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Chair’s Report

The Advisory Board is pleased to once again endorse the 2009 Annual report of the ARC Special Research Centre: The Macquarie Centre for Cognitive Science (MACCS).

2009 was a milestone year in many ways: it was the first year that MACCS was no longer a funded Special Research Centre and the end of an era with the retirement of Max Coltheart as Director of MACCS.

The Board would like to thank Max for his tireless efforts in making MACCS a recognised world-class research centre in the field of Cognitive Science and for ensuring that the future is bright. We would also like to congratulate Professor Anne Castles on her appointment as the new Director for MACCS from 2010.

MACCS continues to attract staff and postgraduate students from around the world. In 2009 the Centre attracted 5 high quality postgraduate students from 4 countries and welcomed 2 new staff members.

Macquarie University are still very committed to the ongoing success of MACCS and we would like to thank them for their ongoing support.

Even though Max has retired we know that he will still be a very valuable part of the MACCS team.

Professor Roger Wales
La Trobe University
Faculty of Humanities and Social Sciences
Chair, MACCS Advisory Board
Director’s Report

I am pleased to present the 2009 Annual Report from the Macquarie Centre for Cognitive Science.

It was another exciting year for MACCS: we hosted a number of events including the 9th Conference of the Australasian Society for Cognitive Science which saw over 160 attendees from Australia and around the world.

2009 was also an extremely busy year for visitors with 28 visitors from 13 countries coming to share their knowledge and expertise with our staff and postgraduate students as well as to collaborate on a wide variety of research projects.

During 2009 we also had six students graduate:

**Petroula (Betty) Mousikou**
Computational Modelling of the Masked Onset Priming Effect in Reading Aloud

**Ann Rémont**
Comprehending and Remembering Briefly Presented Pictures

**Helen Dodd**
Anxiety and Phobias in Williams Syndrome

**Celia Harris**
Social Aspects of Memory: Costs and Benefits of Collaborative Recall

**Glenn Carruthers**
A Cognitive Model of Self Consciousness

**Ian Simpson**
A Re-examination of the Case for Two Orthographic Lexicons

2009 was our first self-funded year as an independent research centre with the ARC SRC funding finishing in 2008. We achieved a 30% increase from 2008 to 2009 in our non-SRC income, which will enable cognitive science at Macquarie to continue into the foreseeable future.

On a personal note, I would like to thank everyone at MACCS over the last 9 year for all your hard work, support and dedication in making MACCS a world-class research centre for cognitive science. Even though I am retired I will still be collaborating with many of my MACCS colleagues but may now take a bit of time to enjoy my passions of food, wine and Jazz guitar. I would also like to thank Stephen for being a truly great Deputy Director and thank him for his friendship and support over the years.

I know that I am leaving MACCS in the very capable hands of Anne and Stephen and wish them and the Centre every success.

Max Coltheart
Director
## Funding

### Sources of Funding

<table>
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<th>Source</th>
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<td>NH&amp;MRC Grant Funds</td>
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<td>Macquarie University Grants</td>
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<tr>
<td>Faculty Funding Model</td>
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</tr>
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<td>Federation Fellowship Support</td>
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<td>Grants</td>
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<td>CORE Start-up &amp; Salary Funding</td>
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<td>ARC Federation Fellowship Funds</td>
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<td>Faculty Funding Model</td>
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<td>Total Macquarie University Funding</td>
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<td>Industry/Private Funds</td>
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<td>Other External</td>
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<td><strong>Total 2009 Income</strong></td>
<td><strong>$7,139,752</strong></td>
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### Pie Chart

The pie chart illustrates the distribution of funding sources with the following percentages:

- Commonwealth Government Funding: 13.44%
- State Government Funding: 9.82%
- ARC Federation Fellowship Funds: 4.51%
- ARC Grant Funds: 18.64%
- NH&MRC Grant Funds: 15.45%
- Macquarie University Grants: 11.6%
- Faculty Funding Model: 14.87%
- Federation Fellowship Support: 2.29%
- Postgraduate Student Scholarships: 1.75%
- Research Fellowships: 1.26%
- Grants: 1.195%
- CORE Start-up & Salary Funding: 2.35%
- Other: 0.72%

The total income for 2009 is $7,139,752.
Management & Personnel

Advisory Board

Professor Sally Andrews  
Head, School of Psychology  
University of Sydney

Professor Denis Burnham  
Director, MARCS Auditory Laboratories  
University of Western Sydney

Professor Max Coltheart  
Director  
Macquarie Centre for Cognitive Science

Professor Michael Corballis  
Psychology Department  
University of Auckland

Professor Stephen Crain  
Deputy Director  
Macquarie Centre for Cognitive Science

Professor Cindy Gallois  
Faculty of Social and Behavioural Sciences  
University of Queensland

Professor Jim Piper  
Deputy Vice-Chancellor (Research)  
Macquarie University

Professor Gill Rhodes  
School of Psychology  
University of Western Australia

Professor Roger Wales (Chair)  
Faculty of Humanities and Social Sciences  
La Trobe University

Associate Professor Philip B. Ward  
School of Psychiatry  
University of New South Wales

Professor Kevin Wheldall  
Macquarie University Special Education Centre  
Macquarie University

Director

Professor Max Coltheart  
BA MA PhD Syd., DSc Macq, FASSA FAA FBA

Deputy Director

ARC Federation Fellow  
Professor Stephen Crain  
BA PhD Calif, FASSA

Research Members

ARC Queen Elizabeth II Research Fellow

Associate Professor Mark Williams  
BSc PhD Monash

ARC Australian Research Fellows

Associate Professor Amanda Barnier  
BA Macq, PhD NSW

Dr Jon Brock  
BSc Brist., PhD Warw.

Dr Matthew Finkbeiner  
BA MA TESL Arizona State, PhD Arizona

Associate Professor Robyn Langdon  
BSc DipEd Qld., BA PhD Macq.

Dr Genevieve McArthur  
BA PhD UWA

Dr Anina Rich  
BSc Monash, MPsych PhD Melb.

NHMRC Senior Research Fellow

Professor Lynsey Nickels  
BA Reading, PhD Lond.

Macquarie University Research Fellows

Dr Britta Biedermann  
MA Freiburg i. Brsg, PhD Macq

Dr Rochelle Cox  
BSc PhD NSW

NHMRC Postdoctoral Training Fellowship

Dr Paul Sowman  
BPhy Otago, PGDipHSci Auckland, PhD Adelaide

Paul Sowman joined MACCS in April 2009 following on from posts at Aalborg University, Denmark and Ege University, Turkey

Research Fellows

Dr Wayne Christensen  
BA PhD Newcastle

Dr Romina Palermo  
BSc W’gong., PhD UWA

Dr Karen Smith-Lock  
BSc MHSc Toronto, PhD UConn.

Dr Rachel Robbins  
BSc PhD ANU

Postdoctoral Research Fellows

Dr Hana Burianová  
BSc MA PhD Toronto

Dr Jason Friedman  
BSc Monash, MSc PhD Weizmann

Dr Jason Friedman joined MACCS in June 2009 from Penn State University, USA

Dr Saskia Kohnen  
MA Potsdam, PhD Macq
Dr Pamela Marsh  
BSocSci UNE, PhD Syd.  

Research Officer  
Dr Laura Schmalzl  
BPsych Padua, MClinNPsysy PhD Macq  

Research Assistants  
Thushara Anandakumar  
BPsych Macq  
Erin Barriball  
BSc PGDipPsych LaTrobe  
Samantha Bzishvili (nee Calacouris)  
BPsych NSW  
Kristy Jones  
BSc Leeds  
Alice Lagas  
MSc Leiden  

Linda Larsen  
BSc Macq  
Catherine Mason  
BAppSc Syd.  
Christopher Sewell  
BEd ACU, BSc Macq  

Research Assistants (52 Casual)  

Academic Members  

Associate Professor Veronika Coltheart  
BA Syd., PhD Monash  

Associate Professor Sachiko Kinoshita  
BSc PhD NSW  

Dr Rosalind Thornton  
BA Massey, MIA Tsukuba, MA Yale, PhD Connecticut  

Administration  

Financial Administrator  
Katie Webb  
BCom-Accg Macq  

KIT-Macquarie Brain Research Laboratory Manager  
Dr Graciela Tesan  
BA Del.Comahue, PhD Maryland  

Research Administrators  
Dr Lisa Yen  
BPsych PhD Macq  

Lesley McKnight  

Lesley McKnight joined the team in March 2009 from Palm Inc.  

Systems Administrator  
Craig R. Richardson  
BSc Macq  

Administrative/Technical Assistants  
(2 casual)  

Research Students  

PhD/MClinNeuroPsy Students  
Emily Connaughton  
BBA BA Macq  

Tania Malouf  
BSc BspHearingSc Macq  

Tracey Shaw  
BPsych Griffith  

Alexandra Wilson  
BPsych Macq  

PhD Students  

Nobuaki Akagi  
BCogSci UWA, MA Macq  

Bhuvanesh Awasthi  
BSc MSc Pune, M5 BITS Pilani  

Samantha Baggott  
BA Macq  

Anna (Lisi) Elisabeth Beyersmann  
MA Stuttgart  

Marissa Calleja  
BA Philippines, MSc DeLaSalle  

Glenn Carruthers  
BSc Adel.  

Lincoln Colling  
BSc MSc Auckland  

Michael Connors  
BA BSc Syd.  

Peter de Lissa  
BSc Macq, MSc Maastricht  

Helen Dodd  
BSc Cardiff  

Magda Dumitru  
BA Leiden, MA Buffalo  

Nora Fieder  
Dip Patholinguistics Potsdam  

Nora Fieder started her PhD in 2009 after completing her Patholinguistics degree at the University of Potsdam, Germany  

Shaun Greenfield  
BA Macq  

Celia Harris  
BSc NSW  

Aljun Huang  
BA Changsha, MA Hunan Norm., MPhil Chinese HK  

Linda Larsen  
BA Macq  

Linda Larsen commenced her PhD in August 2009 following on from her position as a Research Assistant at MACCS  

Yatin Mahajan  
BSc MSc Mysore  

Lars Marstaller  
MA Berlin, MSc Edinburgh  

Lars Marstaller arrived at MACCS in August 2009 to undertake his PhD, following completion of a Philosophy Masters at University of Edinburgh, UK  

Jonathan McGuire  
BPsych Macq  

Greg McLean  
BA Melb.
Amanda Miller Amberber  
BAppSc LaTrobe, MA McGill

Petroula (Betty) Mousikou  
BEd Aristotle, MA MA BA Comp. Madrid

Hock Beng (Tommy) Ng  
BAppSc Qld, MSc S.Fraser

Anna Notley  
BSc BA Syd., MA Amsterdam

Varghese Peter  
BSc MSc Mysore

Vince Polito  
BPsych Macq

Stephen Pritchard  
BA BE NSW

Ann Rémond  
MA Maryland, BPsych Macq

Davide Rivolta  
BPsych Pavia

Stephane Savannah  
PGDipPhil Macq, PGDipDataProc Victoria Col., DipEd BSc Monash

