Key Workers. The workshop provided training on young-onset dementia syndromes with a focus on frontotemporal dementia and related conditions. Topics covered included clinical presentation, diagnosis, prognosis, genetics, pathology, treatments and interventions for these progressive brain disorders. Associate Professor Olivier Piguet, Dr James Burrell and Ms Cassandra Kaizik (Neuroscience Research Australia) facilitated this event.
Workshop
Primary Progressive Aphasia and its Treatment

20 November | War Memorial Hospital

Professor Lyndsey Nickels, Dr Karen Croot and Ms Cathleen Taylor presented at a forum showcasing recent innovative research in primary progressive aphasia and its treatment, conducted through collaborative efforts between War Memorial Hospital, The University of Sydney and the CCD. This event provided an opportunity for the sharing of research and clinical experience between geriatricians, speech pathologists, Alzheimer’s Australia care workers and researchers.

Public Lecture
Language in the Brain: What to Know So You Can Win Friends and Influence People

21 November | Macquarie University

Speaker
Professor David Poeppel, New York University, USA and Max Planck Institute for Empirical Aesthetics, Germany

Language is complicated. The brain is complicated. Is there any hope in developing a satisfying understanding of how nervous tissue forms the basis for the linguistic computational system? The challenge is formidable, but there are a few fundamental ideas that help us construct linking hypotheses. These ideas can be described at a level that is easy to grasp and fun to contemplate.

At this very popular public lecture, Professor Poeppel discussed several foundational concepts that underpin the study of brain and language. These ideas included some surprising features of the memory mechanisms that enable our knowledge of words, and some unexpected insights into the rules that govern the combination of basic elements. Professor Poeppel went on to discuss the ideas that characterize the linguistic computational system of the human mind/brain including the parallel processing streams that segregate the ‘what’ and ‘how’ of language processing, processing that happens on different parallel scales, implementing multi-time resolution and finally the brain mechanisms for language that predict the future, locally and globally.

Public Lecture
What the Computational Neuroanatomy of Speech Reveals about Language, Motor Control, Mirror Neurons, Embodied Cognition, and the Architecture of the Mind/Brain

21 November | Macquarie University

Speaker
Professor Greg Hickok, University of California, Irvine, USA

Language has served as a test bed for some of the biggest questions in neuroscience and psychology. The nineteenth century debates over cortical specialisation, the cognitive revolution of the 1950s and 1960s, the 1980s dispute regarding whether mental computations involved symbolic versus connectionist-distributed processes, the mirror neuron power-grab of the human mind and brain over the last decade, and the growing influence of embodied approaches to cognition have all featured language as a centerpiece of their arguments.

Professor Hickok outlined in this well-attended public lecture the progress to date in understanding the cortical organisation and neurocomputational operations of a fairly low-level aspect of language processing, namely the processing of speech sounds during perception and production. Professor Hickok then showed how this progress can be used to understand the organisation of the language systems, motor systems, mirror neurons, embodied cognition and the organisation of mind and brain itself.
women in science

The CCD is very fortunate to have women well-represented in our Centre’s leadership roles. Three of the five Program Leaders are women, ten of the nineteen Chief Investigators are award-winning female researchers and half of the Centre’s Partner Investigators are female researchers of international repute. Under the supervision and guidance of the balanced Centre leadership, our PhD students, both male and female, have demonstrated clear successes in their degree programs and many have continued on to competitive placements.

Some of the achievements by the Centre’s female researchers and students this year include:

- Professors Anne Castles and Katherine Demuth were recognised as Distinguished Professors for their outstanding contributions to their fields of scholarship and to Macquarie University
- Professor Lyndsey Nickels was elected as Fellow of the Academy of Social Sciences in Australia and was awarded the Macquarie University Excellence in Higher Degree Research Supervision Award
- Professor Amanda Barnier became a Fellow of The US Society for Clinical and Experimental Hypnosis for her outstanding contributions to the science of hypnosis
- Professor Dorothy Bishop was appointed as a Fellow of The Royal Society in recognition of her work on developmental disorders affecting language and communication
- Associate Professor Michelle Meade won the College of Letters and Science Award for Meritorious Research and Creativity for 2014 from her home institution, Montana State University
- Dr Muireann Irish won the NSW Young Tall Poppy award, which honours up and coming scientists who combine world-class research with a passionate commitment to communicating science. Muireann was recognised for her research on episodic memory in people with semantic dementia
- Dr Fiona Kumfor received the Australian Psychological Society “Excellent PhD Thesis in Psychology” Award
- Recent Macquarie University PhD graduates, Drs Genevieve Quek and Nora Fieder received the Vice-Chancellor’s Commendation for Academic Excellence
- Recent Combined Masters/PhD graduate, Dr Michelle Marnewek, received recognition on The University of Western Australia Dean’s list of outstanding graduating students
- Recent PhD graduate, Dr Shu Hui Yau was highlighted as a ‘Woman to Watch’ by the Sydney Morning Herald
- PhD student Emma Nile was named an AMP Tomorrow Maker 2014

The CCD proudly supports a number of efforts and events designed to maximise participation and success of women in science. Female members from the Centre annually present at local girls’ high school careers days, host visiting students for high school work experience and undergraduate internship placements, and continue to be supported by the Centre to attend networking and career building events sponsored by professional women’s associations.

In addition, this year the CCD supported an initiative by the Macquarie University Perception in Action Research Centre (PARC) that brought together women from a number of departments within Macquarie University’s Faculty of Human Sciences at two lunchtime events to discuss issues that enhance or impede the success of women in academic science careers. There are plans for future events that will bring together interested academics, professional staff, students and postdocs of both genders, to discuss gender equality within science.

regional universities

Collaborations continued with Emeritus Professor Brian Byrne and Associate Professor Drew Khentzos of the University of New England. In addition, Emeritus Professor Byrne’s PhD student, Katrina Grasby, whose thesis work is a behaviour-genetic study of The National Assessment Program – Literacy and Numeracy (NAPLAN) results, contributed to the Centre’s collective knowledge through a presentation of their findings at the CCD Annual Workshop. Both also attended the CCD Stakeholder Workshop. The Macquarie University node of the CCD hosted Emeritus Professor Brian Byrne and Associate Professor Khentzos on various occasions throughout the year, and Associate Professor Khentzos presented his research on logic at a language acquisition seminar during one of those visits.
Across our Centre, many members are keen to share their passion and excite interest in the science of cognition and its disorders. This year, the CCD offered a variety of opportunities for students of many different ages to explore and engage with the activities and research of the Centre. These programs are run to provide greater access and more information about cognition and its disorders throughout the community, focusing on primary and high school students, and undergraduate tertiary students.

**Lecture Series for Speech and Language Pathology Students**
22-28 January | National University of Singapore

Every two years, Professor Lyndsey Nickels of the Language Program teaches a week long series of invited lectures to speech and language pathology masters students at the National University of Singapore.

**Frontiers for Young Minds**
14 April | Online

Drs Jon Brock and Paul Sowman authored an article translating the science of MEG for a young audience. Their article, titled “MEG for Kids: Listening to your brain with super-cool SQUIDS” was published in an online science journal for kids that is edited and reviewed by kids, Frontiers for Young Minds.

**OzClo Winners Tour**
3 June | Macquarie University

The top placing student teams from the 2014 Australian Computational and Linguistics Olympiad for NSW were hosted by the CCD as part of their award for winning the regional competition. The students were given an overview of the Centre, including lab demonstrations and tours, and information about pathways to a variety of linguistics degrees as well as those relevant to pursuing a research degree in cognitive science.

**Careers Day**
6 June | North Sydney Girls High School

For the fourth time, North Sydney Girls High School requested that women from the CCD present at its annual careers day and provide information about pathways to a career in cognitive science. Dr Nora Fieder, of the Language Program, talked about what qualifications are needed to enter the field of cognitive science, and discussed opportunities and challenges for women who choose a career in research.

**Work Experience Program**
June – ongoing | Macquarie University

This year, a program was developed to offer a varied and comprehensive experience to high school students seeking to undertake their required Workplace Learning experience with the CCD at Macquarie University. As a part of this process, students were hosted by individual researchers and then, as the program developed, across the Centre by a team of volunteer hosts. Four students in total were hosted across the year with plans to expand the offering to small groups from local schools on a quarterly basis.

**National Youth Science Forum - Next Step Program**
2 July | Macquarie University

The National Youth Science Forum, sponsored by Rotary International, is a program for Year 12 students who have been selected to participate based on their demonstrated aptitude for, and interest in, science. The aim of the program is to inspire young Australians to consider a future in science.

In conjunction with Cochlear Limited, a partner of the Forum, the CCD hosted 50 Year 12 students as part of the Next Step Program. The students were given an overview of the Centre, lab demonstrations and tours, and information about pathways to a PhD in cognitive science.
The University of Western Australia Open Day
10 August | The University of Western Australia

Open Day is an opportunity for prospective students of The University of Western Australia to attend mini lectures and demonstrations, talk to academics, listen to a panel discussion and discover what life is like on campus. As part of the demonstration, members of the Person Perception Program demonstrated the rubber hand illusion, and offered videos on the illusion and on prosopagnosia. As part of the mini lecture series, Associate Professor Jason Bell gave a talk about course requirements and career opportunities in psychology.

Perth Science Festival
16 August | Perth

The Person Perception Program, as part of National Science Week, participated in the Perth Science Festival. The Festival was attended by over 10,000 people, and the Person Perception Program offered a PowerPoint presentation on prosopagnosia as well as running a stall offering demonstrations of the rubber hand illusion.

Macquarie University Open Day
13 September | Macquarie University

Open Day is an opportunity for prospective Macquarie University students and the broader community to attend mini lectures, talk to academics and discover what life is like on campus. As part of the mini lecture series, Dr Nicholas Badcock of the Reading Program, gave a presentation about and demonstrated the Emotiv System, a portable system used to measure brain activity that has been converted by CCD researchers from video gaming equipment. Dr David Kaplan also discussed and answered questions about potential educational pathways to a research career.

Sydney Kids Intellectual Development Study (School Holiday program)
September - October | Macquarie University

Sixty children and adults visited the Centre over the school holidays to help explore the development of face processing and whether it is related to reading ability as part of a project looking at ‘Cognitive and Social-Emotional Development in Learning Difficulties’.

Uni in a Day
2 October | Macquarie University

Uni in a Day was an opportunity for Year 10, 11 and 12 students to experience a day in the life of a university student. As part of the experience, students were able to choose to attend mini lectures in a variety of content areas according to their own interests. Associate Professor Anina Rich and Dr Rochelle Cox each presented a lecture, and Dr Ivan Yuen, Dr Peter de Lissa and Erin Martin teamed together to present a session titled, “Brains at Work” incorporating demonstrations about some of the tools used in CCD research, such as the Emotiv and MEG systems for brain responses and ultrasound systems for understanding speech production.

Undergraduate Internships
Ongoing | Macquarie University

In addition to the learning opportunities provided to high school and postgraduate students by the Centre, members of the Language and Reading Programs hosted a total of six undergraduate interns from Australia and overseas.
community engagement

CCD members provide ongoing support and resources to clinicians, educators and other community members. This support takes the form of direct consultation with clinicians and educators, provision of updates about new developments in research, participation in formal and informal discussion, and advice about evidence-based assessment and interventions.

professional development

The Centre’s hosted events and outreach activities have provided numerous opportunities for members to develop and enhance links with stakeholders and the community. Additionally, individual CCD members have engaged with related professional communities (for further details see Symposia).

Belief Formation

Members of the Belief Formation Program collaborate with clinicians who use cognitive remediation in the design, execution and evaluation of psychological treatments for different psychiatric symptoms. In addition to the SoCog presentation hosted by the Centre (see Centre Activities), individual engagement by Belief Formation Program members included:

- Multiple training workshops run for clinicians in the SoCog social cognitive remediation program for people with schizophrenia
- Voluntary computer classes for patients in the inpatient Life Skills program
- Initial work with an individual consumer carer who is using the SoCog program with her daughter
- The cognitive and social cognitive remediation “brain training” program, offering personalised psychosocial interventions to complement pharmacological treatment, is now being used as part of rehabilitation offerings for mental health patients at St Vincent’s Hospital (funded by the Schizophrenia Research Institute and the Sydney City Rotary Club’s Jane Salter Fund)

Language

Members of the Language Program investigate the development of language in people with and without language disorders and share their findings with speech pathologists, teachers, parents, and other researchers. In addition to the Primary Progressive Aphasia and its Treatment Workshop hosted by the Centre (see Centre Activities), individual engagement by Language Program members included:

- Presentations to speech pathologists about current research, and conclusions about efficacy of treatments for types of aphasia
- Participation in an open discussion about barriers to exchange between clinicians and researchers, and ways to overcome them, at an international symposium of clinicians and researchers
- Briefings of special education teachers about models of language assessment and implications for language remediation

- A presentation to educators about the potential of meditation as a tool for language remediation
- A presentation to embassy officials, teachers, parents and researchers about language impairment treatments in bilingual children and adults
- Participation in an expert panel at an event addressing the benefits and challenges of raising bilingual children
- A presentation to teachers, parents and other community members as part of the Australian Hearing Hub Open House about the Child Language Lab’s research

Memory

Members of the Memory Program investigate cognitive systems and brain structures underlying memory, and collaborate with clinicians who work with people with congenital or acquired brain abnormality or with individuals with progressive conditions, such as dementia.

In addition to the workshops hosted by the Centre for younger onset dementia key workers and for carers of those with frontotemporal dementia (see Centre Activities), epilepsy nurse practitioners were updated via a webinar about memory disorders in children with epilepsy and approaches to remediation.

Person Perception

Person Perception Program members investigate how people extract, process and use information about others and how related cognitive mechanisms function differently in neurodevelopmental disorders, such as autism and prosopagnosia.

In addition to the public lecture about autism research directions hosted by the Centre (see Centre Activities), an autism support group was given a presentation, as part of a workshop about teen autism, about the challenges that teenage girls with autism spectrum disorders face, and how to support them.

Reading

Reading Program research informs educational practice and develops targeted treatment programs for children with difficulty learning to read and spell. In addition to providing ongoing engagement via the Macquarie Online Test Interface (MOTIf) and the Macquarie Cognition Clinic for Reading, individual engagement by Reading Program members included:

- Multiple presentations to groups of teachers and parents about using evidence-based methods, programs and resources to assess reading, diagnose dyslexia and remediate spelling and reading difficulties
A professional development presentation to speech pathologists about dyslexia assessment and intervention

A presentation for parents and teachers of children with dyslexia as part of the Australian Hearing Hub Open House

Delivery of three, full-day, professional learning workshops to leadership and specialist literacy staff from 33 schools

Provision of ongoing consultant mentoring to educational advisors and professional learning workshop attendees

Neural Markers

Our Neural Markers projects involve collaborative research projects using magnetoencephalography (MEG), electroencephalography (EEG), transcranial magnetic stimulation (TMS) and eye-tracking techniques to investigate neural markers of cognition and its disorders. As part of ongoing collaboration with a key industry stakeholder, Cochlear Limited, employees were given a presentation about the Cochlear Implant MEG and its potential research applications as part of the company’s internal seminar series “Get Advanced”.

community consultation

Members from across the Centre are often invited to collaborate on multidisciplinary projects or to contribute to community programs and events as experts in their field. This year, Centre Members:

- participated in a roundtable meeting hosted by the Australian Federal Minister for Education and Training that brought together select academics, educators and advocates to provide advice and feedback on issues impacting students with dyslexia
- participated in a forum debating art and the creative endeavour from a variety of perspectives as part of the 19th Biennale of Sydney
- participated as the scientist member of a team on a live Science-Comedy show, engaging in quizzes and debates about current affairs and scientific topics and giving a presentation with subsequent discussion to a public audience
- consulted on a prototype 3D browser for viewing photographs that incorporates a filter to suggest the cognitive processes of memory retrieval and loss
- participated in an interdisciplinary collaborative research project investigating memory loss through drawing, sound, photography and 3D imaging
- visited a Men’s Shed to discuss current research and to answer questions about the nature of memory and how to protect it as one ages
- were interviewed for, and will feature in, a documentary aiming to increase dyslexia awareness in schools and to provide teachers with effective strategies to maximise opportunities for children with dyslexia to learn and succeed
- participated in a university journalism student project that produced a video, currently hosted on a health website, about research using the Cochlear Implant MEG system
- were interviewed by a research artist as part of a research residency in the use of body illusions in the context of neuroscience and chronic pain
- featured in a NSW Trade & Investment video about industry-led ‘Knowledge Hubs’ and the importance of collaborative innovation
- participated in a briefing of the Australian Prime Minister and the Federal Minister for Health during their visit to Cochlear Limited headquarters
Australian Hearing Hub
CCD facilities
tour program

Since relocating to the Australian Hearing Hub, the Macquarie University node of the CCD has been actively involved in demonstrations and tours of our world-class research facilities, which now include three MEG systems (one for adults, one for children and one for people with a cochlear implant), a liquid helium recovery system, high quality neurophysiology and action labs (including ERP, TMS, Optotrack, and CyberGlove) and other behavioural research labs. This year, the Centre hosted 22 customised tours for over 250 domestic and international visitors, including delegations from China, India, United States of America, South America, the Middle East and Europe.

As part of the Visiting Implant Specialists to Australia (VISTA) program, the CCD hosted 53 international Cochlear Implant surgeons when they visited Cochlear Limited’s world headquarters to learn more about technology innovations and to share their own insights into implantable hearing solutions. The CCD tours showcased the facilities of the Australian Hearing Hub and the KIT-Macquarie Brain Research Laboratory.

resources and tools

Newsletters

The Reading Program, Person Perception Program, Frontotemporal Dementia Research Group of the Memory Program and the Aphasia Research Group of the Language Program each distributed annual newsletters to stakeholders including schools, teachers, clinicians, professionals, study participants and parents. The Language Program’s Child Language Lab also distributed a quarterly newsletter to stakeholders, parents and study participants. In addition, the Neuronauts Brain Science Club provides a quarterly newsletter highlighting news from across the Centre to its members, which include children and families who participate in the Centre’s research. These newsletters will be available on the CCD website.

Social Media

The Person Perception team connects to the community and fellow researchers via Twitter (@PersonPercept) and Facebook (CCD Person Perception). Social media is used to share interesting articles on person perception and provide information about the latest news from the CCD Person Perception team, including recent publications, prizes and events. In addition, 12 individual researchers within the CCD maintain Twitter accounts and update with regular posts related to their work and academic interests.

The Conversation | Blogs

CCD members contributed to the personal and externally hosted blogs listed below. In addition, 13 of the Centre’s researchers from across all five programs contributed to the online forum of academic and research commentary, The Conversation. Eleven of these authored original articles and two were requested as expert sources and interviewed for articles written by others.

- Cracking the Enigma: An Autism Research Blog: a blog maintained by Chief Investigator Dr Jon Brock (crackingtheenigma.blogspot.com.au)
- BishopBlog: a well-followed blog about academic matters by Partner Investigator Professor Dorothy Bishop (deeybee.blogspot.com)
- This Month in Voices: Voice-Hearing Research Update Blog: a monthly summary of new, notable academic papers pertaining to the experience of hearing voices (thismonthinvoices.wordpress.com)
- NeuRA Blog: Neuroscience Research Australia’s forum for research updates and researcher commentary (blog.neura.edu.au)
- Institute of Education Blog: The UK’s leading centre for educational research, the IOE (Institute of Education) hosts a blog consisting of expert opinion in the field (ioelondonblog.wordpress.com)
ACEmobile App

Led by a member of the CCD Memory Program, along with a team at the University of Plymouth, UK, the ACEmobile iPad app is a tool that assists doctors and nurses to conduct dementia assessments, thereby widening the clinical team. The iPad app guides the user through the Addenbrooke's Cognitive Examination (ACE-III) - the most popular and commonly used paper and pencil dementia screening tool. The app removes the need for clinicians to learn the ACE-III manual. It also automatically calculates patients' scores and creates a report for their medical records. The creators have designed the app to make dementia assessment easier and more reliable for staff and health professionals globally (acemobile.org).

Macquarie Online Test Interface (MOTIf)

The Macquarie Online Test Interface (MOTIf) is an online facility designed to automatically administer, score and provide reports for cognitive tests developed by researchers in the CCD Reading and Language Programs. MOTIf tests are available online at no charge to registered teachers, clinicians and researchers. The test results of each MOTIf user are stored in a secure and private database. As of October 2014, there were around 4000 registrants from all around the world, with 20-40 new registrants every week (motif.org.au).

Macquarie University Cognition Clinic for Reading

CCD Reading Program researchers from Macquarie University’s Department of Cognitive Science have been setting up a new Macquarie University Cognition Clinic for Reading. The clinic offers research-based assessments, intervention, recommendations and professional workshops that are tailored to individuals with reading and spelling problems.

LiteracyPlanet

Researchers in the CCD Reading Training Study are involved in an online reading training program called LiteracyPlanet. LiteracyPlanet includes dozens of exercises that train students' letter-sound reading and sight-word reading. CCD researchers have provided content and advice to the site, and continue to use it as a research tool (literacyplanet.com).

Prosopagnosia Register

The Prosopagnosia Register is an online register for people with prosopagnosia, which is a term for when a person experiences difficulty in recognising faces. This web resource enables people who suffer from prosopagnosia to make contact with leading experts in the field and to participate in research. In turn, research updates are provided and queries are answered (cogsci.mq.edu.au/research/projects/prosopagnosia).

Our Stories Program

“Our Stories” is a seven week program offered on an ongoing basis that has been developed by a member of the Memory Program’s Collective Cognition team. This program is based on reminiscence therapy and aims to improve the wellbeing of older adults in the community and in nursing homes by helping them record their lives.

SoCog

CCD Belief Formation members have developed 'SoCog', which is a psychosocial group intervention to help people with schizophrenia overcome social difficulties. SoCog is comprised of two programs that use a suite of games and activities focusing on the specific social cognitive problems experienced by people with schizophrenia. The Schizophrenia Fellowship of NSW has provided additional funding for an internet version of the program, eSoCog, the development of which is currently underway.

Neuronauts Brain Science Club

The Neuronauts Brain Science Club is a register of young people (0 to 17 years) who are interested in taking part in research. When research projects are advertised through Neuronauts, children on the register can be signed up for studies that they are eligible for. Parents are reimbursed for their time and travel costs, and children receive certificates and other rewards. Neuronauts was launched in November 2012, and currently there are 886 families, with a total of 1339 children who are members.

This year, we ran 24 studies with participants from the Neuronauts Brain Science Club (ccd.edu.au/services/neuronauts).
CCD Adult Registers

The CCD Adult Register and Older Adult Register are databases of adults who are interested in taking part in research on the brain and the mind. People who sign up to one of these Registers can take part in studies that help us to learn about how the brain typically functions and when difficulties are encountered (ccd.edu.au/involvement/research).

Promotion of CCD Adult Registers during the Australian Hearing Hub Open House

community | stakeholder | industry organisations

The CCD’s hosted events and outreach activities have provided numerous opportunities for our Centre members to develop and enhance links with stakeholders and the community. Representatives from the following industry, community and peak body organisations have been involved in CCD activities and events throughout the year:

- AD Instruments
- Advanced Bionics
- AEIOU Foundation
- Alzheimer’s Australia
- Alzheimer’s Australia NSW
- Amaze (Autism Victoria)
- Aphasia NSW
- Autism Queensland
- Autism Spectrum Australia (Aspect)
- Australian Pain Management Association
- Australasian Cognitive Neuroscience Society (ACNS)
- Australasian Society for Autism Research (ASfAR)
- Australian Cricketer’s Association
- Australian Hearing
- Australian Pain Management Association
- BESA
- Brain and Mind Research Institute (UNSW)
- Children’s Hospital Westmead
- Cochlear Limited
- College of Educational and Developmental Psychologists
- Concord Hospital
- Cricket Australia
- CSIRO
- Cumberland Hospital
- Department of Education
- Department of Families, Housing, Community Services, and Indigenous Affairs
- Department of Health and Ageing
- Gold Coast Dyslexia Support Group
- Hear and Say
- Hearing Voices Network NSW
- InsideOut Associates
- Janssen
- Intervention Services for Autism and Developmental Delay
- LEARN Foundation for Autism
- Learning Difficulties Australia
- LiteracyPlanet
- Mental Health Association of NSW
- Mental Health Council of Australia
- National Acoustic Laboratories
- North Shore Ryde Mental Health Service
- North Sydney Local Health District
- Northern Sydney Home Nursing Service
- NSW Centre for Effective Reading
- NSW Government Health
- NSW Trade and Investment
- Office of Health and Medical Research
- Office of the NSW Chief Scientist & Engineer
- Prince of Wales Hospital
- Psychosis Australia Trust
- Respite Day Centres
- Richmond PRA
- Royal Institute for Deaf and Blind Children
- Royal Rehabilitation Centre
- Schizophrenia Research Institute
- Schizophrenia Fellowship of NSW Inc
- SDN Children’s Services
- Speech Pathology Australia
- State Specific Learning Difficulties (SPELD) Associations
- SR Research Eyelink
- Sydney Cochlear Implant Centre
- The Australian Computational and Linguistics Olympiad (OzCLO)
- The HEARingCRC
- Therapy Focus
- The Shepherd Centre
- Tobii Technology AB
- War Memorial Hospital
- Westmead Hospital
- Western Australian Department of Education, School Psychology Service
collaborations

Our researchers have strong links with international and national researchers beyond the five national collaborating institutions and nine international partner institutions of the CCD. Our researchers have developed and maintained collaborations with research partners from over 88 institutions in 17 countries. This collaboration section highlights links between the Centre and leading international and national researchers.

international agreements

The CCD has been instrumental in developing and formalising several institution-to-institution research and exchange agreements. In 2014, this leadership resulted in four international collaborative agreements.

10 January | A Collaborative Research Agreement was executed between Macquarie University and Kanazawa Institute of Technology, Japan to develop a world-first Real Time Head-position Monitoring System for the Child MEG system.

27 May | An Agreement of Cooperation and Exchange was signed between Macquarie University and Kanazawa University, Japan to develop activities to promote the academic and educational exchange.

10 December | A Memorandum of Understanding between Macquarie University and Beijing Language and Culture University, China was signed to promote MEG research projects and to investigate future collaboration on a Master of Speech Pathology.

16 December | A Memorandum of Understanding between Macquarie University and the Institute of Cognitive Neuroscience, National Central University, Taiwan was signed between the two organisations to promote collaboration in joint research projects and student exchange programs.

Associate Professor Amanda Barnier
Professor David Balota (University of Washington, USA), Dr Roger Dixon (University of Alberta, Canada), Associate Professor Janet Duchek (University of Washington, USA), Professor Suparna Rajaram (Stony Brook University, USA) and Professor William Hirst (The New School, USA) with Dr Celia Harris, Associate Professor Greg Savage and Professor John Sutton, on individual, collaborative, social and collective memory.