Charlie Stone  
BA West Washington, MA New School

Yi (Esther) Su  
BA Hunan, MA CSU

Hua-Chen Wang  
BA National Chiao-Tung, MSc Potsdam

Francesco-Alessio Ursini  
BA L'Aquila, MA Utrecht

Dr Barry Ward  
BSc MCogSc NSW, PhD Macq

Megan Willis  
BPsych Macq

Catherine (Ellie) Wilson  
BSc Leeds

Peng Zhou  
BA MA Beijing Lang. Culture

Regine Zopf  
MSc Tubingen

DPsych Students  
Debbie Arguedas  
BSc Macq

Kate Croaker  
MAPS CCN

Cliff Deyo  
BA Simon Fraser, BSoCSc UNE, MA Deakin

Donna McCabe  
BSc Syd

Vince (Didier) Oxenham  
BSc Birmingham

Shelley Simpson  
BSci W'gong, MA Macq

Honorary Associates

Dr Kirrie Ballard  
Discipline of Speech Pathology  
University of Sydney, Australia

Dr Ruth Bronson  
Neuropsychologist  
The Children's Hospital at Westmead,  
Sydney, Australia

Dr Mike Burton  
Department of Psychology  
Glasgow University, UK

Dr Glenn Carruthers  
Center for Integrative Life Sciences  
Humboldt University of Berlin, Germany

Dr Trevor Chong  
St Vincent's Health, Melbourne, Australia

Dr Wayne Christensen  
Konrad Lorenz Institute for Evolution and Cognition, Austria

Dr Karen Croot  
Department of Psychology  
University of Sydney, Australia

Professor Katherine Demuth  
Department of Linguistics  
Macquarie University, Australia

Dr Melissa Green  
School of Psychiatry  
University of New South Wales, Australia

Dr Celia Harris  
Macquarie University, Australia

Dr Irina Harris  
Department of Psychology  
University of Sydney, Australia

Dr Florian Hutzler  
Department of Psychology  
University of Salzburg, Austria

Dr Britta Jensen  

dr Bridgehouse University, Australia

Dr Mark Johnson  
Department of Psychology  
University of Glasgow, UK

Dr Pamela Joy  
Developmental Cognitive Neuropsychology Research Unit  
The Children's Hospital at Westmead,  
Sydney, Australia

Associate Professor Drew Khlentzos  
Department of Psychology  
University of New England, Australia

Professor Stephen Lupker  
Department of Psychology  
University of Western Ontario, Canada

Kate Makin  
Speech Pathologist  
Royal Rehabilitation Centre,  
Sydney, Australia

Dr Eva Marinus  
Department of Education  
University of Amsterdam, The Netherlands

Professor Daphne Maurer  
Visual Development Lab  
McMaster University, Canada

Belinda McDonald  
Speech Pathologist  
St Josephs Hospital, Sydney, Australia

Dr Stephen Mondy  
Centacare Broken Bay  
Waitara, Australia

Dr Melanie Moses  
Speech Pathologist  
Royal Rehabilitation Centre,  
Sydney, Australia

Dr Kate Nation  
Department of Experimental Psychology  
University of Oxford, UK

Dr Dennis Norris  
MRC Cognition and Brain Sciences Unit  
Cambridge, UK

Dr Dennis Norris and  
Associate Professor Sachiko Kinoshita

Dr Sallyanne Palethorpe  
Macquarie University, Australia

Professor Kathy Rastle  
Department of Psychology  
Royal Holloway College, University of London, UK

Dr Elizabeth Schier  
Macquarie University, Australia

Professor Niels Schiller  
Leiden Institute for Brain and Cognition  
Leiden University, the Netherlands

Associate Professor Geoff Stuart  
Department of Psychology  
La Trobe University, Australia
Visitors

**Academic Visitors**

**Dr Branka Spehar**
School of Psychology
University of New South Wales, Australia

**Professor Niels Schiller**
Leiden Institute for Brain and Cognition
Leiden University, the Netherlands

**Professor Mary O’Kane**
NSW Chief Scientist and Scientific Engineer
NSW Government, Australia

**Dr Kristza Szendroi**
Department of Human Communication Science, University College London, UK

**Professor Peter Halligan**
School of Psychology
Cardiff University, UK

**Dr Florian Hutzler**
Department of Psychology
University of Salzburg, Austria

**Professor Naama Friedmann**
Language and Brain Lab, School of Education Tel Aviv University, Israel

**Dr Thomas Metzinger**
Department of Philosophy
Johannes Gutenberg-Universität Mainz, Germany

**Professor Barbara Tversky**
Department of Psychology
Stanford University, USA

**Professor Jason Mattingley**
School of Psychology
University of Queensland, Australia

**Dr Jakob Hohwy**
Department of Philosophy
Monash University, Australia

**Dr Georg Theiner**
Department of Philosophy
University of Alberta, Canada

**Professor Roger Wales**
Humanities and Social Sciences
La Trobe University, Australia

**Professor Liqun Gao**
Beijing Language and Culture University, China

**Dr Roger Chaffin**
Department of Psychology
University of Connecticut, USA

MACCS was also honoured to host the Speaker of the National Assembly of the Republic of Serbia HE. Prof Dr Slavica Djkic Dejanovic and several members of parliament: Mr Branko Ruzic, Mr Milan Stanimirovic, Mr Mladen Grujic, Ms Jorgovanka Tabakovic and Mrs Lepsa Stulic – Charge d’Affairs Serbian Embassy, Mr Aleksandar Besarabic – Consul General and Ms Fiona Way – Parliamentary Relations Office.
Student Visitors

Juliane Burmester
University of Potsdam, Germany

Bianca De Wit
Erasmus University Rotterdam, the Netherlands

Veronica Cembrani
University of Trento, Italy

Maria Etzien
University of Potsdam, Germany

Marleen Stelter
Saarland University, Germany

Marlene Stetler undertook an internship in 2009

Sandra Truong
University of California, USA

Ami Sambai
University of Tsukuba, Japan

Elliot Bell
Otago University, NZ

Lili (Maggie) Li
Beijing Language and Culture University, China

Juliane Burmester
University of Potsdam, Germany

Janna Geertruida (Trudy) Krajenbrink
Rijksuniversiteit Groningen, The Netherlands

Pei-Shu Tsai
National Yang-Ming University, Taiwan

International student visitor Pei-Shu Tsai
Max Coltheart – the heart of MACCS

Interview conducted by Paul Wild, Macquarie University

At the end of 2009, MACCS founder Professor Max Coltheart retired as director of the Centre. Under his leadership the Centre has grown from humble beginnings as an ARC supported initiative to one of the University’s greatest success stories; and the next decade looks to be as exciting as the last.

Coltheart is understandably proud of this success, “In the first few years it was relatively small and I didn’t know that it was going to grow. I used to go to all the seminars and I could recognise every graduate student and tell you what they were working on. It would be impossible now.”  Coltheart attributes the phenomenal growth to a sensible approach to funding, and judicious investment in resources to create a Centre like no other.

Most staff apply to the ARC for their own funding, and many are successful. This leaves the Centre’s initial funding available for investment in facilities, says Coltheart. “You can actually spend your funding on buying equipment for everybody. You make what you have excellent and then people pay to come here.”

No one can dispute that the business model works. For 2010, MACCS anticipates successful applications for 13 grants and 10 postdoctoral fellowships. With the increase in student numbers potentially bringing more than $1 million in PhD fees alone to the Centre over the next four years.

With income like that, Coltheart admits there is a temptation to favour quantity over quality, and therefore the Centre puts a lot of effort into monitoring the industry and keeping in touch with graduates to help avoid that trap. “There are MACCS PhD graduates all over the world and we’re keeping an eye on them. If they couldn’t get jobs we’d be overproducing,” he says. “We make sure we can supervise them, and we make sure that when they’re finished there’s a job for them somewhere, and if there isn’t then we’ll have to cut back. We’re very conscious of what happens after they leave.”

MACCS ensures the prospects of its graduates through controlling numbers, but also by investing heavily in student supervision. Whilst the University requires all PhD students have two supervisors, MACCS has aimed at always providing a panel of three. This naturally limits the number of students MACCS can take at any one time. “Sometimes there’s a case where there’s a really good student but we can’t find appropriate supervisors; either there’s no appropriate supervisor or the appropriate supervisor can’t take any more”, says Coltheart. At the moment, this is the only reason students who meet the entry requirements are refused, and with the expected expansion of the Centre over the coming years, there is optimism that this will not be the case for much longer.

Coltheart is excited about the future of MACCS, but remains philosophical about his own involvement, “If I wanted to give up work completely, give up research, I could. I could give up supervision because supervision for these students is covered, so it makes you feel very free.” But he’s not putting his feet up just yet, “I’m not planning to do any of that. I’m just doing a lot more research and trying not to interfere.”
Max Coltheart Festschrift

20 – 22 March 2009, Macquarie University and Harbourview Hotel, Sydney

Professor Max Coltheart turned 70 in 2009 and a Festschrift was held in his honour for his enormous contributions to cognitive science in Australia and internationally.

The Festschrift was held over three days, from March 20th – 22nd, 2009. Max is one of the most prominent ambassadors of cognitive neuroscience and has contributed enormously to Macquarie University: as Professor of Psychology, Director of MACCS, a Federation Fellow, and the recipient of honours and awards too numerous to mention. It was therefore fitting for the new Faculty of Human Sciences, for MACCS, and for the University to honour Max on the occasion of his 70th birthday.

Six high-profile international researchers attended and presented at the Festschrift.

- Professor Michael Corballis, Department of Psychology, University of Auckland, New Zealand
- Professor Ken Forster, Department of Psychology, University of Arizona, USA
- Professor David Howard, School of Education, Communication and Language Sciences, University of Newcastle upon Tyne, UK
- Professor John Morton, Institute of Cognitive Neuroscience, University College London, UK
- Professor Andy Young, Department of Psychology, University of York, UK

Over the 3 days MACCS hosted a public event, intensive research workshops, cocktail party and reception for over 200 guests from Australia and around the world.

9th Conference of the Australasian Society for Cognitive Science

30 September – 2 October 2009, Macquarie University, Sydney

The 9th Conference of the Australasian Society for Cognitive Science saw 163 attendees, including substantial numbers from overseas and interstate, enjoying both the sweet Sydney spring weather and three stimulating days of talks. There was no specific theme, but in addition to specialist research papers within specific sub/disciplines, we encouraged integrative papers that forged connections between sub/disciplines.

This integrative ideal also informed invitations to our five excellent keynote speakers: Professor Stephen Crain (Macquarie Centre for Cognitive Science, Macquarie University), Dr Jakob Hohwy (Philosophy, Monash University), Professor Jason Mattingley (Psychology and Queensland Brain Institute, University of Queensland), Dr Thomas Metzinger (Philosophy, Johannes Gutenberg-Universität, Mainz; and Institute for Advanced Study, Berlin, Germany), and Professor Barbara Tversky (Psychology, Stanford University; and Columbia University, USA). Versions of three of these keynote talks appear in these proceedings; the papers by Jason Mattingley and Thomas Metzinger have been published elsewhere.

Perhaps because the cognitive science community in Australasia is relatively small, compared at least with our counterparts in Asia, Europe, and North America, it retains a thoroughly multidisciplinary atmosphere. The programme confirmed the striking pluralism of the contemporary cognitive sciences, drawing on many distinctive disciplines as researchers on cognition are looking both down into the brain and out into the environment. Most contributions were from psychologists, with sizable numbers from philosophy and linguistics; many other areas were also represented, including computational neuroscience, neuropsychiatry, clinical psychology, computer science, human-computer interaction, anthropology, education, history and philosophy of science, cognitive archaeology, cognitive ethology, English literature, and cultural history. All those who had presented papers and posters were invited to submit revised versions following the conference, as full contributions to the published proceedings. Fifty-seven papers were accepted for publication.
Cognitive Neuropsychology and Cognitive Neuropsychiatry Research Forum

16 – 17 July 2009, Macquarie University, Sydney

The Cognitive Neuropsychology and Cognitive Neuropsychiatry Research Forum aimed to bring together researchers from different disciplines including linguistics, psychology, cognitive neuropsychology, psychiatry, philosophy and speech pathology to present research that relates neuropsychological or psychiatric impairment to theories of normal cognitive functioning.

Keynote presentations were given by Professor Peter Halligan (School of Psychology, Cardiff University, Associate Professor Robyn Langdon (MACCS, Macquarie University) and Professor Lyndsey Nickels (MACCS, Macquarie University).

Communication in Autism: HCSNet Workshop


The conference focused on current research investigating the behavioural, cognitive, and neural basis of communication impairments affecting individuals with autism spectrum disorders, as well as research evaluating the efficacy of various intervention strategies. Topics included (but were not limited to) speech perception and production, grammatical skills, semantics, conversation and pragmatics, nonverbal communication, reading, and alternative forms of communication.

This workshop was a joint initiative of the ARC Network in Human Communication Science (HCSNet), Macquarie University and the University of Sydney.

Keynote speakers included Professor Pat Howlin (Institute of Psychiatry, London and University of Sydney), Dr Morton Ann Gernsbacher (University of Wisconsin-Madison), Dr Jacqui Roberts (University of Western Australia) and Associate Professor Lesley Stirling (University of Melbourne). The organisers were Dr Joanne Arciuli (University of Sydney) and Dr Jon Brock (MACCS).

HCSNet Workshop on Movement and Motion Capture

25 – 26 September 2009, Macquarie University, Sydney

Co-organised by Dr Matthew Finkbeiner (MACCS) and Professor Bill Thompson (Psychology) and funded by an HSCNet workshop grant.

Motion capture is now recognised as a powerful technology for understanding the science of human movement and its relation to human cognition. Over 20 leading and emerging researchers presented their work in this workshop, including two keynote presentations by Professors Michael Spivey (University of California-Merced) and Petri Toiviainen (University of Jyvaskyla, Finland). The workshop also provided opportunities for participants to engage in demonstrations and tutorials in the Music, Sound and Performance (MSP) Laboratory housed in Psychology and in the Action and Cognition Laboratory located in MACCS.

Cochlear MEG Workshop

19 December 2009, Macquarie University, Sydney

The first Cochlear MEG workshop was held on December 19, 2009, at the KIT-Macquarie Brain Research Laboratory. This international meeting discussed the development of a specialised magnetoencephalogram (MEG) system capable of measuring brain activity from individuals with cochlear implants. Dr Higuchi, from the Kanazawa Institute of Technology was the main speaker and presented the technical issues associated with the presence of a cochlear device in a regular MEG environment and possible avenues for the development a novel MEG system capable of measuring auditory responses from individuals with cochlear implants. The discussion benefited from the feedback provided by the wide variety of specialists present including: psychologists, linguists, audiologists and electrical engineers from Macquarie University, Cochlear Ltd, the Kanazawa Institute of Technology (Japan) and CSIRO.

Mandarinfest

17 November 2009, Macquarie University, Sydney

Our first Mandarinfest was held on the 17th November 2009. This international workshop was a series of talks co-sponsored by MACCS and CLaS (Centre for Language Sciences).

Two prominent international figures Professors Liqun Gao (Beijing Language and Culture University) and Thomas Lee (Chinese University of Hong Kong) presented their research, as did students and researchers from MACCS and Linguistics.
KIT-Macquarie Brain Research Laboratory

The magnetoencephalography (MEG) laboratory is called the KIT-Macquarie Brain Research Laboratory, in recognition of the collaboration between Macquarie and the Kanazawa Institute of Technology (KIT), Japan. One of the aims of this laboratory is to link research efforts between local scholars and international collaborators from Academia Sinica (Taiwan) and the Kanazawa Institute of Technology (Japan).

In 2009, over fifty children participated in our MEG studies conducted by different research areas at MACCS. The world’s first child MEG was installed in July 2008. Our experiments focused on language development in normal English speaking children and Mandarin speaking children, and language production in normal and stuttering populations. In order to measure cognitive functions in preschoolers, we have developed a child-friendly protocol for experimentation adapting current adult experimental tasks to children’s capabilities and motivations. The implementation of this protocol resulted in a high rate of participation and it has allowed researchers to study language processing in healthy and awake children.

Our facilities provide researchers in Australasia with state-of-the-art equipment. The child MEG system consists of 64 axial gradiometers, which makes it the first whole-head system specifically designed for children. The size and shape of the child MEG helmet ensures that the 64 sensors are positioned close enough to the child’s head to measure ongoing brain activity accurately. In addition to our child MEG system, the KIT-Macquarie Brain Research Laboratory houses a 160-channel MEG system with 48 external channels, a fibre optics eye-tracker and an analog 32-channel EEG. Researchers can also use our MEG compatible 64-channel EEG (BrainVision Brainamp MR plus series) for the combined acquisition of EEG and MEG activity.

For data acquisition, we use MEG160 (Yokogawa Electric Co.), which operates on Windows XP. Researchers have on site access to advanced software for developing experiment scripts such as Presentation® and MATLAB® Psychtoolbox, as well BESA®, SPM 8 and MNE for processing data and data mapping.

MEG as a brain imaging technique

MEG (magnetoencephalography) is a brain imaging technique that measures the magnetic fields generated by the human brain whenever information is being processed. This technique does not require direct contact, and it is non-invasive, so it is a technique that can be used safely with children, thus offering great research potential.

Neuronal electric currents generate magnetic fields 100 million times smaller than the earth’s magnetic field. These fields can be detected by superconducting quantum interference devices (SQUIDs). The SQUIDs are kept in a superconducting state in a bath of liquid helium at a temperature of about -269°C. Our two MEG systems are housed in a Magnetically Shielded Room (MSR) to isolate the weak biomagnetic fields from environmental magnetic noise (large trucks, radiowaves, etc.) and from the earth’s own magnetic field.

For more information:
http://www.maccs.mq.edu.au/laboratories/meg/

Action and Cognition Laboratory

In the Action and Cognition Laboratory, we use a combination of different tools to investigate information processing as it unfolds in real time. The lab is currently equipped with an Optotrak Certus, which is an optical motion capture device that can track an individual’s movements with sub-millimeter and sub-millisecond precision. We also have a 64-Channel BioSemi ActiveTwo EEG system and a Magstim Rapid2 Transcranial Magnetic Stimulator.

The Action and Cognition Lab is designed to allow researchers to use continuous measures in their investigation of cognitive processes. The reason for using a continuous measure in the study of human cognition is that it is potentially a much richer data source than discrete measures (i.e. reaction times). Where discrete measures reflect the culmination of several stages of information processing, a continuous measure has the potential to reveal these processes as they unfold in real time.

For more information:
http://www.maccs.mq.edu.au/laboratories/action/
Behavioural Testing Laboratories

Researchers at MACCS now have access to six individual testing rooms that are equipped with PC or Macintosh computers as well as four group testing rooms, which enable an experimenter to simultaneously collect data from four to six participants. Each PC and Macintosh lab contains identical hardware that is maintained from a common disk image. This allows data collected from different computers to be used in the same study.

To cater for the varied backgrounds of researchers at MACCS we have a range of stimulus presentation packages available in our behavioural testing laboratories. Centre members can choose from the strengths of DMDX, ePrime, SuperLab, MATLAB® or Presentation® for their research.

For more information: http://www.maccs.mq.edu.au/laboratories/behavioural/

Event-Related Potential (ERP) Laboratory

When brain cells fire, they release tiny amounts of electricity that travel right through the brain and the scalp. This is very convenient because it means that we can measure a person’s brain responses from outside their head. We do this by using small sensors that are placed near the scalp. Unfortunately, these sensors do not just pick up electricity from brain cells. They also detect random electricity produced by other types of cells such as muscle cells around the eyes and jaw. To get rid of this unwanted random electricity, we take a continuous recording (called an electroencephalograph or EEG) of the electricity present at a person’s scalp (i.e., brain-cell electricity + random electricity), while we present them with the same stimulus over and over again. We then average together time chunks of the EEG that occur when the stimuli occur. When any type of random activity is averaged together, it cancels itself out. So, when we average the EEG chunks, the random electricity cancels itself out, leaving us with the brain-cell electrical potentials that are related to a particular stimulus event (hence the term event-related potential or ERP).

It is important to note that when electricity travels through the head the different layers of brain tissue and bone deflect it making it difficult to use ERPs to find the location of firing brain cells. However, the deflections do not interfere with the timing of the electrical potentials. So ERPs are good for measuring the temporal processing of perceptual stimuli (e.g., sounds, images, tastes), motor responses (e.g., a button press), and higher level cognitive skills. ERPs are also good for testing children or people with poor attention because they can be measured without a person attending to stimuli. The MACCS ERP Laboratory has been turned into a “jungle” to make it more relaxing for children.

32-Channels SYNAMPS II: technical specifications

The MACCS ERP laboratory uses the latest 32-channel SYNAMPS II amplifier from Neuroscan, which measures ERPs at all frequencies, including brainstem responses. The Neuroscan SynAmps2 32-channel amplifier system is suitable for high-density, low noise recordings. Additional headboxes and System Units may be added to create up to 512 recording channels. Our existing headbox can support 70 channels, consisting of 64 monopolar, 4 bipolar and 2 high-level channels. Participants’ electroencephalograms (EEGs) are detected at the scalp using Ag/AgCl sintered electrodes that are held in place by Quik-Caps (small, medium, and large). The EEGs are recorded using SCAN Acquire software and are processed to produce ERPs using the SCAN Analysis software.

The stimuli are presented using Presentation software that drives a SoundBlaster Audigy2 CZ soundcard (for sounds) and NVIDIA GEForce FX 5200 videocard (for images). Sounds are presented through speakers and Sennheiser headphones. Images are presented on a 19-inch CRT Monitor. The resolution of the system (i.e., the time delay between when a stimulus code is recorded on the EEG and when the stimulus is actually presented) is less than 1 ms. The laboratory has a comfortable sofa chair that can be converted into a bed. It also has a DVD/video player that can be used to entertain participants during auditory ERP experiments and while the electrodes are being applied.

For more information: http://www.maccs.mq.edu.au/laboratories/erp/

Eye Tracking Laboratory

The MACCS Eye Tracking Laboratory consists of an EyeLink II eye tracking system connected to a portable host PC. The system uses three cameras: two high speed cameras allow for binocular (or dominant-eye monocular) recording of eye movements; the third camera tracks four infrared markers mounted on the display screen, allowing the EyeLink software to automatically compensate for small head movements by tracking the position of the subject’s head in relation to these markers on the screen. This means that a chin rest, or head restraint, is not required. Pupil measurements are recorded at a rate of 500 samples per second, affording analysis of visual scanpaths and smooth pursuit eye movements. Experiments can be run using a customised stimulus presentation program developed at MACCS for use with the PC. This system allows researchers to perform a wide variety of eye movement experiments without needing programming knowledge to develop them.