Dr Nora Breen (Royal Prince Alfred Hospital), Dr Lisa Bortolotti (University of Birmingham, UK) and Dr Martha Cox, Emeritus Professor Max Coltheart and Associate Professor Robyn Langdon, on hypnotic analyses of clinical delusions.

Professor David Oakley (Cardiff University, UK) with Professor Peter Halligan, on instrumental uses of hypnosis, including hypnotic analogues of neuropsychological and neuropsychiatric conditions.

Professor Erik Woody (University of Waterloo, Canada), on conceptualising and measuring individual differences in hypnotic ability.

Dr Jon Brock
Dr Joe Mcleery (University of Birmingham, UK) with Professor Ian Apperly, on a magnetoencephalography (MEG) study of social perspective taking.

Dr Michael Hautus (The University of Auckland, NZ) with Associate Professor Blake Johnson, on MEG and electroencephalography (EEG) studies of auditory processing in autism.

Associate Professor Alison Lane (The University of Newcastle), on studies of auditory processing in autism.

Professor Rhoshel Lenroot (The University of New South Wales) and Dr Jim Lagopoulos (The University of Sydney) with Associate Professor Blake Johnson, on the relationship between gamma-aminobutyric acid (GABA) levels and neural oscillations in autism.

Dr Caroline Witton (Aston University, UK), on MEG studies of auditory processing in autism.
Emeritus Professor Brian Byrne
Dr Erik Wilcutt and Dr Richard Olson (University of Colorado Boulder, USA), Dr Bruce Pennington and Dr Janice Keenan (University of Denver, USA) and Dr Stefan Samuelsson (Linköping University, Sweden), on studies of genetic and environmental influences on mathematics, literacy and attention in elementary and high school twins.

Professor Anne Castles
Dr Helene Deacon (Dalhousie University, Canada), on longitudinal studies of orthographic learning.
Professor Gareth Gaskell (The University of York, UK) and Dr Anna Weighall (University of Leeds, UK) with Professor Kate Nation, on lexical consolidation effects in written word learning.
Dr Meredith McKague (The University of Melbourne) with Dr Saskia Kohnen and Ms Yvette Kezilas, on letter position processing in normal reading and dyslexia.
Professor Sheena Reilly, Professor Margot Prior, Associate Professor Melissa Wake, Professor John Carlin and Dr Lesley Bretherton (The University of Melbourne and the Murdoch Children’s Research Institute), on an NHMRC project: The Early Language in Victoria (ELVS) study.

Emeritus Professor Max Coltheart
Professor Derek Besner (University of Waterloo, Canada) with Professor Kathy Rastle, Dr Betty Mousikou and Dr Claudio Mulatti, on computational modelling of reading aloud.
Dr Anika Fiebich (Ruhr-University Bochum, Germany), on theories of theory of mind.
Dr Rachel Robbins (University of Western Sydney), on body cues to person recognition.
Professor Akira Uno (University of Tsukuba, Japan) with Dr Ami Sambai, on cognitive mechanisms of reading Japanese and dyslexia in Japanese children.
Professor Daniel Bub (University of Victoria, Canada), on pure alexia.

Professor Stephen Crain
Professor Robert Cowan (HEARing CRC), Professor Liquin Gao, (Beijing Language and Culture University, China), Professor Gen Uehara (Kanazawa Institute of Technology, Japan), Professor Harvey Dillon (National Acoustic Laboratories), Professor Si Fuzhen (Beijing Language and Culture University, China), Professor Shou Wang (Capital Medical University, China), Professor Hong-Yan Bi (Institute of Psychology of Chinese Academy of Science, China), Dr Wen Yu (Haidan Special Education School, China), Professor Fengying Wang (Xuanwu Hospital of Capital Medical University, China) with Associate Professor Blake Johnson, Dr Peng Zhou and Emeritus Professor Max Coltheart, on hearing impairment and language acquisition to develop joint research and clinical projects to be undertaken in partnership with the International Centre of Child Language Health (ICCLH).
Professor Liquin Gao (Beijing Language and Culture University, China) with Associate Professor Rosalind Thornton, on the acquisition of logical words in Mandarin Chinese and in English.
Professor Liquin Gao (Beijing Language and Culture University, China), Professor Gen Uehara (Kanazawa Institute of Technology, Japan) with Associate Professor Blake Johnson, on the development of a child MEG system to be located at Beijing Language and Culture University.

Dr Takuya Goro (Ibaraki University, Japan), on the acquisition of logical words in Japanese and in English.
Ms Wendy Haigh (The Benevolent Society), Associate Professor Jim Patrick (Cochlear Limited) and Dr Cathy Foley (CSIRO) with Associate Professor Blake Johnson, on measuring brain function in disadvantaged children.
HEARing CRC, Sydney Cochlear Implant Centre, National Acoustic Laboratories, Cochlear Limited with Associate Professor Blake Johnson, on the cortical evaluation of implant performance and on cognitive development in children with hearing disorders.
Dr Mitsuru Kikuchi (Kanazawa University, Japan) and Professor Liquin Gao (Beijing Language and Culture University, China) with Associate Professor Blake Johnson, on a collaborative project to study children with autism spectrum disorders using child MEG systems to measure functional brain connectivity.
Dr Chris Roberts (Cochlear Limited), Dr Dimity Doman AO (Hear and Say) with Associate Professor Blake Johnson, on measurement of auditory brain function in children with cochlear implants.
Professor Gen Uehara (Kanazawa Institute of Technology, Japan), Associate Professor Yoshiashi Adachi (Kanazawa Institute of Technology, Japan) with Associate Professor Blake Johnson, on a development of a Real Time Head-Position Monitoring (ReTHM) system for the child MEG system.

Professor Katherine Demuth
Dr Teresa Ching (National Acoustic Laboratories), on the phonetics/phonology of the speech of children with hearing loss.
Dr Michael Frank (Stanford University, USA), on looking at modelling word learning as a function of social interactions.
Dr Mark Harvey (The University of Newcastle), on the articulatory phonology of coronal consonants in English and Arandic languages.
Dr Barbara Höhle (University of Potsdam, Germany), on phonological, morphological and syntactic development in typically developing children and those with hearing loss/ language delay and on eye-tracking methods.
Dr Colleen Holt (The University of Melbourne), on prosodic development in children with Cochlear Implants.
Dr Letitia Naigles (University of Connecticut, USA), on the language system of children with autism.
Dr Varghese Peter (University of Western Sydney), on EEG methods.
Dr Susan Purdy (The University of Auckland, NZ), on the speech of children with hearing loss.
Dr Stefanie Shattuck-Hufnagel (Massachusetts Institute of Technology, USA), on the acoustics and articulation of prosodic and phonological systems in children and adults.
Dr Jae Yung Song (University of Wisconsin, USA), on the acoustics and articulatory organisation of adult and child speech.
Dr Megha Sundara (University of California Los Angeles, USA), on infant speech perception and grammatical morphology across typical, bilingual, specific language impairment (SLI) and hearing loss populations.
Dr Rachel Theodore (University of Connecticut, USA), on phonological and morphological development and effects of phonotactic probability.
Dr Myfany Turpin (The University of Queensland), on the phonology of Arandic languages.
Professor Peter Halligan  
Professor Paolo Bartolomeo (Pitié-Salpêtrière Hospital, France and Catholic University of Sacred Heart, Italy), on neglect.  
Dr Vaughan Bell (King’s College London, UK), on hysteria and hypnosis.  
Dr Quinton Deeley (King’s College London, UK), on suggested limb paralysis.  
Professor David Oakley (University College London, UK), on the neuroscience of hypnosis.

Professor William Hayward  
Professor Roberto Caldara (University of Fribourg, Switzerland), on differences in eye-movements between ethnic groups during face perception.  
Dr Janet Hsiao (University of Hong Kong, Hong Kong), on differences in eye-movements between ethnic groups during face perception.  
Dr Ian Thornton (University of Malta, Malta), on extraction of face information during perception.  
Dr Holger Wiese (Friedrich Schiller University of Jena, Germany), on recollection and familiarity of objects and faces.  
Dr Guomei Zhou (Sun Yat-sen University, China), on the other-race effect in face perception.

Professor John Hodges  
Dr Samrah Ahmed (University of Oxford, UK), on autobiographical memory in the dementias.  
Associate Professor Kirrie Ballard (The University of Sydney), on language studies in dementia.  
Professor Matthew Kiernan (The University of Sydney), on cognition in motor neurone disease.  
Professor Jillian Kril (The University of Sydney) and Professor Glenda Halliday (The University of New South Wales) with Associate Professor Olivier Piguet, on patholgy and anatomy of memory.  
Dr Rupert Noad (Plymouth University, UK), on development of tests of cognition.  
Professor Chris Rowe (The University of Melbourne) with Associate Professor Olivier Piguet, on positron emission tomography (PET) imaging in the dementias.  
Dr Victor Villemagne (The University of Melbourne) with Associate Professor Olivier Piguet, on PET imaging in the dementias.  
Professor Adam Zeman (University of Exeter, UK), on forgetting and memory in epilepsy.  
Dr Christopher Butler (University of Oxford, UK), on memory in epilepsy.  
Dr Agustin Ibáñez (Institute of Cognitive Neurology (INECO), Argentina), on resting state of fMRI studies.  
Associate Professor Simon Lewis (The University of Sydney), on cognition in Parkinson’s disease.  
Dr Sarah McGrory (University of Edinburgh, UK), on statistical analyses of complex cognitive data.  
Dr James Rowe (University of Cambridge, UK), on cognition in frontotemporal dementia.

Associate Professor Blake Johnson  
Associate Professor Douglas Cheyne (University of Toronto and Toronto Hospital for Sick Children, Canada) with Professor Stephen Crain and Professor Maria Teresa Guasti, on the relationship between motor control and rhythm in language comprehension.  
Dr Brian Cornwell (Swinburne University of Technology), on the human hippocampal theta rhythm.  
Dr Dimitry Dornan AO (Hear and Say) and Dr Chris Roberts (Cochlear Limited) with Professor Stephen Crain, on effects of early intervention on auditory brain development in a child with a cochlear implant: A MEG pilot study.  
Dr Michael Hautus (The University of Auckland, NZ), on brain mechanisms of auditory scene analysis.  
Professor Andrew Heathcote and Dr Scott Brown (The University of Newcastle), on acquisition of expertise in spatial imagery.  
Professor Jennifer Hudson (Macquarie University), on neural mechanisms of anxiety in children.  
Associate Professor Frini Karayanidis (The University of Newcastle), on spatio-temporal components of preparation in task-switching.  
Professor Ovid Tzeng (Academia Sinica, Taiwan), Professor Thomas Lee (The Chinese University of Hong Kong, Hong Kong) and Professor Liquan Gao (Beijing Language and Culture University, China) with Professor Stephen Crain, Associate Professor Drew Khlentzos and Associate Professor Rosalind Thornton, on the emergence of logic in child language.  
Professor Ravi Krishan (Purdue University, USA), on brainstem and cortical representation of native and non-native contours in speech sounds.  
Dr Penelope McNulty and Professor Caroline Rae (The University of New South Wales), on imaging of brain recovery after stroke.

Associate Professor Robyn Langdon  
Professor Martin Brüne (Ruhr-University Bochum, Germany), on moral reasoning in schizophrenia.  
Dr Tao Gao (Massachusetts Institute of Technology, USA), on the detection of signals of agency and intent in people with schizophrenia.  
Associate Professor Adam Guastella (The University of Sydney) and Associate Professor Philip Ward (The University of New South Wales), on examining the effect of oxytocin on social cognitive abilities in people with schizophrenia.  
Dr Kate Martin (Macquarie Hospital) and Dr Matthew Large (The University of New South Wales), on misidentification delusions.  
Associate Professor Ulrich Schall, Professor Patricia Michie and Dr Juanita Todd (The University of Newcastle), Assistant Professor Philip Ward (The University of New South Wales) and Dr Helen Stain (Durham University, UK), on identifying predictors of transition to psychotic illness in at-risk young people.  
Dr Olav Nielsen (The University of Sydney) and Dr Matthew Large (The University of New South Wales), on shared delusional beliefs leading to homicide.
**Professor Facundo Manes**
Dr Tristan Bekinschtein (University of Cambridge, UK), on disorders of consciousness.
Professor John Cacioppo and Assistant Professor Stephanie Cacioppo (University of Chicago, USA), on affective neuroscience.
Professor Jean Decety (University of Chicago, USA), on social cognition.
Professor John Duncan (University of Cambridge, UK), on intelligence and the frontal lobes.
Dr Mario Parra (The University of Edinburgh, UK), on Alzheimer’s disease and memory.
Associate Professor Josef Parviz (Stanford University, USA), on electrocorticography (ECoG) and electrical brain stimulation (EBS).
Professor Chris Rorden (University of South Carolina, USA), on neuroimaging.
Associate Professor William Seeley (University of California, San Francisco, USA), on neuroimaging.

**Dr Genevieve McArthur**
Dr Lena Quinto (The University of Sydney) with Dr Britta Biedermann, Dr Yatin Mahajan, Dr Peter de Lissa, Dr Nicholas Badcock, Dr Vince Polito and Dr Michael Connors, on using event-related potentials (ERPs) to examine the effect of meditation on neural correlates of auditory attention.
Dr Johnson Thie (The University of Sydney) with Dr Nicholas Badcock, Dr Peter de Lissa, Dr Betty Mousikou and Dr Yatin Mahajan, on a project converting and validating the EMOTIV gaming EEG system into an ERP system.
Dr Hannah Nash, Professor Charles Hulme (University College London, UK) and Professor Maggie Snowling (University of Oxford, UK) with Dr Yatin Mahajan, on a project using ERPs to investigate the learning of phonemes in the brain.
Dr Varghese Peter (The University of Sydney), on the neural indices of phrase boundaries in English.

**Dr Ryan McKay**
Professor Peter Brugger (University Hospital Zurich, Switzerland), on unrealistic optimism and caloric vestibular stimulation.
Professor Daniel Dennett (Tufts University, USA), on evolution and religion.
Professor Ernst Fehr and Dr Charles Efferson (University of Zurich, Switzerland), on religion and prosocial behaviour and on shared delusions.
Dr Petter Johansson (University College London, UK), on religion and choice blindness.
Professor Ara Norenzayan, Professor Joe Henrich, Dr Jon Lannman and Dr Miriam Mathews (The University of British Columbia, Canada), on ritual and group cohesion.
Professor Bill Swann (The University of Texas at Austin, USA), on identity fusion and ritual.
Professor Harvey Whitehouse (University of Oxford, UK), on religion and morality and on ritual and group cohesion.

**Dr Laurie Miller**
Professor Skye MacDonald (The University of New South Wales), on the effects of focal frontal lobe lesions on communication.
Dr Anna Mitchell (University of Oxford, UK), on the role of the thalamus in memory (comparing human and nonhuman primates).
Associate Professor Armin Mohamed (The University of Sydney and Royal Prince Alfred Hospital), on epilepsy and its relationship to cognition and mood.
Professor Richard Stevenson (Macquarie University), on olfaction, gustation and synaesthesia in patients with focal brain lesions.
Dr Ysbrand van der Werf (VU University Medical Center and Netherlands Institute for Brain Research, The Netherlands), on sleep and cognition in epilepsy.
Associate Professor Else van den Hoven (University of Technology, Sydney), on developing devices to aid memory.
Dr Kathryn Nicholson Perry (Australian College of Applied Psychology), on disorders of sleep in epilepsy.

**Professor Kate Nation**
Dr Victoria Murphy and Professor Stephen Pulman (University of Oxford, UK), on exploring children’s reading via a corpus of reading experience.
Professor Kim Plunkett (University of Oxford, UK), on predicting reading outcomes in school-age children from measures of vocabulary in infancy.
Dr Emily Transcianco (St John’s College, Oxford, UK) and Dr Karin Kukkonen (University of Turku, Finland), on eye movements in literary reading.

**Professor Lyndsey Nickels**
Associate Professor Kirrie Ballard and Ms Dominique Scholl (The University of Sydney), on intervention in aphasia and apraxia of speech.
Dr Wendy Best (University College London, UK) and Professor David Howard (Newcastle University, UK), on common methodological failings in single case study treatment research.
Professor Barbara Höhle (University of Potsdam, Germany), Professor Roelien Bastiaanse (University of Groningen, The Netherlands), Professor David Howard (Newcastle University, UK), Professor Gabriele Miceli (University of Trento, Italy), on the International Doctorate in Experimental Approaches to Language and Brain (IDEALAB) program.
Professor David Howard (Newcastle University, UK), on persistence of activation in the language system.
NHMRC Centre for Clinical Research Excellence in Aphasia Rehabilitation: A large network of national and international aphasia researchers, on developing evidence for better pathways for aphasia rehabilitation.
Professor Brenda Rapp (Johns Hopkins University, USA) with Dr Saskia Kohnen, on the jointly edited special issue of Cognitive Neuropsychology on using intervention to inform cognitive theory.
Professor Niels Schiller (Leiden University, The Netherlands), Dr Antje Lorenz (University of Münster, Germany), Dr Elisabeth Beyersmann (Aix-Marseille University, France) with Dr Britta Biedermann and Dr Nora Fieder, on the representation and processing of grammatical number.
Cathleen Taylor (War Memorial Hospital) with Dr Karen Croot, on intervention for individuals for progressive language disorders.
Dr Elizabeth (Liz) Pellicano
Dr Geoff Bird (King’s College London, UK), on susceptibility to social influence in autism.
Professor David Burr (University of Florence, Italy), on number perception in autism, perceptual adaptation, motion processing and Bayesian decision theory.
Professor Tony Charman (King’s College London, UK), on re-mapping autism research and a feasibility study into an early intervention program for parents of children with autism.
Professor Anthony Costello (University College London, UK), on intervention in autism.
Professor Steven Dakin (University College London, UK), on visual perception in autism.
Dr Kristine Krug (University of Oxford, UK), on social conformity in monkeys, typical children and children with autism.
Mr Ari Ne’eman (Autistic Self Advocacy Network, USA), on ethical and social implications of autism research.
Professor Marc Stears (University of Oxford and the Institute for Public Policy Research, UK), on ethical and social implications of autism research.
Professor Michael Yudell (Drexel University, USA), on social and ethical implications of autism research, and risk communication.

Associate Professor Olivier Piguet
Associate Professor Kay Double (The University of Sydney), on cognition in Parkinson’s disease.
Professor Skye McDonald (The University of New South Wales), on emotion processing in traumatic brain injury.
Professor Alan Pegna (University Hospital of Geneva, Switzerland), on emotion processing in temporal lobe epilepsy.
Associate Professor Åsa Petersén (Lund University, Sweden), on eating behaviour in the dementias.
Professor Katherine Samaras (Garvan Institute of Medical Research), on eating behaviour in frontotemporal dementia.
Dr Marc Sollberger (University Hospital of Basel, Switzerland), on social cognition in major depressive disorders.
Dr Gabrielle Todd (University of South Australia), on cognition in Parkinson’s disease.
Dr Agustin Ibáñez (INECO, Argentina), on neuroimaging in dementia.

Professor Gillian Rhodes
Dr David Alais (The University of Sydney), on ultra-fast face adaptation.
Professor Colin Clifford (The University of New South Wales), on adaptive coding models for face identity and gaze direction.
Professor John Dunn (The University of Adelaide), on processes underlying recognition memory decisions.
Dr Michael Ewbank (Cambridge University, UK), on integrating facial cues and perception of eye gaze and on neural adaptation and autism-spectrum traits.
Dr Ian Stephen (Macquarie University), on morphological correlates of MHC heterozygosity and facial attractiveness and on the effects of exposure to cues of parasite contagion on preferences for skin yellowness in humans.

Dr Larissa Vingilis-Jaremko (McMaster University, Canada), on the effect of early visual deprivation on later judgments of facial attractiveness.
Dr Jeremy Wilmer (Wellesley College, USA), on heritability of face preferences: A twin study.
Dr Mintao Zhao (Max Planck Institute for Biological Cybernetics, Germany), on an other-race effect in face recognition.

Associate Professor Greg Savage
Professor David Ames and the Australian Imaging, Biomarkers and Lifestyle Study of Ageing Research Group, Melbourne and Perth, on understanding the development of Alzheimer’s disease.
Professor David Balota (University of Washington, USA) and Professor Suparna Rajaram (Stony Brook University, USA) with Associate Professor Amanda Barmier and Dr Celia Harris, on collaborative memory.
Dr Samantha Burnham (CSIRO), on statistically-derived measures of cognition for predicting dementia.
Dr Christopher Butler (University of Oxford, UK) and Professor Adam Zeman (University of Exeter, UK), on accelerated forgetting and remote memory impairment in cases of epileptic amnesic syndrome.
Professor Stuart Graham, Dr Mojtaba Golzlan and Dr Carolyn Orr (Macquarie University), on retinal biomarkers of early Alzheimer’s disease.
Dr Nicole Kochan (The University of New South Wales), on early detection of Alzheimer’s disease.
Professor Michael Morgan (Macquarie University), on functional outcome after surgery to aneurysms and arteriovenous malformations.
Professor Dominic Rowe (Macquarie University), on memory functioning in Parkinson’s disease.
Associate Professor Peter Schofield (The University of Newcastle), on olfaction and the early detection of Alzheimer’s disease.

Professor William (Bill) Thompson
Professor Gottfried Shliaug (Harvard Medical School, USA), on music-based interventions for neurological impairment.
Professor Robin Green (Toronto Rehabilitation Institute and University of Toronto, Canada), on the design of wearable devices for individuals with cognitive impairment.
Professor Glenn Schellenberg (University of Toronto, Canada), on research that uncovers shared processes for perceiving music and language.
Dr Fang Liu (University College London, UK), on congenital amusia, a neurodevelopmental disorder that disproportionately affects music perception but may also affect language functions.
Dr Cunmei Jiang (Shanghai Normal University, China), on congenital amusia.

Associate Professor Rosalind Thornton
Dr Hirohisa Kiguchi (Miyagi Gakuin Women’s College, Japan), on children’s interpretation of cleft structures in English.
visitors

Professor David Burr  
Department of Psychology  
University of Florence, Italy  
10 December 2013 - 15 January, The University of Western Australia

Professor Concetta Morrone  
Faculty of Medicine  
University of Pisa, Italy  
6 - 15 January, The University of Western Australia

Associate Professor Chin-Moi Chow  
Faculty of Health Sciences  
The University of Sydney  
15 January, Macquarie University

Mr Timothy English  
Faculty of Health Sciences  
The University of Sydney  
15 January, Macquarie University

Dr Yorgi Mavros  
Faculty of Health Sciences  
The University of Sydney  
15 January, Macquarie University

Professor Ulrike Demske  
Institute for German Studies  
University of Potsdam, Germany  
22 January, Macquarie University

Ms Dagmar Schröder-Huse  
Administration  
Max Planck Institute for the Structure and Dynamics of Matter, Germany  
22 January, Macquarie University

Professor Xiaolin Wang  
Institute for Superconducting and Electronic Materials  
University of Wollongong  
28 January, Macquarie University

Professor Roelien Bastiaanse  
Department of Linguistics  
University of Groningen, The Netherlands  
3 - 14 February, Macquarie University

Professor Ria De Bleser  
Department of Linguistics  
University of Potsdam, Germany  
3 - 14 February, Macquarie University

Professor Barbara Höhle  
Department of Linguistics  
University of Potsdam, Germany  
3 - 14 February, Macquarie University

Professor David Howard  
School of Education, Communication and Language Sciences  
Newcastle University, UK  
3 - 14 February, Macquarie University

Professor Gabriele Miceli  
Department of Psychology and Cognitive Sciences  
University of Trento, Italy  
3 - 14 February, Macquarie University

Dr Stefan Bode  
Melbourne School of Psychological Sciences  
The University of Melbourne  
6 - 7 February, 10 - 12 June, Macquarie University

Professor Jutta Stahl  
Department of Psychology  
University of Cologne, Germany  
6 - 7 February, Macquarie University

Dr Bernd Waldmann  
Cochlear Deutschland GmbH and Co KG, Germany  
6 February, Macquarie University

Dr Joana Cholin  
Department of Linguistics  
University of Bielefeld, Germany  
11 February - 9 March, Macquarie University

Professor Natale Stucchi  
Department of Psychology  
University of Milano-Bicocca, Italy  
11 - 13 February, Macquarie University

Associate Professor Susan Small  
School of Audiology and Speech Sciences  
The University of British Columbia, Canada  
19 February, Macquarie University

Ms Lisa Kurylowicz  
Hear and Say  
24 February, Macquarie University

Associate Professor Alison Lane  
School of Health Sciences  
The University of Newcastle  
28 February, Macquarie University

Dr Dany Adone  
Northern Institute  
Charles Darwin University  
3 March, Macquarie University

Dr Tim Besley, AC  
Macquarie University Foundation Patrons  
10 March, Macquarie University

Associate Professor Tim Hunter  
Institute of Linguistics  
University of Minnesota, USA  
10 March, Macquarie University

Dr Malcolm Irving, AM  
Macquarie Graduate School of Medicine  
10 March, Macquarie University

Dr Robin Litt  
Department of Experimental Psychology  
University of Oxford, UK  
10 March - 31 July, Macquarie University

Professor Andrea Halpern  
Psychology Department  
Bucknell University, USA  
14 March, Macquarie University

Mr Guan-Dong Liu  
Chinese PLA General Hospital, China  
17 March, Macquarie University

Mr Jia-Nan Liu  
Chinese PLA General Hospital, China  
17 March, Macquarie University

Mr Kai Xuan  
Beijing Daohong Investment Management Company Ltd, China  
17 March, Macquarie University

Mr Shi-Ming Yang  
Chinese PLA General Hospital, China  
17 March, Macquarie University

Mr Shi-Tao Zhang  
Chinese PLA General Hospital, China  
17 March, Macquarie University

Mr Yan-Qing Zhang  
Da-Quing Intercontinental Precious Metals Management Company Ltd, China  
17 March, Macquarie University

Professor John Duncan  
MRC Cognition and Brain Sciences Unit  
University of Cambridge, UK  
21 March, Macquarie University

Distinguished Professor Peter Godfrey-Smith  
The Graduate Center  
City University of New York, USA  
21 March, Macquarie University

Professor Kim Sterelny  
College of Arts and Social Sciences  
Australian National University  
21 March, Macquarie University

Professor Fred Adams  
Department of Linguistics and Cognitive Science  
University of Delaware, USA  
26 March - 9 April, Macquarie University
Dr Susanne Ravn
Institute of Sports Science and Clinical Biomechanics
University of Southern Denmark, Denmark
31 March - 4 April, Macquarie University

Dr Elizabeth Irvine
Philosophy Department
University of Cardiff, UK
4 April, Macquarie University