Data analysis can be undertaken with the Eyelink Data Viewer software or...
DRC simulations over large vocabularies at MACCS the time taken to process reading aloud. Before cluster computing the Dual Route Cascaded (DRC) model of The primary model run on the cluster is configured for cluster and grid computing. The MACCS High Performance Computing Facility consists of 28 Apple Xserve servers run computationally intensive models. The cluster available to MACCS researchers to be conducted at a variety of locations, on campus and off site at other testing locations (e.g., Cumberland Hospital).

For more information: http://www.maccs.mq.edu.au/laboratories/hpc/
http://www.maccs.mq.edu.au/research/projects/DRC/

MACCS Hypnosis Laboratory

The MACCS Hypnosis Laboratory, located in the research hub, is one of the largest hypnosis research laboratories in Australia. This laboratory is fully equipped for large scale hypnosis experiments with a reclining leather chair and footrest, computer, and video camera. In 2009, 1 postdoctoral researcher, 2 PhD students, 1 honours student and 1 research assistant were working in the laboratory. To identify highly hypnotisable individuals, members of the laboratory conduct annual group screening with 400-500 participants, followed by individual screening of 100-150 of these individuals. Once screening is complete, subsequent experiments examine the nature of hypnosis (e.g., feelings of control during hypnotic suggestions), and use hypnosis to model a variety of clinical conditions such as delusions and confabulations.

Language Acquisition Laboratory

The Language Acquisition Lab provides up-to-date technical support to researchers that wish to work on children’s language development. Digital video recording equipment and sound recording equipment are available for data collection and analysis. The video camera set-up was dramatically improved this year, as the lab now has two wall-mounted video cameras providing higher quality recordings. Our lab also hosts a large toy library, assembled over the years to provide props for the Truth Value Judgment Task and the Elicited Production Task, experimental techniques developed by Dr Rosalind Thornton and Professor Stephen Crain.

For more information: http://www.maccs.mq.edu.au/laboratories/acquisition/
Research

Language Project

The MACCS Reading Training Study
Genevieve McArthur, Anne Castles, Saskia Kohnen, Max Coltheart, Linda Larsen, Kristy Jones, Thushara Anandakumar and Erin Barriball

In 2008, we were awarded a 5-year NHMRC grant to do a randomised controlled trial of different reading treatments for Australian children who, for no apparent reason, have severe problems learning to read (developmental dyslexia). Developmental dyslexia is a heterogeneous condition composed of different subtypes. Some children have phonological dyslexia (i.e., are poor at reading with the letter-sound rules; the nonlexical reading route), some have surface dyslexia (i.e., are poor at reading whole words by sight; the lexical reading route), and most have mixed dyslexia (i.e., are poor at using letter-sound rules and reading whole words by sight - both reading routes). Although this is known, very little is known about how to tailor different types of treatments to different types of dyslexia.

To date, we have allocated 90 children with dyslexia to one of three training groups. Group 1 (N = 30) has done no treatment (8 weeks) followed by phonics treatment (8 weeks; nonlexical training) followed by sight-word treatment (8 weeks; lexical training). Group 2 (N = 30) has done no treatment (8 weeks) followed by sight-word treatment (8 weeks; mixed training). Group 3 (N = 30) has done no treatment (8 weeks) followed by phonics treatment (8 weeks; nonlexical training). Group 3 (N = 30) has done no treatment (8 weeks) followed by nonlexical training (8 weeks) followed by the same mix of phonics and sight-word treatment (8 weeks). Before and after each treatment, the children completed a large battery of reading, spelling, and spoken language tests.

Preliminary analyses suggest that after phonics training, children with dyslexia have made greater gains in their nonlexical skills than lexical skills, and after sight-word training, children have made greater gains in their lexical skills than nonlexical skills. This suggests that different types of dyslexia respond optimally to different types of reading training.

Developmental Surface Dyslexias
Saskia Kohnen, Genevieve McArthur, Thushara Anandakumar and Anne Castles

Not every child with reading difficulties (developmental dyslexia) has the same kinds of problems. Some children find it far more difficult to learn to read irregular words (i.e., words that cannot be sounded out such as yacht, friend, come) than regular words (i.e., words that follow the letter-sound rules such as garden, hot, sun). These children are said to have developmental surface dyslexia.

One very common error that surface dyslexics make is to read a word as though it were regular. For example, yacht is read as if it rhymed with matched, come is read as comb. In research studies with adults that acquired surface dyslexia after a brain injury, it was noted that not all surface dyslexic readers showed the same kinds of difficulties. One group of surface dyslexics only has difficulties in reading irregular words. A second group of surface dyslexics has an additional problem finding the meaning for written words: what’s the meaning of stair vs. stare? On top of these two problems, a third group shows a problem determining the correct spelling of a word: corn or cawn, chease or cheese. The significance of these differences is that they are linked to different cognitive functions, which has not only theoretical implications but is also relevant for treatment.

Recently, Naama Friedman published a paper showing that these three different subtypes of surface dyslexia can be found in Hebrew-reading children. Yet, to date there is no comprehensive study of these different types of developmental surface dyslexias in English.

Our study seeks to investigate whether the three different types of surface dyslexia exist in English-reading children with reading difficulties. In addition, we are testing what kind of intervention will help these children build up their knowledge of written irregular words.

Orthographic Learning in Children
Anne Castles, Hua-Chen Wang and Kate Nation (The University of Oxford)

This year, we continued our research programme exploring how children acquire representations of individual written words. We were awarded an ARC Discovery Project commencing in 2009 to carry out this work and funds from this supported a visit from Professor Kate Nation in April. During the visit, we discussed the results of previous experiments as well as planning our next experiments in detail.

With the assistance of the PhD student working on the project, Hua-Chen Wang, we then carried out two experiments exploring the question of whether new written word representations are acquired most easily when presented in sentence contexts or out of context (in lists). Children in Grade 2 learned new written words in the form of inventions by the mad scientist, Professor Parsnip (e.g. a jait is a machine for polishing flowers). They were then assessed on the quality of the representations that they had acquired for those new words. We found that, when the new words had regular spelling to sound correspondences, presenting them in context was of no assistance and even appeared to interfere with learning somewhat. However, when the words had irregular spelling to sound correspondences, there was some evidence that the sentence context was helpful in establishing the representations of the new words. We will be presenting this work at conferences in 2010 and writing it up for publication thereafter.

We now plan to move on to exploring orthographic learning in children with reading difficulties of various kinds, so as to obtain a more detailed understanding of where these children’s learning processes break down and why.
Visual Cognition

How Do I Know You, Are You? Or Recognising Others

Rachel Robbins

In collaboration with Professors Max Coltheart, Daphne Maurer and Terri Lewis (the latter two from McMaster University in Canada), I have been researching how people recognise each other. A lot of previous research has focused on how people recognise faces, but we don’t really know what other cues people use to recognise each other. These experiments looked at the relative contribution of faces, body shape and body movement to recognition. So far we have run several studies with adults that suggest that people do indeed use face information more than body shape, but that body shape is used more than movement, at least for individuals met within the context of an experiment (i.e. this might be different for friends and family). Next, we are going to test the same experiments on children and people with face recognition problems to see if they show the same pattern of results.

A second area of research, with Dr Romina Palermo and Professors Daphne Maurer and Terri Lewis, has been to set up a program for testing navigation ability in people with face recognition problems. About one third of people with face recognition problems also report problems finding their way around, but this has not been systematically tested.

With an honours student, Dilan Perera, I conducted research into whether people are less likely to integrate features from a race other than their own into an own race face. We showed Caucasian students pictures of Caucasian and Black African faces where some features (e.g., eyes) had been replaced by those from the other race. We also tested whether awareness of race affected the results.

Temporal Dynamics of Decision Making

Jason Friedman, Matthew Finkbeiner and Paul Sowman

Simple perceptual decisions, for example, ‘Are these dots moving left or right?’ have been well modelled in the past based on the distribution of reaction times of correct and incorrect responses, usually measured using button presses. Most models agree that a decision is made after an accumulation of information reaches a certain level. However, as these techniques measure only reaction time, the dynamics of how the decision is made (e.g., how the information is accumulated in different experimental conditions) must be inferred based on these responses, which occur at the end of this process. In this work, we directly measured the amount of accumulation during the decision making process, before an overt motor response is made, using a novel technique.

This method involved stimulation of the motor cortex using transcranial magnetic stimulation (TMS). In this method, we measured the motor evoked potential (MEP), measured using electromyography (EMG) from a muscle in the hand, caused by TMS. The MEP is understood to be a measure of cortical excitability. We hypothesised that the amount of accumulation of information about a simple perceptual decision would be reflected in the amount of cortical excitability. In pilot trials, this was observed. By changing the quality of the stimulus (easy or hard tasks), we observed changes in the cortical excitability before participants began a movement. This method provides a new way of directly observing the dynamics of the decision making process in humans, before a final decision is made, and can help improve the modelling of these processes. Our future work will explore how the decision making process occurs under different types of stimuli.

Nonconscious Processes Revealed in Reaching Trajectories

Matthew Finkbeiner

My ARC-funded research investigates the role of ‘higher level’ cognitive resources in nonconscious perception. In one line of work, we do this by looking at the effects of temporal and spatial attention on masked (subliminal) priming effects. It has long been held that nonconscious processes are ‘run off’ independently of attention but we have found that this only holds true for face stimuli. Specifically, we have found that masked priming effects for non-face stimuli (e.g. animals, tools, vegetables) depend on spatio-temporal attention. In contrast, face stimuli produce masked priming effects independently of spatial attention (cf. Finkbeiner & Palermo, 2009). Quite intriguingly, we (Quek & Finkbeiner, in prep) have recently discovered using reaching trajectories as our dependent measure that face stimuli do not produce masked priming effects independently of temporal attention. Thus faces appear to be unique insofar as they do not need to be attended spatially to be processed nonconsciously, but they do need to be attended temporally.

In a separate line of work, Dr Jason Friedman and I have been investigating the way in which nonconsciously presented stimuli produce priming. To do this, we have compared masked priming effects for stimuli that are in the response set (i.e. stimuli that are ‘repeated’ as targets on separate trials) versus those that are not in the response set. The question here is whether masked priming reveals the ‘triggering’ of a learned stimulus-response mapping, or whether masked priming effects reveal nonconscious processing at a more abstract level. Previous investigations of this issue have used response latencies (button press measure) as the dependent variable and have not found a difference between repeated and non-repeated primes. Using reaching trajectories as our dependent measure, we have found very robust differences between the prime types, with ‘repeated’ primes producing a much larger priming effect that spans a much larger proportion of the response. But, importantly, non-repeated primes also produce a reliable priming effect. Thus, it appears that masked priming effects do not simply reveal the triggering of learned S-R mappings, but that masked priming effects are nevertheless sensitive to the presence of these mappings.
Synaesthesia Research Group at MACCS

Anina Rich

In synaesthesia, a stimulus in one sensory modality results in an unusual additional experience. For example, when hearing a sentence, a synaesthete may also see vivid colours accompanying each word. In other cases, the taste of certain foods might evoke specific tactile sensations. Estimates of prevalence within the adult population vary from 1 in 500 for the more common types of synaesthesia (e.g., letter-colour synaesthesia), to 1 in 25,000 for rarer forms (e.g., sound-odour synaesthesia).