Dr Jia-Nan Li
General People's Liberation Army Hospital, China
4 April, Macquarie University

Dr Myfany Turpin
School of Languages and Comparative Cultural Studies
The University of Queensland
15 April, Macquarie University

Associate Professor Yoshiaki Adachi
Applied Electronics Laboratory
Kanazawa Institute of Technology, Japan
21 - 22 April, 24 - 27 November, Macquarie University

Associate Professor Daisuke Oyama
Applied Electronics Laboratory
Kanazawa Institute of Technology, Japan
21 - 22 April, 24 - 27 November, Macquarie University

Ms Wanyu Li
Rehabilitation Services
Khoo Teck Puat Hospital, Singapore
28 April - 30 May, The University of New South Wales

Dr Trevor Clark
Autism Spectrum Australia
29 April, Macquarie University

Dr Molly de Lemos
Learning Difficulties Australia
29 April, Macquarie University

Mr Bill Gye, OAM
Schizophrenia Fellowship of NSW
29 April, Macquarie University

Professor Greg Leigh
Renwick Centre, Royal Institute for Deaf and Blind Children
29 April, Macquarie University

Ms Alison McMurtrie
Learning Difficulties Australia
29 April, Macquarie University

Mr Brendan Moore
Alzheimer's Australia NSW
29 April, Macquarie University

Adjunct Professor Jim Patrick
Cochlear Limited
29 April, Macquarie University

Professor Leanne Togher
Faculty of Health Sciences
The University of Sydney
29 April, Macquarie University

Dr Erich Round
School of Languages and Comparative Cultural Studies
The University of Queensland
2 May, Macquarie University

Professor Judy Iles
Brain Research Centre and Vancouver Coastal Health Research Institute
University of British Columbia, Canada
2 May - 8 May, The University of Sydney

Professor Robyn Fivush
Department of Psychology
Emory University, USA
5 - 9 May, Macquarie University

Associate Professor Yukari Hirata
Center for Language and Brain
Colgate University, USA
19 May, Macquarie University

Professor Spencer Kelly
Center for Language and Brain
Colgate University, USA
19 May, Macquarie University

Dr Jennifer Watson
Department of Communication Sciences and Disorders
Texas Christian University, USA
20 May, Macquarie University

Dr Elaine Corbett
Melbourne School of Psychological Sciences
The University of Melbourne
10 - 12 June, Macquarie University

Distinguished Professor Jerrold Levinson
University of Maryland, USA
15 - 22 June, Macquarie University

Professor Chris Davis
The MARCS Institute
University of Western Sydney
25 June, Macquarie University

Professor David Patterson
Departments of Rehabilitation Medicine, Surgery and Psychology
University of Washington, USA
25 June, Macquarie University

Professor Maria Victoria Sanchez-Vives
The August Pi i Sunyer Biomedical Research Institute
Catalan Institution for Research and Advanced Studies, Spain
3 July, Macquarie University

Professor Mel Slater
Catalan Institution for Research and Advanced Studies
University of Barcelona, Spain
3 July, Macquarie University

Associate Professor Simon Carlile
Department of Physiology
The University of Sydney
4 July, Macquarie University

Associate Professor Douglas Cheyne
Department of Medical Imaging
University of Toronto, Canada
11 - 26 July, Macquarie University

Left to right: Dr Alexandra Woolgar, Professor John Duncan (MRC Cognition and Brain Sciences Unit, UK), Associate Professor Anina Rich and Professor Mark Williams

ARC centre of excellence in cognition and its disorders

Professor David Patterson
(University of Washington, USA)
Dr Uli Sauerland  
Center for General Linguistics  
ZAS Berlin, Germany  
10 - 11 July, Macquarie University

Ms Bronwyn Copeland  
Bay of Plenty District Health Board, Tauranga, NZ  
14 - 16 July, The University of New South Wales

Ms Gaylene Delaney  
Bay of Plenty District Health Board, Tauranga, NZ  
14 - 16 July, The University of New South Wales

Dr Susan Bruck  
Autism Spectrum Australia  
15 July, Macquarie University

Dr Devin Terhune  
Department of Experimental Psychology  
University of Oxford, UK  
21 July - 1 August, Macquarie University

Professor Zoltan Dienes  
School of Psychology  
University of Sussex, UK  
22 - 24 July, Macquarie University

Professor Michael Rugg  
School of Behavioral and Brain Sciences  
The University of Texas at Dallas, USA  
23 - 25 July, The University of New South Wales

Dr Marcus Johnson  
SR Research Limited, Canada  
7 August, Macquarie University

Professor Viorica Marian  
Department of Communication Sciences and Disorders  
Northwestern University, USA  
7 - 8 August, Macquarie University

Professor Theo Marinis  
School of Psychology and Clinical Language Sciences  
University of Reading, UK  
7 - 8 August, Macquarie University

Professor Jason Rothman  
School of Psychology and Clinical Language Sciences  
University of Reading, UK  
7 - 8 August, 18 - 22 August, Macquarie University

Professor Jyotsna Vaid  
Department of Psychology  
Texas A&M University, USA  
7 - 8 August, Macquarie University

Dr Michelle Jarick  
Department of Psychology  
MacEwan University, Canada  
8 - 28 August, Macquarie University

Dr Josephine Terry  
The MARCS Institute  
University of Western Sydney  
8 August, Macquarie University

Dr Ema Sullivan-Bissett  
Department of Philosophy  
University of York, UK  
18 August - 12 September, Macquarie University

Dr Erik Chang  
Institute of Cognitive Neuroscience  
National Central University, Taiwan  
19 - 21 August, Macquarie University

Professor Daisy Hung  
Institute of Cognitive Neuroscience  
National Central University, Taiwan  
19 - 21 August, Macquarie University

Ms Rose Ru-Whui Lee  
Institute of Linguistics  
Academia Sinica, Taiwan  
19 - 21 August, Macquarie University

Professor Ovid Tzeng  
Institute of Linguistics  
Academia Sinica, Taiwan  
19 - 21 August, Macquarie University

Associate Professor Denise Wu  
Institute of Cognitive Neuroscience  
National Central University, Taiwan  
19 - 21 August, Macquarie University

Professor Jason Mattingley  
Queensland Brain Institute  
The University of Queensland  
21 - 22 August, Macquarie University

Associate Professor Lucrecia Rallo Fabra  
Department of Spanish, Modern and Classical Philology  
University of the Balearic Islands, Spain  
27 August, Macquarie University

Professor James Chapman  
Institute of Education  
Massey University, NZ  
4 September, Macquarie University

Distinguished Professor William Tunmer  
Institute of Education  
Massey University, NZ  
4 September, Macquarie University

Dr Daniela Sammler  
Otto Hahn Group - Neural Bases of Intonation in Speech  
Max Planck Institute for Human Cognitive and Brain Sciences, Germany  
5 September, Macquarie University

Dr Lizhen Qu  
Research School of Computer Science  
Australian National University  
15 September, Macquarie University

Professor Daniel Bub  
Department of Psychology  
University of Victoria, Canada  
24 September - 31 March 2015, Macquarie University

Dr Gholarreza (Reza) Haffari  
Faculty of Information Technology  
Monash University  
25 September, Macquarie University

Associate Professor Hirohisa Kiguchi  
Department of Cultural Studies  
Miyagi Gakuin Women’s University, Japan  
29 September - 3 October, Macquarie University

Ms Marie Gorman  
Alzheimer's Australia NSW  
1 October, The University of New South Wales

Ms Melissa Kettle  
The Australian Fronto-Temporal Dementia Association  
1 October, The University of New South Wales

Dr Victoria Leong  
Department of Psychology  
University of Cambridge, UK  
2 October, Macquarie University

2014 annual report
Dr Christopher Butler  
Nuffield Department of Clinical Neurosciences  
University of Oxford, UK  
13 - 14 October, Macquarie University  
15, 17 - 18 October, The University of New South Wales

Dr Loren Mowsgowski  
Brain and Mind Research Institute  
The University of Sydney  
17 - 18 October, The University of New South Wales

Professor David Perrett  
School of Biology  
University of St Andrews, UK  
13 November, Macquarie University

Professor David Poeppel  
Department of Psychology, New York University, USA and Max Planck Institute for Empirical Aesthetics, Germany  
17 - 21 November, Macquarie University

Professor Greg Hickok  
School of Social Science  
University of California Irvine, USA  
20 - 21 November, Macquarie University

Professor Norman Brown  
Department of Psychology  
University of Alberta, Canada  
24 November - 8 December, Macquarie University

Dr Jason Warren  
National Hospital for Neurology and Neurosurgery  
University College London Hospitals, UK  
24 November - 1 December, The University of New South Wales  
2 December, Macquarie University

Professor Yasuhiro Haruta  
Applied Electronics Laboratory  
Kanazawa Institute of Technology, Japan  
25 - 27 November, Macquarie University

Professor Harvey Whitehouse  
Institute of Social and Cultural Anthropology  
University of Oxford, UK  
1 - 6 December, Macquarie University

Professor Tian Hong  
Speech Pathology Department  
China Rehabilitation Research Centre, China  
10 December, Macquarie University

Professor Liquin Gao  
School of Language Science  
Beijing Language and Culture University, China  
10 December, Macquarie University

Professor Yuming Li  
Chairman of the University Council  
Beijing Language and Culture University, China  
10 December, Macquarie University

Professor Yan Zhai  
College of Preparatory Training  
Beijing Language and Culture University, China  
10 December, Macquarie University

Professor Baqjun Zhang  
Department of International Cooperation and Exchanges  
Beijing Language and Culture University, China  
10 December, Macquarie University

Dr Samuel Cheadle  
Department of Experimental Psychology  
University of Oxford, UK  
12 December, The University of Western Australia

Ms Pernille Brondum  
Department of Health Science and Technology  
University of Aalborg, Denmark  
26 August 2013 - 15 January, Macquarie University

Mr Michael Holt  
Department of Health Science and Technology  
University of Aalborg, Denmark  
26 August 2013 - 15 January, Macquarie University

Ms Mareike Morromann  
RWTH Aachen University, Germany  
15 October 2013 - 15 January, Macquarie University

Ms Elena Pagliarini  
Department of Psychology  
University of Milano-Bicocca, Italy  
1 September 2013 - 1 November, Macquarie University

Ms Michelle Mostard  
Department of Psychology and Education  
Radboud University, The Netherlands  
6 January - 27 March, Macquarie University

Left to right: Professor Greg Hickok (University of California Irvine, USA), Professor Stephen Crain and Professor David Poeppel (New York University, USA and Max Planck Institute for Empirical Aesthetics, Germany)

With National Central University and Academia Sinica delegates from Taiwan
Ms Steffie Bunk  
Department of Neurosciences  
VU University Amsterdam, The Netherlands  
1 February – 30 June, The University of New South Wales

Ms Nicole Gotzner  
Centre for General Linguistics  
ZAS Berlin, Germany  
3 February – 31 May, Macquarie University

Mr Rasmus Gahrn-Andersen  
Institute for Language and Communication  
University of Southern Denmark, Denmark  
9 February – 31 May, Macquarie University

Ms Lina Teichmann  
Department of Psychology  
University of Groningen, The Netherlands  
12 February – 1 August, Macquarie University

Ms Inga Hameister  
Department of Literature, Linguistics and Philosophy  
RWTH Aachen University, Germany  
4 March – 3 August, Macquarie University

Ms Leonie Franken  
Department of Psychology  
University of Amsterdam, The Netherlands  
10 March – 31 July, Macquarie University

Mr Andrew Thwaites  
Cambridge Language Sciences  
University of Cambridge, UK  
14 March, Macquarie University

Ms Lisa Bruckert  
Department of Experimental Psychology  
Oxford University, UK  
15 April, Macquarie University

Ms Teagan Williams-Chen  
MLC School Burwood  
16 April, The University of Sydney

Mr Johnny Schmalz  
Duval High School, Armidale  
2 – 6 June, Macquarie University

Ms Trine Sonne  
Department of Psychology and Behavioural Sciences  
Aarhus University, Denmark  
9 – 22 June, Macquarie University

Mr Nay San  
School of Languages and Comparative Cultural Studies  
The University of Queensland  
30 June, Macquarie University

Mr William Comfort  
Center for Mathematics, Computation and Cognition  
Federal University of ABC, Brazil  
9 – 25 July, The University of Western Australia

Ms Amy Robson  
Tara Anglican High School  
14 – 18 July, Macquarie University

Ms Anastasia Ulicheva  
Division of Speech and Hearing Sciences  
University of Hong Kong, Hong Kong  
28 July – 7 September, Macquarie University

Ms Heather Payne  
Deafness Cognition and Language Research Centre  
University College London, UK  
6 August – 9 September, Macquarie University

Ms Federica Degno  
Department of Psychology  
University of Southampton, UK  
8 August – 7 October, Macquarie University

Mr Roderick Gawthrop  
Department of Psychology  
Macquarie University  
9 September – 9 December, Macquarie University

Ms Selena Ledger  
Department of Psychology  
Macquarie University  
9 September – 9 December, Macquarie University

Ms Sarah Griffith  
School of Experimental Psychology  
University of Bristol, UK  
29 September – 22 December, The University of Western Australia

Ms Sira Määttä  
Department of Psychology  
University of Jyväskylä, Finland  
7 – 10 October, Macquarie University

Mr Simon Hoffding  
Center for Subjectivity Research  
University of Copenhagen, Denmark  
3 November – 24 January 2015, Macquarie University

Ms Patricia Palacio  
Macquarie University  
3 November – 12 December, Macquarie University

Ms Lydia Barnes  
Southern Cross University - Coffs Harbour  
4 November – 12 December, Macquarie University

Ms Julia Forkgen  
North Sydney Girls High School  
10 – 14 November, Macquarie University

Ms Clare Sutherland  
Department of Psychology  
University of York, UK  
10 – 14 November, The University of Western Australia

With Beijing Language and Culture University delegation from China  
2014 annual report
Ms Ai-Suan Lee  
School of Psychology  
University of Nottingham, Malaysia  
17 - 28 November, Macquarie University

Ms Belinda Craig  
Department of Psychology  
The University of Queensland  
20 November, The University of Western Australia

Ms Ruth Savage  
Department of Psychology  
The University of Queensland  
20 November, The University of Western Australia

Mr Ethan Noble-Green  
Dulwich High School of Visual Arts and Design  
24 - 28 November, Macquarie University

Ms Cat Jones  
SymbioticA, School of Anatomy and Physiology  
The University of Western Australia  
27 November, The University of Western Australia

Mr Iain Giblin  
Department of Linguistics and Philosophy  
Massachusetts Institute of Technology, USA  
2 - 5 December, Macquarie University

centre visits

Associate Professor Michelle Meade  
Department of Psychology  
Montana State University, USA  
2 September 2013 - 17 July, Macquarie University

Professor Maria Teresa Guasti  
Department of Psychology  
University of Milano-Bicocca, Italy  
10 - 21 February, Macquarie University

Associate Professor Drew Khlentzos  
School of Behavioural, Cognitive and Social Sciences  
University of New England  
14 February, 8 August, 17-21 November, Macquarie University

Associate Professor Olivier Piguet  
Neuroscience Research Australia  
The University of New South Wales  
17 February, 12 May, 24 June, 1 July, 19 - 21 August, 15 September, 4 November, Macquarie University

Emeritus Professor Brian Byrne  
School of Behavioural, Cognitive and Social Sciences  
University of New England  
29 April, 19-21 August, 15 September, Macquarie University

Associate Professor Romina Palermo  
School of Psychology  
The University of Western Australia  
29 April, Macquarie University

Ms Sharon Savage  
Neuroscience Research Australia  
The University of New South Wales  
29 April, 15 September, Macquarie University

Professor Stephen Crain  
Department of Linguistics  
Macquarie University  
21 May, 24 July, The University of New South Wales  
8 - 10 June, 27 -28 October, The University of Western Australia

Professor Ken Forster  
Department of Psychology  
University of Arizona, USA  
2 June - 5 July, Macquarie University

Dr Ian Stephen  
Department of Psychology  
Macquarie University  
25 - 27 June, The University of Western Australia

Professor Naama Friedmann  
School of Education and Sagol School of Neuroscience  
Tel Aviv University, Israel  
28 July - 31 August, Macquarie University

Dr Agustín Ibáñez  
Laboratory of Experimental Psychology and Neuroscience Institute of Cognitive Neurology (INECO), Argentina  
18 - 19 August, The University of New South Wales

Professor Mabel Rice  
Department of Speech, Language and Hearing  
The University of Kansas, USA  
18 - 24 August, Macquarie University

Professor William Hayward  
School of Psychology  
The University of Auckland, NZ  
19 August, 15 September, Macquarie University

Dr Muiireann Irish  
Neuroscience Research Australia  
The University of New South Wales  
15 September, Macquarie University

Dr Linda Jeffery  
School of Psychology  
The University of Western Australia  
15 September, Macquarie University

Dr Fiona Kumfor  
Neuroscience Research Australia  
The University of New South Wales  
15 September, Macquarie University

Dr Markus Neumann  
School of Psychology  
The University of Western Australia  
15 September, Macquarie University

Ms Nichola Burton  
School of Psychology  
The University of Western Australia  
15 September, Macquarie University

Mr Yongzhi Foo  
School of Psychology  
The University of Western Australia  
15 September, Macquarie University

Mr Sicong Tu  
Neuroscience Research Australia  
The University of New South Wales  
15 September, Macquarie University

Dr Lisa Yen  
Department of Cognitive Science  
Macquarie University  
10 September, The University of New South Wales

Ms Monica Brockmyre  
Department of Psychology and Human Development Institute of Education, University of London, UK  
27 October, The University of Western Australia

Dr Elizabeth (Liz) Pellicano  
Department of Psychology and Human Development Institute of Education, University of London, UK  
27 October, The University of Western Australia


Hayward, W. (11 September). Politicians at face value. ONE News NZ.

Hayward, W. (5 November). It’s research, not racist. TVNZ.

Hodges, J. (13 July). ACEmobile app. WIN Television.


Johnson, B. (11 June). Medical researchers in AUS have developed brain scan technology for people with Cochlear implants. SBS World News Australia.

Johnson, B. (11 June). Cochlear implants have been changing lives for decades but now scientists will be able to see what effect Cochlear implants have on the brain. Channel 9 Darwin.

Johnson, B. (11 June). For the first time, scientists will be able to see what effect Cochlear implants have on the brain. WIN Hobart.

Johnson, B. (11 June). Cochlear implants have been changing lives for decades but now scientists will be able to see what effect Cochlear implants have on the brain. Channel 9 Sydney.

Johnson, B. (11 June). Scientists will now be able to see the impact that Cochlear implants have on the brain. Channel 9 Brisbane.

Johnson, B. (11 June). Cochlear implants have been changing people’s lives for years, but now, scientists will be able to see what effects they have on the brain. SKY News Australia.


Johnson, B., & Crain, S. (11 June). Cochlear implants have changed countless lives but the incredible technology is not an exact science. Channel Ten: Ten Play.

Johnson, B., & Crain, S. (11 June). Cochlear implants have changed countless lives but the incredible technology is not an exact science. Channel 10 Sydney.

McKay, R. (1 November). Delusional interference. Facultimedia.


Thompson, W. (17 April). Interview about what type of music is most likely to make us dance. ABC News 24.


Barnier, A. (7 January). Interview about childhood holidays and reflecting on past experiences. 2UE Drive.

Barnier, A. (16 April). Interview about the Oscar Pistorious trial. SKY News Australia.

Barnier, A. (16 April). Interview about the Oscar Pistorious trial. ABC Ballarat Mornings.

Barnier, A. (1 August). Remembering one’s PIN. 5AA, Adelaide, News Hour.


Barnier, A. (21 November). Interview about memory. ABC Central Coast.

Barnier, A. (22 November). Interview about memory. ABC 774 Melbourne.


Castles, A. (17 June). Interview with Professor Anne Castles about
research into dyslexia. 936 ABC Hobart, Statewide Mornings.

Cox, F. (26 March). Interview about the Australian accent and language. 4BC Drive.

Cox, F. (25 November). Interview about accents. 891 ABC Adelaide.


Hodges, J. (30 June). Interview about dementia and why some people can be more resilient than others. 702 ABC Sydney.


Hodges, J. (10 July). Interview about dementia and why some people can be more resilient than others. 702 ABC Sydney.


Marsh, P. & Green, M. (9 May). Brain training for mental illness. ABC All In The Mind.


Piguet, O. (1 August). Synaesthesia. ABC Classic FM.


Barnier, A. (24 December). ‘Remember when we...?’ Why sharing memories is soul food. The Conversation.

Barnier, A. (25 December). ‘Remember when we...?’ Why sharing memories is soul food. The Epoch Times.


Bell, J. (28 September). Ecstasy use affects ability to detect faces, shapes and patterns. Science Network Western Australia.

Bishop, D. (3 July). No logic in King’s College job cuts. Times Higher Education.


Barnier, A. (3 October). Mind change: Susan Greenfield has a big idea, but what is it? The Guardian.

Barnier, A. (16 November). In the mind? The role of neuroscience in education. Euronews.


Should we do away with ‘dyslexia’?

Professor Anne Castle’s article in The Conversation


Castles, A. (24 March). Technology is the key to the ABCs. Nick Jr Parents.


Castles, A., & McArthur, G. (19 August). ‘Brain-training’… or learning as we like to call it. The Learning Staircase.


Cox, R. (3 July). Hypnosis: The day my mind was ‘possessed’. BBC Future.


Crain, S. (5 May). Hearing technologies could play important role in delaying dementia. The Hearing Review.

Crain, S. (9 May). Hearing technologies could play an important role in delaying dementia. Audiology Worldnews.


Crookes, K. (1 December). Familiar faces to young and old. UWA News.


Duchaine, B. (7 October). Inability to recognize voices confirmed. Yale Daily News.


Farina, M., & Williams, M. (7 March). Blind people can see bodies with sound: Study. The Conversation.


Hodges, J. (13 May). The five key messages of ‘dementia friends’. Living Well with Dementia.


Hodges, J. (1 July). Dementia patient Christine Bryden continues to baffle doctors 20 years after diagnosis. ABC News.
Hodges, J. (1 July). Dementia patient Christine Bryden continues to battle doctors 20 years after diagnosis. Yahoo 7 News.


Hodges, J. (10 July). Dementia assessment iPad App launched for health professionals. Alzheimer’s Australia Dementia Research Foundation.


Hodges, J. (11 July). ACEmobile app. Insider Media Ltd.


Hodges, J. (16 July). iPad version of ACE dementia test automatically calculates scores. Pulse it.


Hodges, J. (1 September). Free app to support the assessment of dementia. Research Australia Grassroots.

Hodges, J. (3 October). Curiosity puts brain in state to learn. ABC Science.


Johnson, B. (11 June). Wally Lewis’ daughter participates in world-first study of cochlear implants. WA Today.


Kumfor, F. (3 October). Curiosity in a person’s brain creates desire to learn and improves retention, study suggests. University Herald.

Kumfor, F. (3 October). Curiosity changes the brain to boost memory and learning. The Conversation.


Leivers, S. (15 October). Looking through your girlfriend’s phone? You may have bigger problems than jealousy. Men’s Health.


MEG Lab (7 October). Famous Lewis child participates in world-first study of cochlear implants. Sydney Morning Herald.


Palermo, R. (6 August). Trust is unconsciously determined, thanks to the amygdala: Study. The Conversation.


Piguet, O. (10 July). Scientists working on brain implant to restore lost memory. Nine MSN.

Piguet, O. (22 December). Eating more carbs may signal frontotemporal dementia. Medscape.
outputs
hosted seminars

* From the jointly supported CLaS-CCD Research Colloquium Series

Perspectives on human action monitoring mechanisms: May the response force be with you.
Professor Jutta Stahl
Department of Psychology
University of Cologne, Germany
7 February, Macquarie University

The acoustic change complex in infants: Does it have potential as a tool to assess speech discrimination in clinical populations? *
Assistant Professor Susan Small
School of Audiology and Speech Sciences
The University of British Columbia, Canada
19 February, Macquarie University

Which levels of language are mostly affected in children with SLI and in children with developmental dyslexia?
Professor Maria Teresa Guasti
Department of Psychology
University of Milano-Bicocca, Italy
21 February, Macquarie University

Syllables in speech production: Storage versus computation.
Dr Joana Cholin
Linguistics and Literary Studies
Bielefeld University, Germany
28 February, Macquarie University

Therapy with children with word-finding difficulties: Use of a cueing aid and a comparison between interventions.
Professor Wendy Best
Communication Science and Language Therapy
University College London, UK
28 February, Macquarie University

Memory for music and art in Alzheimer’s disease.
Professor Andrea Halpern
Department of Psychology
Bucknell University, USA
14 March, Macquarie University

How do brains encode auditory information? A new method for examining the E/MEG correlates of language stimuli that are extended in time.
Mr Andrew Thwaites
Department of Theoretical and Applied Linguistics
University of Cambridge, UK
14 March, Macquarie University

Dual-inheritance models of cultural transmission. *
Distinguished Professor Peter Godfrey-Smith
The Graduate Center
City University of New York, USA
Professor Kim Sterelny
College of Arts & Social Sciences
Australian National University
19 March, Macquarie University

A core brain system in assembly of cognitive episodes.
Professor John Duncan
MRC Cognition and Brain Sciences Unit
University of Cambridge, UK
21 March, Macquarie University

Imageability and verb learning.
Dr Weiyi Ma
Department of Cognitive Science
Macquarie University
28 March, Macquarie University

Facial shape predicts aspects of health: A geometric morphometric modeling study.
Dr Ian Stephen
Department of Psychology
Macquarie University
26 June, The University of Western Australia

Compensatory allocation to mate guarding and ejaculate quality in men.
Ms Samantha Leivers
School of Psychology
The University of Western Australia
26 June, The University of Western Australia

The power of the brain over pain: Virtual reality, hypnosis and eastern philosophy.
Professor David Patterson
Department of Rehabilitation Medicine, Surgery and Psychology
University of Washington, USA
25 June, Macquarie University

The ghosts of syllables parsed: Verse design in traditional Aboriginal songs. *
Dr Myfany Turpin
School of Languages and Comparative Cultural Studies
The University of Queensland
15 April, Macquarie University

Linguistics in the age of biostatistics: How data properties matter, and the case of Bayesian clustering.
Dr Erich Round
School of Languages and Comparative Cultural Studies
The University of Queensland
2 May, Macquarie University

Offering a hand to language understanding and to understanding language.
Professor Spencer Kelly and Associate Professor Yukari Hirata
Center for Language and Brain
Colgate University, USA
19 May, Macquarie University

Facial shape predicts aspects of health: A geometric morphometric modeling study.
Dr Ian Stephen
Department of Psychology
Macquarie University
26 June, The University of Western Australia