In 2009, the Synaesthesia Research Group @ MACCS has recruited more synaesthetes, been involved in a number of media interviews, and conducted behavioural experiments. In particular, we have looked at the role of strategy in perceptual grouping, and initiated a new study on olfactory synaesthesia (where smells give colour experiences) in collaboration with Professor Richard Stevenson (Department of Psychology, Macquarie University) and Mr Alex Russell (University of Sydney). Mr Rocco Chiou has joined the group as a PhD student, and Ms Marleen Stelter (Germany) is currently here for an internship for 6 months. Both students are working on projects involving auditory synaesthesia, in which sounds elicit colours, textures and shapes.

Attentional Capture and Distraction

Anina Rich

In everyday life, there is a constant interplay between successfully ignoring or being distracted by irrelevant information. In 2009, I have continued to examine this using multiple object tracking, the topic of my ARC grant. I have also taken on a PhD student, Ms Loes Koelewijn, who is examining the neural correlates of ignoring a salient visual object using MEG (KIT-Macquarie Brain Imaging Research Laboratory).

Cerebral Mechanisms of Mental Imagery

Blake Johnson

Mental images are not merely static representations but can be dynamically changed and displaced during everyday cognitive activities, such as when we imagine a rearrangement of furniture in a living room. These activities require that we anticipate what we would see if things were actually moved, a type of visuospatial reasoning that underlies our ability to successfully manipulate and navigate among a myriad of objects in the visual world.

In recent work we examined the effects of intensive practice on brain activity associated with mental imagery. Brain activity was measured with magnetoencephalography (MEG) and electroencephalography (EEG) in two separate sessions separated by a week of intensive practice on a mental rotation task. Pre-practice reaction times increased monotonically as a function of angular misorientation of the visual stimuli, confirming that participants were performing a mental rotation of the images. Post-practice reaction times were flat, indicating that subjects were no longer using a mental rotation strategy. Pre-practice ERPs showed an orientation-sensitive component over parietal cortex during a time window of about 300-500 ms after stimulus onset, an established electrophysiological marker of mental rotation. Post-practice ERPs lacked this component and exhibited an enhanced P300 component several hundred ms earlier than in the pre-practice ERPs. Interestingly, the post-practice P100 component, an index of relatively early visual cortical processing, was markedly enhanced in the post-practice ERPs. These results provide neurophysiological support for the interpretation that expertise in mental imagery involves a switch in strategy. Further, our data suggest that expertise in visual imagery involves plastic changes in visual cortex at quite early stages of visual processing.

Auditory Processing in Dyslexia

Blake Johnson

A prominent theory of dyslexia states that it is caused, at least in part, by neural deficits in processing auditory information. We measured brain responses of 17 dyslexic and 17 control children, aged 7-12 years, to sounds designed to challenge the temporal processing capabilities of the auditory system. The sounds were 500 ms duration broadband noises containing a binaurally embedded pitch. Event-related brain responses were measured with simultaneous 64-channel electroencephalography (EEG) and 160-channel magnetoencephalography (MEG). During the brain measurements children viewed a video and ignored the acoustic stimuli. Children tolerated the experimental environment well and we were able to collect data from all subjects for 800 trials over a 40 minute experimental session. This resulted in auditory responses with a high signal-to-noise ratio, important because children’s auditory responses tend to be considerably noisier and more variable than those of adults. In ongoing analyses we will examine the notion that auditory processing is abnormal in the brains of dyslexic children.
Belief Formation Project

Hypnosis Research Laboratory

Amanda Barnier, Rochelle Cox, Robyn Langdon, Max Coltheart, Michael Connors, Vince Polito, Jillian Attewell, Emily Connaughton (MACCS, Macquarie University), Martha Turner (University College London, UK), Nora Breen (Royal Prince Alfred Hospital) and Lisa Bortolotti (University of Birmingham, UK)

Delusions and confabulations are pathological forms of false belief and memory that are often seen in conditions such as schizophrenia, dementia, and following traumatic brain injury. Traditionally, delusions and confabulations have been difficult to investigate in the laboratory because they co-occur with other clinical symptoms. However, researchers at the MACCS Hypnosis Laboratory have addressed this difficulty by using hypnosis as a laboratory model of these conditions.

We have used hypnosis to model a number of delusions such as mirrored-self misidentification (the delusional belief that I see a stranger when I look in the mirror), somatoparaphrenia (the delusional belief that one of my limbs belongs to someone else), and alien control (the delusional belief that my actions are being controlled by someone else). Hypnosis is ideal for modelling delusions because hypnotic experiences and delusions share a number of features. Both are believed with conviction, resistant to rational counterargument, and maintained regardless of evidence to the contrary. Also, during hypnosis, people evaluate their experiences less critically, making them essentially deluded about the real state of the world.

In 2009, Jillian Attewell used hypnosis to model erotomania, which is the delusional belief that one is loved from afar by another person. She gave high and low hypnotisable subjects a hypnotic suggestion to believe in the existence of a fictional character called Jo Pearson and then gave them a suggestion that Jo Pearson was in love with them. She asked subjects to describe Jo, discuss how Jo felt about them and to tell her what evidence they had that Jo was in love with them. Clinical erotomania is thought to involve biases in the interpretation of ambiguous information – patients often believe that the target of their delusion is sending them secret signals. To explore this, she read subjects a story containing ambiguous social scenarios (e.g., “you notice Jo having a conversation with a group of people but they stop talking as you approach?”) and later asked them to interpret Jo Pearson’s behaviour. She found that many high hypnotisable subjects claimed that Jo Pearson loved them and could provide plenty of evidence to support this belief.

For instance, one female subject said that she knew he loved her because of “the way he looks at me in class and smiles at me”. Subjects also interpreted Jo’s ambiguous behaviour in ways that supported their delusional belief. For instance, one female subject said Jo stopped talking as she approached because he wanted to show his friends that she was the girl he liked.

This research indicates that hypnosis can model many of the features of erotomania and suggests that the delusion may be facilitated and maintained by biases in the interpretation of ambiguous information.

Michael Connors has also been using hypnosis to model mirrored-self misidentification, which is the delusional belief that the person I see when I look in the mirror is a stranger. He gave high hypnotisable subjects a suggestion that when they opened their eyes and looked into the mirror they would not be able to recognise the person they saw. Because some people have argued that high hypnotisable subjects can experience hypnotic effects in their normal waking state, he gave half of the subjects this suggestion during hypnosis and gave the other half the suggestion when awake. He found that 73% of participants who received the suggestion during hypnosis reported seeing a stranger in the mirror. These subjects described a stranger with physical characteristics different to their own, and looked around the room to find the stranger. In contrast, only 8% of subjects who received the suggestion while awake reported seeing a stranger in the mirror. Thus, it appears that receiving the suggestion during hypnosis leads to a more compelling delusional experience than receiving the suggestion while awake.

Rochelle Cox has recently extended this work on hypnotic delusions by modelling clinical confabulation. Confabulation is the production of fabricated or distorted memories about oneself and the world without the intention to deceive. It is thought to occur in conjunction with amnesia and may involve: 1) an attempt to fill in gaps in memory, 2) previously experienced events misplaced in time or context, or 3) never-experienced events misattributed as real. To elicit confabulations she gave high and low hypnotisable subjects a hypnotic suggestion to either: 1) forget all of the events that had occurred since they started university, 2) forget all of the events that had occurred since they started university and to fill in the gaps in their memory, or 3) mix up the order of the events that had occurred since they started university. She tested the impact of these suggestions by asking subjects about university and high school events. After cancelling the suggestion and after hypnosis, she asked subjects to indicate the source of each memory. She found that high hypnotisable subjects confabulated more than low hypnotisable subjects, particularly those who had received the suggestion to fill in gaps in their memory. The majority of their confabulations seemed to involve misplacing events in time. Notably, high hypnotisable subjects were also very confident that their confabulations were accurate.

In 2009, Professor Peter Halligan from the University of Cardiff, Wales, visited the MACCS Hypnosis Laboratory. Professor Halligan is an international expert in cognitive neuropsychology and neuropsychiatry and he is particularly interested in using hypnosis to create “virtual patients” with reversible psychological disturbances. During his visit he gave us valuable feedback on our research and together we planned two collaborative projects. One will examine neural activity during hypnotically suggested paralysis and the other will use hypnosis to model Capgras delusion, which is the delusional belief that a loved one has been replaced by an impostor.

In summary, research from our laboratory indicates that hypnosis is a useful technique for investigating clinical conditions such as delusions, as well as confabulations in the laboratory. Our hypnotic models can recreate features of these conditions in ways that are strikingly similar to clinical cases. One potential benefit of these hypnotic models is that they may provide a testing ground for exploring treatment possibilities. Given the fragile state of many clinical patients, it would be detrimental to use relentlessly or extremely confrontational techniques in an...
attempt to break down their false beliefs and memories. Instead, using temporary, reversible hypnotic models we can explore techniques that are most likely to be successful and least likely to be distressing. In future work we plan to use our hypnotic analogues to test whether hypnosis can model only the features of clinical conditions or whether it can also influence underlying processes. We will explore this issue by using brain imaging techniques to examine neural patterns during hypnotic delusions.

From Autobiographical Memory to Collective Memory: An Interdisciplinary Study of Individual and Group Cognition
Amanda Barnier, John Sutton, Celia Harris, Charlie Stone and Paul Keil

Our project explores the relationship between individual memory and memory in small groups. Memory in cognitive psychology is typically studied at an individual level, yet remembering is often a social activity; the way that events are encoded and retrieved may be influenced by the presence of others. Recently, cognitive psychologists have begun to explore and measure the effects of groups on individual memory. While robust experimental paradigms have been developed to index group influence, this influence has most often been characterised as a negative or distorting influence, and these experiments have focused on a rather narrow kind of remembering: specifically, the remembering of simple materials like word lists by groups of strangers. This project aims to radically extend existing psychological literature on collective memory by examining social influences on different kinds of memories in different kinds of groups. By using robust, experimental paradigms but extending them to more ecologically valid cases of remembering, we aim to understand the full range of social influences on memory: when it is beneficial to remember with others and when it is not, and whether there are social influences beyond simply the amount recalled and its accuracy.

Cognitive/ Extended Mind Framework, in which the embodied mind is seen as embedded in and extended into its world. Neural and cognitive operations are modelled in their bodily, environmental and social contexts, since brains rarely perform cognitive operations in isolation. Rather, intelligent action is conceptualised as the outcome of the cooperation or coupling of neural, bodily and external systems in complex webs of “continuous reciprocal causation”. Applying this framework to memory, we argue that humans augment their relatively unstable individual memories with more stable external scaffolding. This project focuses on one crucial form of external scaffolding: other people in our social groups. We investigate how small groups influence individual memory and how this reliance on the group may, in turn, lead to collective memory that is not the mere sum of individual memories. This framework allows us to consider different cases of social remembering in terms of their potential to result in extended cognition, so that we might predict different outcomes for different kinds of groups and different kinds of remembering tasks.