Compensatory allocation to mate guarding and ejaculate quality in men.
Ms Samantha Leivers
School of Psychology
The University of Western Australia
26 June, The University of Western Australia

The power of the brain over pain: Virtual reality, hypnosis and eastern philosophy.
Professor David Patterson
Department of Rehabilitation Medicine, Surgery and Psychology
University of Washington, USA
25 June, Macquarie University
Embodied representation of tool-use verbs and hand action verbs.
Dr Jie Yang
Department of Cognitive Science
Macquarie University
27 June, Macquarie University

Acoustic correlates of stress in Kaytetye words. *
Nay San
School of Languages and Comparative Cultural Studies
The University of Queensland
30 June, Macquarie University

Active listening: Speech intelligibility in cocktail party listening.
Associate Professor Simon Carlile
Department of Physiology
The University of Sydney
4 July, Macquarie University

How do we understand meaning within a face?
Mr William Comfort
Center of Mathematics, Computation and Cognition
Federal University of ABC, Brazil
10 July, The University of Western Australia

Extending the learnability driven language evolution model: Coordination and subordination compositionality.
Dr Uli Sauerland
Center for General Linguistics Zentrum fur Allgemeine Sprachwissenschaft (ZAS), Germany
11 July, Macquarie University

Think fast! The role of automaticity in the cognitive control of action.
Associate Professor Douglas Cheyne
Department of Medical Imaging
University of Toronto, Canada
18 July, Macquarie University

Using Bayes to get the most out of null results.
Professor Zoltan Dienes
School of Psychology
University of Sussex, UK
23 July, Macquarie University

Bayes and the credibility crisis in psychology.
Professor Zoltan Dienes
School of Psychology
University of Sussex, UK
23 July, Macquarie University

The cognitive neuroscience of age-related memory decline: Evidence from fMRI.
Professor Michael Rugg
School of Behavioral and Brain Sciences
The University of Texas at Dallas, USA
24 July, The University of New South Wales

Why staring is a contest.
Ms Michelle Jarick
Department of Psychology
MacEwan University, Canada
15 August, Macquarie University

1. The effects of content-and-language-integrated-learning on Spanish-Catalan EFL learners’ fluency and pronunciation. *
2. An acoustic study of vowel reduction by Spanish-English early and late bilinguals. *
Associate Professor Lucrecia Rallo Fabra
Department of Spanish, Modern and Classical Philology
University of the Balearic Islands, Spain
27 August, Macquarie University

Syntactic difficulties of children with hearing impairment: The critical role of the critical period for syntax.
Professor Naama Friedmann
School of Education and Sagol School of Neuroscience
Tel Aviv University, Israel
29 August, Macquarie University

Neural pathways for prosody.
Dr Daniela Sammler
Max Planck Institute for Human Cognitive and Brain Sciences, Germany, and Institute of Neuroscience and Psychology, University of Glasgow, UK
5 September, Macquarie University

Using virtual reality to investigate the neural mechanisms of social interaction.
Mr Nathan Caruana
Department of Cognitive Science
Macquarie University
12 September, Macquarie University

Deep learning for fine-grained text analysis. *
Dr Lizhen Qu
Research School of Computer Science
Australian National University
15 September, Macquarie University

Studying the effect of syntactic and lexical complexity in magnetoencephalography data.
Mr Mehdi Parviz
Department of Computing
Macquarie University
16 September, Macquarie University

Implicit learning of complex auditory temporal structures with even and uneven meters.
Dr Josephine Terry
MARCS institute
University of Western Sydney
19 September, Macquarie University

Graph-based semi-supervised learning for structured prediction: The case of machine translation. *
Dr Gholamreza (Reza) Haffari
Faculty of Information Technology
Monash University
25 September, Macquarie University

Laryngeal assimilation, markedness and typology.
Dr Jason Brown
Applied Language Studies and Linguistics
The University of Auckland, NZ
30 September, Macquarie University

When context, intonation and tone come to mind. *
Carmen Kung
Department of Linguistics
Macquarie University
15 October, Macquarie University

Quantifying rhythm development, and the role of prosodic heads and edges in rhythm acquisition of simultaneous bilinguals. *
Dr Elaine Schmidt
Department of Linguistics
Macquarie University
22 October, Macquarie University

Bilingual aphasias: Language switching and selection, cross-language generalisation and implications for bilingual control.
Dr Amanda Miller Amberber
Faculty of Health Sciences Australian Catholic University
31 October, Macquarie University

First impressions of faces: Dimensions and categories.
Ms Clare Sutherland
Department of Psychology
University of York, UK
13 November, The University of Western Australia

Three challenges for the neuroscience of language: The maps problem, the mapping problem, and the timing problem. *
Professor David Poeppel
Department of Psychology, New York University, USA and Max Planck Institute for Empirical Aesthetics, Germany
18 November, Macquarie University

Other faces impose context on the processing of multiple face cues.
Ms Belinda Craig
Department of Psychology
The University of Queensland
20th of November, The University of Western Australia

What Broca’s area is and isn’t doing for language and cognitive processing. *
Professor Greg Hickok
School of Social Science, University of California Irvine, USA
20 November, Macquarie University
Eye tracking and search for emotional expressions.
Ms Ruth Savage
Department of Psychology, The University of Queensland
20 November, The University of Western Australia

Transition theory: An almost completely selfless, goalless account of autobiographical memory.
Professor Norman Brown
Department of Psychology, University of Alberta
28th November, Macquarie University

Dementia and the auditory brain.
Professor Jason Warren
Institute of Neurology, University College London, UK
2 December, Macquarie University

Adaptive gain control during human perceptual choice.
Dr Samuel Cheadle
Department of Experimental Psychology, University of Oxford, UK
12 December, The University of Western Australia

publications
Belief Formation Program

Books

Book Chapters


Periodicals


**Language Program**

**Books**


**Book Chapters**


**Periodicals**


Yang, H., Ma, W., Gong, D., & Yao, D. (2014). A longitudinal study on children’s music training experience and academic development. Scientific Reports, 4, 5854. doi:10.1038/srep05854


**Published Conference Proceedings**


2014 annual report
**Memory Program**

**Books**


**Book Chapters**


**Periodicals**


**Person Perception Program**

**Book Chapters**


Periodicals


Published Conference Proceedings


Reading Program

Books


Book Chapters


Periodicals


Published Conference Proceedings


Perception in Action Program

Book Chapters


Periodicals


Finkbeiner, M., & Coltheart, M. (2014). Dismissing subliminal perception because of its famous problems is classic ‘baby with the bathwater’. Behavioral and Brain Sciences, 37, 45-61. doi:10.1017/S0140525X13000708


Other programs

Books


Book Chapters


Periodicals


Deconvolution of magnetic Acoustic Change Complex (mACC). Clinical Neurophysiology. doi:10.1016/j.clinph.2014.03.003


Published Conference Proceedings


keynote and invited papers


Marsh, P., & Polito, V. (2014, March). Assessment of social cognitive impairments in schizophrenia. Presentation given at the Half-day Training Workshop on SoCog: Early Psychosis Intervention Team (EPI), Community Child and Youth Mental Health Services (CYMHS), Penrith.
Marsh, P., & Polito, V. (2014, March). Results from two efficacy studies of SoCog. Presentation given at the Half-day Training Workshop on SoCog: Early Psychosis Intervention Team (EPI), Community Child and Youth Mental Health Services (CYMHS), Penrith.
Macquarie University, Sydney.
Morris, T. (2014, August). Cognitive discrepancy analysis in the detection of individuals at-risk for Alzheimer’s disease. Invited presentation given at the Knight Alzheimer’s Disease Research Centre, Washington University School of Medicine, St Louis, USA.
Nickels, L. (2014, August). Efficacy of treatments for progressive aphasias. Presentation given at the Speech Pathology Australia NSW Adult Neurogenic Communication Disorders Interest Group, Concord Hospital, Sydney.
Polito, V., & Marsh, P. (2014, March). How to improve social cognitive impairments in schizophrenia with a focus on SoCog. Presentation given at the Half-day Training Workshop on SoCog: Early Psychosis Intervention Team (EPI), Community Child and Youth Mental Health Services (CYMHS), Penrith.

awards | recognition | grants

awards

Professor Amanda Barnier
Macquarie University Research Excellence Awards: Highly Commended for the Jim Piper Award for Excellence in Research Leadership

Catherine Browning
Macquarie University Medal in Psychology
Macquarie University Postgraduate Research Fund Deputy Vice Chancellor’s Commendation
Australian Psychological Society Prize for 2013

Nathan Caruana
CCD Annual Workshop Highly Commended Poster Award

Professor Anne Castles
Distinguished Professor, Macquarie University

Aline Cordonnier
CCD “Memory in the Treetops” Workshop Best Student Presentation Award

Amy Dawel
CCD Annual Workshop Highly Commended Poster Award

Professor Katherine Demuth
Distinguished Professor, Macquarie University

Mirko Farina
Macquarie University Faculty of Human Sciences Higher Degree Research Excellence Award
Macquarie University Award for Excellence in Higher Degree Research – Social Sciences, Business & Humanities: “Foundations for a psycho-historical, socio-technologically scaffolded theory of cultural learning”


Dr Nora Fieder
Macquarie University Vice-Chancellor’s Commendation for Academic Excellence

Rebecca Gelding
2nd Place, Macquarie University 3 Minute Thesis Competition
1st Place, Faculty of Human Sciences 3 Minute Thesis Competition
1st Place, Department of Cognitive Science 3 Minute Thesis Competition

Dr Celia Harris
Macquarie University Research Excellence Awards: Highly Commended for Early Career Researcher of the Year – Social Sciences, Business & Humanities

Professor John Hodges
Recognised as one of the top 400 most-cited biomedical scientists in ‘Nature’

Qandeel Hussain
Tuition Waiver Scholarship: The University of Hong Kong Summer Institute for Linguistic Research, Hong Kong
The Australian Speech Science and Technology Association Travel Award: 14th Laboratory Phonology Conference, Tokyo, Japan
The National Institute for Japanese Language and Linguistics Financial Subsidy: 14th Laboratory Phonology Conference, Tokyo, Japan

Dr Muireann Irish
NSW Young Tall Poppy Science Award: In recognition of outstanding research/academic achievement as well as excellence in communication and community engagement to promote an understanding of science
Contributing to Australian Scholarship and Science Foundation Travel Award: 25th Annual Rotman Research Institute conference, Toronto, Canada

Yvette Kezilas
Macquarie University Postgraduate Research Fund Deputy Vice Chancellor’s Commendation

Dr Fiona Kumfor
The University of New South Wales Faculty of Medicine Dean’s Rising Star Award: In recognition of postdoctoral researchers who have made an outstanding contribution in their field
Australian Psychological Society “Excellent PhD Thesis in Psychology” Award
The University of New South Wales School of Medical Sciences “Paper of the Month” Award for a publication in ‘Brain’

Xuejing Lu
13th International Conference on Music Perception and Cognition and 5th Conference for the Asia-Pacific Society for Cognitive Sciences of Music Travel Award

Pragati Rao Mandikal Vasuki
Macquarie University Linguistics Higher Degree Research Showcase Best Presenter Prize
Professor Facundo Manes
Legislatura de la Ciudad Autónoma de Buenos Aires: “Leading figure in the field of Science and Medicine” ALMA Asociación Lucha contra la enfermedad de Alzheimer Diploma of Merit: “Leading figure in the fight against Alzheimer’s disease”

Dr Michelle Marneweck
The University of Western Australia Dean’s list of outstanding graduating students

Christopher McCarroll
Macquarie University Postgraduate Research Fund Deputy Vice Chancellor’s Commendation

Associate Professor Michelle Meade
Montana State University’s College of Letters and Science Dean’s Award for Meritorious Research and Creativity

Kiri Mealings
CCD Annual Workshop Highly Commended Poster Award

Manjunath Narra
CCD Annual Workshop Highly Commended Poster Award

Professor Lyndsey Nickels
Macquarie University Vice-Chancellor’s Award for Excellence in Higher Degree Research Supervision
Macquarie University Faculty of Human Science Award for Excellence in Higher Degree Research Supervision

Emma Nile
AMP Tomorrow Maker Award

Dr Vince Polito
Australian National Finalist in the British Council’s Famelab Competition: Freemantle Maritime Museum, Western Australia
NSW State Finalist in the British Council’s Famelab Competition: Powerhouse Museum, Sydney
American Psychological Association’s Division 30 Ernest Hilgard Award for the Best PhD thesis in hypnosis

Dr Genevieve Quek
Macquarie University Vice-Chancellor’s Commendation for Academic Excellence

Anastasiia Romanova
Macquarie University Postgraduate Research Fund Deputy Vice Chancellor’s Commendation

Sharon Savage
CCD Annual Workshop Highly Commended Poster Award

Amy-Lee Sesel
CCD Annual Workshop Best Postgraduate Poster Award

Dr Paul Sowman
Macquarie University Faculty of Human Sciences Extra Mile Award: “Exemplary effort as Chair of the committee managing the magnetoencephalography (MEG) facility in the Australian Hearing Hub”

Sicong Tu
CCD Annual Workshop Best PhD Poster Award

Dr Hua-Chen Wang
Macquarie University Faculty of Human Sciences Extra Mile Award: “Exemplary effort as teaching development coordinator by developing two new units including all digital iLearn information and adapting these for offering in OUA mode”

Vana Webster
Macquarie University Postgraduate Research Fund Deputy Vice Chancellor’s Commendation
CCD Annual Workshop Highly Commended Poster Award

Professor Andrew Young
British Psychological Society 2014 Cognitive Psychology Award for R.J. Harris, A.W. Young and T.J. Andrews. “Morphing between expressions dissociates continuous from categorical representations of facial expression in the human brain”

Dr Regine Zopf
Faculty of Human Sciences Research Award: “Highest research funding secured by an Early Career Researcher”

promotions

Professor Amanda Barnier
Promotion to Professor (Level E)

Associate Professor Melissa Green
Promotion to Associate Professor (Level D)

Dr Celia Harris
Promotion to Lecturer (Level B)

Dr Simon McCarthy-Jones
Promotion to Senior Lecturer (Level C)

Associate Professor Romina Palermo
Promotion to Associate Professor (Level D)

Dr Serje Robidoux
Promotion to Lecturer (Level B)

Professor Mark Williams
Promotion to Professor (Level E)

new external appointments

Professor Amanda Barnier
Fellow, The US Society for Clinical and Experimental Hypnosis (2014 continuing)
Member, Macquarie University Senate (2014 continuing)

Dr Amee Baird
Clinical Neuropsychologist, Hunter Brain Injury Service, Newcastle (2014 continuing)
external grants


Alzheimer’s Australia Dementia Research Foundation PhD Top-Up Scholarship (2013 - 2014) “Prefrontal contributions to learning and memory in behavioural variant frontotemporal dementia.” Wong, S. ($15,000)


ARC Discovery Early Career Research Award [DE120100898] (2012 - 2014) “Hypnotic illusions and clinical delusions: How closely and usefully can hypnosis model delusional beliefs.” Cox, R.E. ($375,000)


ARC Discovery Project and Australian Post-Doctoral Fellowship (APD) Award [DP101101511] (2011 - 2014) “Decoding the process of holistic shape encoding in the human visual system.” Bell, J. ($254,138)

ARC Discovery Project Grant [DP1096160] (2010 - 2014) “The emergence of logic in child language.” Crain, S., Johnson, B., Khlentzos, D., Tseng, O., Lee, T.H.T., & Gao, L.Q. ($601,000)

ARC Discovery Project Grant [DP110100850] (2011 - 2014) “Perceptual and psychosocial factors associated with individual differences in face identity and face expression processing.” McKone, E., Palermo, R., O’Kearney, R., & Moore, T. ($414,000)

ARC Discovery Project Grant [DP120100187] (2012 - 2014) “Point of View in Personal Memory: A philosophical study of perspective in remembering and imagining.” Sutton, J. ($114,000)


ARC Discovery Project Grant [DP120100750] (2012 - 2014) “The extinction of human fear.” Lipp, O.V. ($210,000)


ARC Discovery Project Grant [DP140101199] (2014 - 2016) “Beyond reading jumbled words: Bridging perception and language in the Noisy Channel model.” Kinoshita, S., & Norris, D. ($335,000)

ARC Discovery Project Grant and Australian Research Fellowship [DP111014202] (2011 - 2015) “Make up your mind! - Dissociating the roles of orbitofrontal cortex and striatum in human decision making.” Horneberger, M., Hodges, J., & Lewis, S. ($1,005,000)

ARC Discovery Project Grant and Discovery Outstanding Researcher Award (DORA) [DP130102300] (2013 - 2019) “Fitting the mind to the world: Adaptive processes in face perception.” Rhodes, G. ($629,101)


ARC Future Fellowship [FT110100631] (2011 - 2015) “Poor social functioning in schizophrenia: Understanding its causes and developing better treatment.” Langdon, R. ($674,019)

ARC Future Fellowship [FT120100020] (2012 - 2016) “Why remembering together is crucial as we age.” Barnier, A. ($803,734)


ARC Linkage Project [LP130100181] (2013 - 2016) “Attention and hazard perception while driving: How experts see the scene.” Pammer, K., Bell, J., Beanland, V., Symmons, M., Cooke, L., Smith, K., & Brook, C. ($151,066)


Canada Research Chair Tier II - Canada Research Chair in Social Perceptual Development (2012 - 2017) Rutherford, M.D. ($500,000)


Canadian Institutes of Health Research (2013 - 2016) “Developmental relationships among social perceptual and social cognitive measures in infants at risk for autism spectrum disorders and in control infants.” Rutherford, M.D. ($211,737)


Enhancing the Centre’s national and international standing through highly innovative transformational research in the five core areas of cognition.
## Income

<table>
<thead>
<tr>
<th>Source</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC Centre of Excellence Grant</td>
<td>$3,047,251</td>
<td>$3,164,494</td>
<td>$3,286,244</td>
<td>$3,385,555</td>
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<tr>
<td>Cash Contributions by Node</td>
<td>$1,098,116</td>
<td>$1,824,287</td>
<td>$996,487</td>
<td>$1,442,681</td>
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<tr>
<td>Macquarie University</td>
<td>$750,535</td>
<td>$1,473,899</td>
<td>$646,099</td>
<td>$1,065,792</td>
</tr>
<tr>
<td>The University of New South Wales</td>
<td>$150,000</td>
<td>$150,000</td>
<td>$150,000</td>
<td>$150,000</td>
</tr>
<tr>
<td>The University of Western Australia</td>
<td>$197,581</td>
<td>$200,388</td>
<td>$200,388</td>
<td>$226,888</td>
</tr>
<tr>
<td>Other Income</td>
<td>–</td>
<td>$11,060</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>NSW Science Leveraging Fund</td>
<td>$511,579</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td><strong>$4,656,946</strong></td>
<td><strong>$4,999,841</strong></td>
<td><strong>$4,282,731</strong></td>
<td><strong>$4,828,236</strong></td>
</tr>
<tr>
<td>Accumulated funds from previous year</td>
<td>–</td>
<td>$2,062,637</td>
<td>$2,607,150</td>
<td>$2,339,975</td>
</tr>
</tbody>
</table>

## Expenditure

<table>
<thead>
<tr>
<th>Description</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries/Contractors</td>
<td>$1,830,699</td>
<td>$3,148,550</td>
<td>$3,230,798</td>
<td>$3,450,435</td>
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<tr>
<td>Scholarships</td>
<td>–</td>
<td>$285,369</td>
<td>$348,185</td>
<td>$497,888</td>
</tr>
<tr>
<td>Equipment</td>
<td>$295,387</td>
<td>$408,456</td>
<td>$471,986</td>
<td>$31,234</td>
</tr>
<tr>
<td>Travel/Professional Development</td>
<td>$190,836</td>
<td>$267,494</td>
<td>$167,891</td>
<td>$231,646</td>
</tr>
<tr>
<td>Maintenance/Consumables</td>
<td>$165,195</td>
<td>$212,482</td>
<td>$235,848</td>
<td>$135,957</td>
</tr>
<tr>
<td>Other Expenditure</td>
<td>$112,192</td>
<td>$132,977</td>
<td>$95,198</td>
<td>$140,933</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td><strong>$2,594,309</strong></td>
<td><strong>$4,455,328</strong></td>
<td><strong>$4,549,906</strong></td>
<td><strong>$4,488,093</strong></td>
</tr>
<tr>
<td>Accumulated funds to next year</td>
<td>$2,062,637</td>
<td>$2,607,150</td>
<td>$2,339,975</td>
<td>$2,680,118</td>
</tr>
</tbody>
</table>
### Performance Indicators

**Research Findings**

<table>
<thead>
<tr>
<th>Category</th>
<th>Target</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of research outputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Books</td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Book chapters</td>
<td>30</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Journal articles</td>
<td>90</td>
<td>175(^1)</td>
<td></td>
</tr>
<tr>
<td><strong>Quality of journal articles (IF &gt; 2)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td><strong>Keynote and invited presentations at major meetings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td><strong>Commentaries about Centre achievements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media releases &amp; articles</td>
<td>22</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td><strong>Scopus citations for Chief Investigators</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>4843</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Count based on a CCD affiliation appearing in the publication.

**Research Training | Professional Education**

<table>
<thead>
<tr>
<th>Category</th>
<th>Target</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training sessions organised by the Centre</td>
<td>15</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Number of attendees at Centre training sessions</td>
<td>57</td>
<td>&gt;750</td>
<td></td>
</tr>
<tr>
<td>New postgraduate students</td>
<td>15</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>New postdoctoral researchers</td>
<td>12</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>New honours students</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>PhD completions, completion times</td>
<td>12, 3yr 6mth</td>
<td>11, 4yr 2mth</td>
<td></td>
</tr>
<tr>
<td>Number of Early Career Researchers (within 5 years of PhD)</td>
<td>17</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Mentored high school and visiting students</td>
<td>10</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

**International, National and Regional Links | Networks**

<table>
<thead>
<tr>
<th>Category</th>
<th>Target</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>International visitors</td>
<td>18</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>National and international workshops organised by the Centre</td>
<td>5</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Visits to overseas laboratories</td>
<td>30</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Interdisciplinary research supported by the Centre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-program experiments/papers</td>
<td>5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Interdisciplinary PhD supervision</td>
<td>20%</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

**End-user Links**

<table>
<thead>
<tr>
<th>Category</th>
<th>Target</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government, industry and business briefings</td>
<td>10</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Public awareness programs</td>
<td>3</td>
<td>3: Community Engagement, Educational Outreach, Regional Universities Outreach</td>
<td></td>
</tr>
<tr>
<td>Website updates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Events</td>
<td>12</td>
<td>&gt;12</td>
<td></td>
</tr>
<tr>
<td>Research outcomes</td>
<td>4</td>
<td>&gt;4</td>
<td></td>
</tr>
<tr>
<td>Website hits</td>
<td>15000</td>
<td>43028</td>
<td></td>
</tr>
<tr>
<td>Public talks given by the Centre</td>
<td>10-15</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

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*2014 annual report*
### Organisational Support

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total annual cash contributions from Collaborating Organisations ($180,000 of target commitment received in 2012)</td>
<td>$1,148,501</td>
<td>$1,442,681</td>
</tr>
<tr>
<td>Total annual in-kind contributions from Collaborating Organisations</td>
<td>$1,174,407</td>
<td>$2,042,215</td>
</tr>
<tr>
<td>Total annual cash contributions from Partner Organisations</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total annual in-kind contributions from Partner Organisations</td>
<td>$111,692</td>
<td>$111,692</td>
</tr>
<tr>
<td>Total annual other research income</td>
<td>$3,825,000</td>
<td>$14,087,546</td>
</tr>
<tr>
<td>New collaborations with institutions/industry</td>
<td>3</td>
<td>4: see Collaborations</td>
</tr>
</tbody>
</table>

### Governance

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Committee</td>
<td>4</td>
<td>6: members</td>
</tr>
<tr>
<td>Advisory Board</td>
<td>10</td>
<td>11: members</td>
</tr>
</tbody>
</table>

### Bringing researchers together to form an interactive and effective research team

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruit (or retain) new staff and students across the five research programs</td>
<td>42</td>
<td>72</td>
</tr>
<tr>
<td>Research Management Committee meetings</td>
<td>1</td>
<td>6 meetings; plus 5 Director/COO visits to UWA/UNSW nodes</td>
</tr>
</tbody>
</table>

### National Benefit

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution to the National Research Priorities and the National Innovation Priorities</td>
<td>6</td>
<td>Contributed to National Research Priorities: A healthy start to life: Reading, Language and Person Perception Programs; Ageing well, ageing productively: Memory, Belief Formation and Language Programs Contributed to National Innovation Priorities: 1, 2, 6 &amp; 7</td>
</tr>
</tbody>
</table>

### Centre-specific Performance Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation at peak body meetings and information sessions</td>
<td>10</td>
<td>38</td>
</tr>
<tr>
<td>Cognitive science in the public interest program</td>
<td></td>
<td>13 Centre members contributed to 'The Conversation': 11 authored original articles and 2 were interviewed as expert sources (see Media</td>
</tr>
<tr>
<td>Women in Science program</td>
<td></td>
<td>Female researchers spoke with high school student groups about careers in cognitive science. 2 PhD students were supported to attend a networking event for female science researchers. In combination with the Perception in Action Research Centre, held 2 Women in Science meetings (see Women in Science).</td>
</tr>
<tr>
<td>Educational outreach program</td>
<td></td>
<td>Consolidated our involvement with the IDEALAB PhD exchange program by hosting the 2014 Winter School. Hosted 5 high school students as part of their workplace learning experiences, hosted 21 Australian Computational and Linguistics Olympiad winners, and 50 Year 12 students as part of the National Youth Science Forum. Centre members provided mentoring to 6 undergraduate interns (see Educational Outreach).</td>
</tr>
<tr>
<td>Rural outreach program</td>
<td></td>
<td>Our regional collaborations remained focused on UNE, hosting Cl Byrne and Al Khentzos on various occasions. Byrne and his PhD student Katrina Grasby participated in the Annual and Stakeholder Workshops (see Centre Activities).</td>
</tr>
</tbody>
</table>
participating organisations

funding sources

Australian Government
Australian Research Council

Trade & Investment

administering organisation

ccd
ARC CENTRE OF EXCELLENCE IN COGNITION AND ITS DISORDERS

MACQUARIE University

collaborating organisations

UNSW
The University of New South Wales

The University of Western Australia

The University of Sydney

line

partner organisations

UNIVERSITY OF CAMBRIDGE

UNIVERSITY OF OXFORD

Royal Holloway University of London

The University of York

KU THE UNIVERSITY OF KANSAS

THE UNIVERSITY OF AUCKLAND

New Zealand

To Whaere Whanau a Tāmaki Makaurau

INECO

Institute of Cognitive Neurology

Institute of Education and Social Research

Cardiff University

Paris 12 University