In 2009, in empirical studies we continued three streams of research, each adopting a paradigm from cognitive psychology to examine consequences of sharing memories in social groups. In the Collaborative Recall paradigm, we showed that the impact of collaboration is influenced by shared vs. unshared encoding of the material, and that discussing a public event leads to substantial convergence on a shared understanding of that event. We also conducted a methodologically innovative, quantitative and qualitative study of how older married couples share their memories. In a second stream of experiments, we used the retrieval-induced forgetting (RIF) paradigm to demonstrate “socially-shared retrieval-induced forgetting” (SS-RIF) during a conversation: in collaboration with Professor William Hirst, New School, we showed that even autobiographical memories can be influenced by these RIF effects. In our theoretical work, we sought to integrate the distributed cognition framework with psychological research on transactive memory, and responded to criticisms of the extended mind hypothesis. Across the board, we continue to use a range of methods to examine the products and processes, costs and benefits of remembering with others in ecologically valid ways.

From the Neuron to the Self: Human Nature and the New Cognitive Neurosciences
Amanda Barnier, Wayne Christensen, Max Coltheart, Stephen Crain, Robyn Langdon, John Sutton, with Catriona Mackenzie and Peter Menzies (Philosophy) and Tim Bayne (University of Oxford, UK)

Dramatic advances in neuroscience promise to transform our conception not only of the biology and dynamics of brain function, but also of personal identity and the roots of action. Active research programmes address the neural bases of deliberation and decision-making, emotion and empathy, moral judgement, the strengths and frailties of memory, and other capacities at the heart of our self-image. Some leaders in the field see the emerging neuroscientific image of human nature not as complementing ordinary conceptions of the self, but as revising or undermining them. Researchers in neuroscience, neuropsychiatry, and the cognitive sciences seek more subtle ways to characterize mental illness, volition, affect, agency, memory, and psychopathology, so as to improve investigative strategies and, ultimately, treatments. These research programmes are giving rise to new hybrid disciplines – neuroethics, neuropsychiatry, social cognitive neuroscience – that straddle the traditional divide between the neurosciences and the human sciences. In this interdisciplinary project between philosophy and cognitive science, we aim to offer scientifically-informed assessments of the impact of neuroscientific advances on specific assumptions about ethics, human nature, and social practices; a better interdisciplinary account of explanation in the neurosciences, informed by detailed empirical case studies and by recent accounts of scientific explanation; and detailed applications of our collaborative methods to three specific areas in which philosophical contributions can directly aid cognitive neuroscientific research – agency, emotion and moral decision-making, and memory. In 2009, in particular, we continued collaborative research on relations between levels of explanation in cognitive psychology and cognitive neuroscience.
We developed a mechanisms-based view that does justice to scientific practice, but resists the twin extremes by which psychology is either ruthlessly reduced to neuroscience or insulated and isolated from it. Wayne Christensen and John Sutton continued research with Doris McIlwain (Psychology) on agency in skilled and expert movement, and on relations between declarative and procedural memory. Robyn Langdon continued her interdisciplinary work with Catriona Mackenzie (Philosophy) on emotion, imagination, and moral reasoning, leading to a jointly edited volume on these topics forthcoming in 2010. Elizabeth Schier and John Sutton continued research on the history and conceptual basis of philosophy of cognitive science in Australasia. As well as these ongoing projects, a number of PhD students from MACCS and Philosophy now regularly attend joint research and reading groups, and embark on collaborative research across the two disciplines.
PhD Research Students

MACCS postgraduate research students have the opportunity to undertake a PhD in cognitive science across a broad range of fields, including psychology, linguistics, speech pathology, psychiatry, clinical psychology, and philosophy. Most MACCS PhD students complete their thesis in the journal article format. Journal article theses allow students to submit articles ready for publication prior to thesis submission. This gives students the opportunity to build their research track record during their PhD candidature, and sees them well placed for future academic employment.

Congratulations to our 2009 PhD graduands Dr Betty Mousikou, Dr Ann Rémond, Dr Helen Dodd, Dr Celia Harris, Dr Glenn Carruthers and Dr Ian Simpson.

This year we welcomed the arrival of 5 new Higher Degree Research students: Rocco Chiu, Nora Fieder, Linda Larsen, Donna McCade, and Lars Marstaller.

During 2009, our students published 59 journal articles, with a further 21 book chapters and 4 journal articles in press, as well as 16 published conference abstracts or papers. They were active participants in the international research community presenting at 34 international and 43 national conferences.

Nobu Akagi
Interpretation of Disjunction in Human Language
Professor Stephen Crain and Associate Professor Rosalind Thornton

I have investigated children’s understanding of a yes-no question with a logical word ‘or’, as in “Did John eat an apple or an orange?” In English this question can be interpreted as either asking whether or not John ate those fruits or which fruits John ate. In contrast, as an adult, some languages like Japanese can be only taken as the former interpretation. Interestingly, our experimental results show us that Japanese children could interpret this question like English, which offers a new insight into linguistic theory of questions.

Samantha Baggott
Processing Facial Expressions of Emotion
Associate Professor Mark Williams, Dr Romina Palermo and Dr Anina Rich

Emotional facial expressions are known to play a fundamental role in social interactions, with previous research indicating that the ability to respond to emotional words is influenced by emotional facial expressions that are task irrelevant. The current research aims to further investigate the conditions under which the processing of irrelevant emotional facial expressions occurs, by considering the effect of task requirements as well as the effect of different target and distractor types.

Anna (Lisi) Beyersmann
Morphological Processing in Visual Word Recognition by Children and Adults
Professors Anne Castles, Max Coltheart and Lyndsey Nickels

My research focuses on the role of morphological structure in visual word recognition in both children and adults.

Morphological representations are thought to be correlations between the physically perceived visual word form and the abstract neuronal representation of the word’s meaning. In order to compare different types of whole-word and morpheme-based theories, my PhD considers the role of the stem, the affix, and their relationship in morphological processing.

Michael Connors
Modelling the Mirrored-self Misidentification Delusion with Hypnosis
Associate Professor Amanda Barnier, Professor Max Coltheart, Associate Professor Robyn Langdon and Dr Rochelle Cox

My research uses hypnosis to model the mirrored-self misidentification delusion: the belief that one’s reflection in the mirror is a stranger. In clinical cases, the delusion can result when a patient has either a deficit in face processing or mirror agnosia (an inability to use mirror knowledge when interacting with mirrors). My research this year has shown that giving a hypnotic suggestion for these specific deficits can recreate the features of the delusion in the hypnosis laboratory.

Emily Connaughton
Delusions in Traumatic Brain Injury
Associate Professor Robyn Langdon and Professor Max Coltheart

Misidentification delusions involve the mistaken identity of a person or persons (e.g., the Capgras delusion – the delusional belief that a loved one has been replaced by an impostor). While the role of face
processing impairments in these delusions has been established, limited research has investigated the role of other person-identity information, such as voice. My research involves a series of single case studies investigating the contribution of both face and voice processing to the development and maintenance of these delusions.

**Helen Dodd**

**Beyond Behaviour: Exploring Anxiety and Sociability in Williams Syndrome**  
*Dr Melanie Porter, Associate Professor Robyn Langdon and Professor Max Coltheart*

During 2009 I conducted three experimental studies examining cognitive biases associated with anxiety and sociability in Williams syndrome (WS). Two of these studies used a dot-probe paradigm to examine attention bias in WS. The results suggested that individuals with WS are biased to attend towards happy, but not angry, faces and towards threatening scenes. The results of the third study suggested that individuals with WS are biased to interpret physical, but not social, ambiguous situations as threatening.

**Magda Dumitru**

**Cognitive Properties of Disjunctions and Conjunctions**  
*Professors Stephen Crain and Max Coltheart*

Thinking with conjunctions and disjunctions has long intrigued researchers in the fields of language, reasoning, and judgment and decision-making - the age-old question of whether disjunctions are inclusive or exclusive by default has remained largely unanswered, for instance. My contribution is to demonstrate that perceptual cues in processing actual or imaginary objects, as well as schemas of actions stored in long-term memory contribute to individual differences both in conjunctive interpretation and in judging the felicity of conjunction and disjunction structures.

**Nora Fieder**

**Representation for Count and Mass Nouns: Evidence from Brain-Impaired and Normal Speakers**  
*Professor Lyndsey Nickels and Dr Britta Biedermann*

My research focuses on the processing of mass and count nouns. Both noun groups differ syntactically. Count nouns for example can form a plural (e.g., ‘cats’) whereas mass nouns have no plural form (e.g., ‘milks’).

In previous studies it has been shown that mass and count nouns are processed differently by normal speakers. The aim of this study is to analyse differences between mass and count nouns at the syntactic level within individuals with and without language impairments and to extend theories of language processing regarding the representation of both categories in the language system.

**Celia Harris**

**Social Aspects of Autobiographical Memory**  
*Associate Professor Amanda Barrier and Professor John Sutton*

In my thesis research, I examined social influences on memory in a range of groups (from strangers to long-married couples) and using a range of quantitative and qualitative methods. Across a series of 6 studies, I examined how different kinds of groups are influenced by collaboration, and whether certain conditions improve group remembering. I also focused on the functions of remembering. Overall, I aimed to bridge the gap between theories of shared remembering and laboratory findings on collaborative recall. My thesis was passed in December 2009.

**Linda Larsen**

**Testing and Treating Phonological Dyslexia in Children**  
*Dr Genevieve McArthur, Dr Saskia Kohnen, Professors Anne Castles and Lyndsey Nickels*

The dual-route cascade (DRC) model of single word reading proposes that two procedures can be used to read words aloud. The first is a mental lexical lookup procedure (the lexical route), while the second relies on applying knowledge of letter-sound correspondences (the non-lexical route). My research will focus on the non-lexical route and its subcomponents. I will be conducting a series of studies with children with impaired non-lexical reading skills and my aim is to further our understanding of how to test and treat non-lexical reading impairments.

**Loes Koelewijin**

**Neural Mechanisms of Visual Attention and Salience**  
*Dr Anina Rich and Professor Krish D. Singh (Cardiff University)*

Humans are amazingly capable of attending successfully to items in the visual world, while at any time there are many irrelevant distractions to be inhibited.
at different ages or to detect when an auditory or visual processing impairment has been successfully treated using ERPs, we need to know what normal auditory or visual ERPs look like at different ages. We are measuring auditory and visual ERPs in children and young adults aged 10-25 years. Data obtained will be analyzed using different methods and development trajectories will be drawn for various auditory ERP peaks and components.

Tania Malouf
Lack of Insight After Traumatic Brain Injury: Developing a Neuropsychological Battery to Predict Long-term Impairment
Dr Robyn Langdon, Associate Professor Arthur Shores and Professor Max Coltheart
My area of research focuses on the factors that underlie a patient’s ability to recognise changes in themselves after a traumatic brain injury. This year I finished my data collection and have commenced analysis. I have completed neuropsychological assessment sessions and interviews with 45 patients at different time points since their injury. 24 patients were followed longitudinally for a 12 month period to document the change in their awareness level over time.

Lars Marstaller
Gestures and the Mind-tool Interface
Professor John Sutton and Dr Greg Downey
Speech accompanying gestures seem to lighten the cognitive load by somehow reducing the number of chunks in working memory. My hypothesis is that gestures are a strategy to use working memory capacity more flexibly by capitalizing on the idiosyncratic properties of different modalities and the associated differences in the ways they are processed. I am planning to measure hand movements to extract indicators of cognitive load. I am further conducting cognitive ethnographic research on the role of gestures during surfing instruction.

Hock Beng (Tommy) Ng
Can Systems of Anticipatory Postural Adjustment (APA) Provide Information About Motor Problems in Autism Spectrum Disorder (ASD)?
Dr Blake Johnson and Dr Jon Brock
Anomalies in ASD are characterized by a combination of cognitive, affective, and motor dysfunction. Research into motor functions in ASD reveals a poverty of motor coordination. This deficit, namely ‘clumsiness’, may be among the earliest symptoms of the disorders but little is known about the neurological bases of the problem. We investigated the systems of APA, an important component of motor coordination, by measuring brain activity from participants in a bimanual load-lifting task. When participants voluntarily lifted a weight placed on the arm, APA minimised arm deflection during unloading. Analyses showed that desynchronization of brain activity in the beta frequency band localised in the contralateral primary motor cortex preceded APA. We will compare this finding with those from an autistic sample to address problems of motor coordination in ASD.

Vince Polito
Agency and Hypnosis
Associate Professors Amanda Barrier, Robyn Langdon & Professor Max Coltheart, Dr Rochelle Cox and Professor Erik Woody (University of Waterloo)
The subjective experience of personal agency, i.e., the sense that our conscious intentions cause our actions, has become an important factor in theories of motor control, thought and consciousness. I am using hypnosis as a case study to investigate the phenomenology of agency changes, to develop and test paradigms for modifying sense of agency and to test existing theories of agency and hypnosis.

Davide Rivolta
Behavioural and Neurophysiological Correlates of Face Perception in Congenital Prosopagnosia
Dr Raimona Palermo, Associate Professor Mark Williams and Professor Max Coltheart
People with congenital prosopagnosia (CP) have a specific difficulty in recognizing other people by their faces despite not having any other neurological and cognitive deficits. In a series of behavioural experiments I have shown that some people with CP show covert (or implicit) recognition of faces that they cannot overtly recognize. In addition, I am now investigating the neural correlates of face recognition impairments using Magnetoencephalography (MEG) and functional MRI.

Tracey Shaw
Social Processing in Fragile X Syndrome
Dr Melanie Porter, Professor Max Coltheart and Associate Professor Robyn Langdon
Fragile X syndrome (FXS) is the most common cause of inherited intellectual impairment. It is also associated with socio-emotional difficulties including gaze aversion, shyness and increased rates of autism, social anxiety and schizotypal features. Anecdotally, social anxiety is considered to be one of the most debilitating symptoms associated with this disorder. As a result, the current research is focused on investigating several aspects of social functioning in individuals with FXS, including eye-scan paths, skin conductance responses and social approach behaviour.

Charlie Stone
From Autobiographical Memory to Collective Memory: An Interdisciplinary Study of Individual and Group Cognition
Associate Professor Amanda Barrier and Professor John Sutton
How communities forge collective memories has been a topic of long-standing interest among social scientists, and more recently psychologists. However, researchers have typically focused on how what is overtly remembered becomes collectively remembered.
My research is concerned with the role conversational silence plays in shaping collective memories through collective forgetting. To investigate this, I have used the recently developed socially shared retrieval-induced forgetting paradigm focusing on both meaningful material (i.e., autobiographical memories) and groups likely to form a collective memory (i.e., intimate couples).

Esther Su
The Interpretation of Disjunction in Mandarin Chinese
Professor Stephen Crain, Dr Rosalind Thornton and Professor Thomas H-un-tak Lee (The Chinese University of Hong Kong)
My research will explore how children and adults interpret disjunction in Mandarin Chinese. Specifically, I will investigate several putatively universal principles governing the interpretation of disjunction (for example, whether disjunction licenses conjunctive entailments in the scope of downward entailing expressions). I am also interested in the role of scalar implicatures in child Mandarin.

Hua-Chen Wang
Skills beyond Phonological Decoding in Orthographic Learning.
Professor Anne Castles, Professor Lyndsey Nickels, Dr Genevieve McArthur and Professor Max Coltheart
Reading and difficulties in reading have been the subject of intense study, yet how the recognition of words develops from seeing unfamiliar letter strings to accessing lexical units remains somewhat unclear. The most influential theory is the self-teaching hypothesis (Share, 1995), where orthographic learning depends primarily on phonological decoding. However, given the inconsistency of English spelling rules and the existence of children with phonological dyslexia, there are clearly skills required beyond phonological decoding. My PhD study aims to explore the role of semantic in orthographic learning and how it interacts with word regularity in both normal and poor readers.

Megan Willis
The Cognitive and Neural Mechanisms Underlying Facial Expression Recognition and Social Decision-Making
Dr Romina Palermo, Dr Darren Burke, Professor Max Coltheart and Dr Genevieve McArthur
This research has explored the role of the orbitofrontal cortex in social judgement and facial expression recognition. Our findings have revealed that damage to the orbitofrontal cortex results in an impaired ability to use the emotional faces of others to guide social judgements. We have also demonstrated that the orbitofrontal cortex plays a critical role in linking the perceptual representation of a facial expression to one’s conceptual knowledge of the emotion signalled by the facial expression.

Peng Zhou
Interface Conditions in Child Language: A View from Mandarin Chinese
Professor Stephen Crain, Dr Rosalind Thornton and Professor C.-T. James Huang (Harvard University)
This project looks at how different levels of linguistic knowledge contribute to children’s understanding of interface phenomena, like scope assignment, focus interpretation, etc. Specifically, this project explores three related questions concerning interface phenomena:
(1) What’s the nature of linguistic representations underlying children’s understanding of interface phenomena?
(2) To what extent do these representations differ from those of adults?
(3) What development underlies the differences between children and adults?
The answers to the three questions will help us understand children’s mastery of the interfaces between different levels of linguistic knowledge, which is crucial for modelling our human language processing system.

Regine Zopf
Body Illusions, Body Delusions and the Human Brain
Associate Professors Mark Williams, Greg Savage and Professor Max Coltheart
The aim of this project is to investigate how our brain creates the sensation that our body-parts belong to us. We investigated the sense of body-part ownership and its underlying sensory and sensorimotor processes using the rubber hand illusion. Together with Sandra Truong, Matthew Finkbeiner and Jason Friedman we investigated if action is affected by this illusion. In cooperation with Justin Harris (University of Sydney) we performed an experiment looking at changes of tactile acuity in relation to the sense of body-part ownership.
Industry & Community Links

Beijing Language & Culture University

Following on from 2008, when Macquarie University and Beijing Language and Cultural University (BLCU) signed a Memorandum of Understanding for research, Professor Stephen Crain and Associate Professor Rosalind Thornton were invited to lecture at BLCU in April 2009. As visiting Professors, Crain and Thornton were also part of a successful grant application by BLCU to the National Philosophy and Social Science Foundation Grant of China (09BYY022) entitled “Semantic Acquisition in Chinese and English: A Cross-linguistic Comparison of Children’s Understanding of Logical Words”. The international collaboration between BLCU and MQ was further strengthened by a visit in 2009 by BLCU President Professor Cui Xiliang. During this visit, President Cui signed an agreement with Macquarie University on student exchanges and toured the MACCS research labs and the KIT-MQ Brain Research Lab at Lane Cove Road.

Kanazawa Institute of Technology & Yokogawa Electric Corporation

In July 2008, the world’s first whole-head child MEG system was installed at the KIT-Macquarie Brain Research Laboratory. This laboratory is part of the Macquarie Centre for Cognitive Science (MACCS). The new child MEG system adds to an adult MEG system that was launched in 2006. The adult MEG system is the first of its kind in the Southern Hemisphere. With the new child system, the KIT-Macquarie Brain Research Laboratory is the first lab in the world to house two MEG systems in the same location. The child MEG system is funded, in part, by an Australian Research Council Linkage Industrial Partner Grant. This grant was awarded to Macquarie researchers (Professors Stephen Crain and Max Coltheart and Dr Rosalind Thornton) and to Professor Hisashi Kado, Director of the Applied Electronics Laboratory at the Kanazawa Institute of Technology in Japan. In developing the child MEG system we also received generous financial support from the Yokogawa Electric Co., the industry partner of the Kanazawa Institute of Technology.

Schizophrenia Research

Associate Professor Robyn Langdon and Dr Pamela Marsh are active members of the Schizophrenia Research Institute (SRI), a NSW government funded research organisation. Professor Max Coltheart and Dr Langdon are members of the Cognitive Neuroscience Research Panel, Schizophrenia Research Institute. Dr Pamela Marsh is financially supported by MACCS and NARSAD: The Mental Health Research Association. Dr Langdon is an ongoing active member of the Schizophrenia Research Unit, Sydney South West Area Health Service, based at Liverpool Hospital. Drs Langdon and Marsh work to promote public awareness of schizophrenia whenever possible, for example by hosting public forums, appearing on radio programmes and presenting to general community groups. With the assistance of Jonathan McGuire (Research Assistant), Dr Marsh co-ordinated and chaired two graduation ceremonies at Life Skills, Cumberland Hospital (Westmead) to recognise the achievements of the people with schizophrenia who completed her Mental-State Reasoning (MSR) program. Participants were awarded Certificates of Completion by Professor Max Coltheart at the inaugural graduation while certificates were awarded at the second graduation, which was held in conjunction with the Life Skills Christmas party by Professor Anne Castles.

Clinical Neuropsychology and Speech Pathology

The continued involvement of MACCS staff in teaching on Masters of Speech Pathology and Masters of Clinical Neuropsychology courses ensures that future clinicians are aware of the Centre’s research, its applicability to clinical practice and the role the Centre provides as a resource (for advice etc) for clinicians. Associate Professor Lyndsey Nickels also teaches on an equivalent course at the National University of Singapore.

In 2009, Associate Professor Nickels and Dr Saskia Kohnen have supervised Research theses undertaken by four Masters of Speech Pathology students. Undertaking such research projects is an excellent mechanism for equipping these future clinicians to become clinical researchers. Similarly, practicing clinicians are encouraged to undertake clinical research, become research active through working as research assistants at MACCS, and enrol for postgraduate research degrees. Associate Professor Nickels has current collaboration/ supervision of all three kinds of researcher. Two clinicians graduated with postgraduate research degrees in 2008 (Kohnen: PhD; Berarducci, MPhil), and one is currently enrolled (Miller-Amberber).

Associate Professor Nickels has had a longstanding collaboration with the clinicians of the Speech Pathology Service at Royal Rehabilitation Centre Sydney (RRCS). This collaboration and resulting external grant support has resulted in a large body of data that is currently being prepared for publication. In addition to the direct research gains, the research enhances the clinical and theoretical expertise of those clinicians involved. Associate Professor Nickels regularly meets with the clinicians at RRCS providing professional development seminars and informal advice and discussion. To recognise her role at RRCS Associate Professor Nickels was nominated as a clinical consultant to the speech pathology service. Associate Professor Nickels also has research collaborations with Speech Pathologists at Bankstown Hospital (Starr), and War Memorial Hospital (Taylor, Miles Kingma) with resulting conference presentations and publications.

Associate Professor Nickels continues her role as the invited Academic Member of the NSW Speech Pathology Evidence Based practice group (Adult Language), a group that meets bi-monthly to critically appraise the evidence supporting clinical questions and topics. Associate Professor Nickels also contributes to professional development workshops for various NSW health regions and Speech Pathology Australia.

MACCS also acts as a clinical resource for speech pathologists and clinical neuropsychologists on an ad-hoc basis. That is, clinicians are encouraged to use the Centre for discussion and advice regarding assessment and rehabilitation of clients. Clinicians ring, email and visit the Centre for discussion and advice. That is, clinicians are encouraged to use the Centre for discussion and advice regarding assessment and rehabilitation of clients. Clinicians ring, email and visit the Centre for these purposes, and MACCS staff provide seminars/professional development courses on request.
Intrepica

Researchers in the MACCS Reading Training Study (Genevieve McArthur, Anne Castles, Linda Larsen, Kristy Jones, Saskia Kohnen) are collaborating with the team at Intrepica, a new online reading training program being developed in Queensland. We know from human and animal training studies that there are four necessary ingredients to learning a task: attention, motivation, repetition, and feedback. We also know from reading research that there are two necessary skills for learning to read new words: the ability to use the letter-sound rules (i.e., phonics) and the ability to read words by sight. Intrepica includes all these necessary elements: It engages students attention with its sophisticated graphics and design; it motivates students’ to practice their reading skills by rewarding students with points that can be used to buy clothes for their avatar or buy online games; it encourages students to repeat exercises many times to hone their skills (and earn more points!); and provides highly engaging feedback. Further, Intrepica includes dozens of exercises that train students’ letter-sound reading and their sight-word reading. The MACCS Reading Training Study team are acting as consultants for the development of Intrepica. In exchange, Intrepica is adjusting the format of its programme so that it can be used in the MACCS Reading Training Study in 2010.

Macquarie Online Test Interface (MOTIf)

Researchers in the MACCS Reading Training Study (Genevieve McArthur, Anne Castles, Saskia Kohnen, Thushara Anandakumar) are collaborating with LazyKate (Pip Jones) in developing the Macquarie Online Test Interface (MOTIf; www.motif.org.au). MOTIf is an online facility designed to automatically administer, score, and provide reports for cognitive tests developed by Macquarie researchers. The test results of each registered user of MOTIf are stored in a secure and private database. MOTIf 1.0 includes four cognitive tests, one of which is fully automated (the remaining three tests are in pdf form). Despite this modest start, MOTIf 1.0 already has around 300 approved registered users from around the world (researchers, teachers and therapists). In addition, MOTIf 1.0 was highly commended at the 2009 Macquarie University Innovation Awards. Given the demonstrated demand for, and success of, the pilot MOTIf 1.0, we are now further developing the MOTIf facility (MOTIf 2.0) by adding a more complete range of tests created by Macquarie researchers. Additionally this team (McArthur, Castles, Kohnen, Jones, Barriball, Ananakumar, and Larsen) are collaborating with Lexia, a reading teaching program, to assess the phonics components of the program. They are also collaborating with Macroworks to assess the efficacy of a lexical reading program in children with dyslexia.
Collaborations

**Associate Professor Amanda Barnier** is collaborating with Prof David Balota (University of Washington, USA), Dr Roger Dixon (University of Alberta, Canada), Prof Suparna Rajaram (Stony Brook University, USA), A/Prof Greg Savage, Prof John Sutton (Macquarie University, Australia) and Prof William Hirst (The New School, USA) on individual, collaborative, social and collective memory.

Barnier is also collaborating with Dr Adam Brown (New York University) on autobiographical and social memory, especially in trauma.

Barnier continues her collaboration with Prof Max Coltheart, Dr Rochelle Cox and A/Prof Robyn Langdon (Macquarie Centre for Cognitive Sciences), Dr Nora Breen (Royal Prince Alfred Hospital, Australia), Dr Lisa Bortolotti (University of Birmingham, UK) and Dr Martha Turner (Institute of Cognitive Neuroscience, UK) on hypnotic analyses of clinical delusions (University of Leeds).

Branier is also collaborating with Prof Peter Halligan (University of Cardiff, UK) and Dr David Oakley (University of Cardiff, UK) on instrumental uses of hypnosis, including hypnotic analogues of neuropsychological and neuropsychiatric conditions.

Barnier is also collaborating with Prof Erik Woody (University of Waterloo, Canada) on conceptualising and measuring individual differences in hypnotic ability.

**Dr Britta Biedermann** is collaborating with Dr Antje Lorenz (University of Potsdam, Germany) comparing German and English plural errors in aphasispe.

Biedermann is collaborating with Ms. Samantha Siyambalapitiya (James Cook University, Australia) on ‘cognates in bilingual unimpaired speakers and speakers with bilingual aphasia – German / English, Italian / English’.

**Dr Jon Brock** is collaborating with Dr Lisa Archibald (University of Western Ontario, Canada) and the speech pathology team at Royal Far West Children’s Hospital, comparing phonological memory skills in children with autism and specific language impairment.

Brock has an ongoing collaboration with Prof Kate Nation (Oxford University, UK) using eye-tracking to investigate language comprehension in children with autism.

**Brock and Dr Blake Johnson** are collaborating with Prof Rhosbel Lenroot (NeuRA / UNSW) on a study of brain oscillations and neurotransmitters in adolescents with autism

Brock and Dr Blake Johnson are also collaborating with Prof Valsa Eapen (UNSW / Liverpool Autism Specific Early Learning and Care Centre) to develop ways of testing pre-schoolers with autism using MEG.

**Professor Anne Castles** collaborated with Prof Kate Nation (Oxford University, UK) on their joint ARC Discovery Project on orthographic learning processes in children.

Castles collaborated with Prof Denis Burnham (University of Western Sydney, Australia) on Language Specific Speech Perception and its relationship with reading development.

Castles collaborated with Prof Sheena Reilly, Prof Margot Prior, A/Prof Melissa Wake, Prof John Carlin and Dr Lesley Bretherton of the University of Melbourne and the Murdoch Children’s Research Institute on an NHMRC project, the Early Language in Victoria (ELVS) study.

Castles collaborated with A/Prof Naama Friedmann (Tel Aviv University, Israel) on their jointly-authored book on subtypes of developmental dyslexia.

**Professor Max Coltheart** and Dr Robyn Langdon are collaborating with Dr Ryan McKay (University of Zurich, Switzerland) on motivational factors in delusion.

Coltheart, Ass. Prof Robyn Langdon and A/Prof Amanda Barnier, in collaboration with Prof Richard Bryant (University of New South Wales, Australia) conducted research on a hypnotic model of mirror delusions.

Coltheart and Dr Claudio Mulatti (University of Trento, Italy) have been working in computational modeling of reading (Italian and English) and a PhD student of Dr Mulatti’s will shortly be coming to spend time at MACCS working on this project.

Coltheart has another collaborative project on computational modeling with Prof Kathy Rastle (Royal Holloway College, University of London, UK), Prof Taeko Wydell (Brunel University, UK) and Dr Jelena Havelska (University of Leeds, UK) and Prof Derek Besner (University of Waterloo, Canada).

**Professor Stephen Crain** has ongoing collaborations with Dr Takuya Goro, (Takayama University, Japan) on the acquisition of logical words in Japanese and in English.

Crain and A/Prof Rosalind Thornton have continued their collaboration with Prof Liquin Gao (Beijing Language and Culture University, China) on the acquisition of logical words in Mandarin Chinese and in English.

Crain, Dr Blake Johnson and Dr Catherine McMahon continue to collaborate with Prof Gen Uehara (Applied Electronics Laboratory, Kanazawa Institute of Technology, Japan) on developing the world’s first MEG brain imaging system for measuring brain responses in people with cochlear implants.

Crain has another collaborative project working with Dr Cathy Foley and Dr Marcel Bick (CSIRO) on developing a Liquid Helium Recovery System for the MEG brain imaging systems that will be located at the Hearing Hub.

Crain and Dr Blake Johnson are currently collaborating with HEARing CRC, Sydney Cochlear Implant Centre, National Acoustic Laboratories and Cochlear Ltd on the cortical evaluation of implant performance.

**Dr Blake Johnson** is collaborating with Prof Andrew Heathcote and Dr Scott Brown (University of Newcastle, Australia) on acquisition of expertise in spatial imagery.

Johnson also collaborates with Dr Penelope McNulty and Prof Lindy Rae (Neuroscience Research Australia) on imaging of brain recovery after stroke.

Johnson collaborates with Prof Rhosbel Lenroot (Neuroscience Research Australia) on the relationship between GABA levels and neural oscillations in autism.

Johnson, Prof Stephen Crain and Assoc. Prof Rosalind Thornton are collaborating with A/Prof Drew Khlentzos (University of New England, Australia), Prof Ovid Tzeng (Academia Sinica,Taiwan) and Prof Thomas Lee and Prof Liquin Gao, (Beijing Language and Culture University, China) on “The emergence of logic in child language”.

Dr Blake Johnson is collaborating with Prof Andrew Heathcote and Dr Scott Brown (University of Newcastle, Australia) on acquisition of expertise in spatial imagery.
Johnson is a collaborating with Dr Michael Hautus (University of Auckland, New Zealand) on brain mechanisms of auditory scene analysis.

**Associate Professor Sachiko Kinoshita** is collaborating with Dr Dennis Norris (MRC Cognition and Brain Sciences Unit, UK) on developing a Bayesian model of masked priming funded through an ARC Discovery Project grant.

Kinoshita also continues her collaboration with Prof Kenneth Forster (University of Arizona, USA) on their joint National Science Foundation (USA) funded grant titled “Unconscious processes in word recognition”.

Kinoshita continues to work with Prof Niels Schiller (Leiden University, the Netherlands) on masked onset priming effects in reading aloud.

Kinoshita also continues to collaborate with Prof Michael Mozer (University of Colorado, USA) and Prof Stephen Lupker (University of Western Ontario, Canada) on their joint ARC Discovery grant “Developing a general theory of RT control”.

**Associate Professor Robyn Langdon** continues to collaborate with German colleague, Prof Martin Brüne (University of Bochum, Germany), on the relations between poor social cognition and social behavioural problems in schizophrenia.

Langdon also collaborates with Dr Simon Jones (University of Durham, UK) on the ‘inner-speech’ theory of auditory verbal hallucinations (or hearing voices).

Langdon has continued her collaboration with clinical neuropsychologist, Dr Martha Turner (University College, UK), and philosopher, Dr Tim Bayne (Oxford University, UK), on the relations between delusion and confabulation in amnesic brain-injured patients.

Langdon also continues to collaborate with Dr Ryan McKay (Royal Holloway, University of London, UK) and her local colleague, Prof Max Coltheart, to extend the original two-deficit model of bizarre delusions to incorporate motivational factors into a more generic two-factor explanatory framework.

**Dr Genevieve McArthur** is collaborating with Prof Maggie Snowling and Prof Charles Hulme (University of York, UK) helping with the auditory processing component of a Wellcome Trust funded study that they are doing with children with spoken language and reading impairments.

McArthur, Dr Romina Palermo and Mr Pete de Lissa are collaborating with Dr Florian Hutzler and Mr. Stefan Howelka (Salzburg University, Austria) on a project using fixation-related potentials (FRPs) to investigate the N170 brain response to eyes in faces.

McArthur and Mr. Pete de Lissa are collaborating with Dr Florian Hutzler and Mr. Stefan Howelka (Salzburg University, Austria) on a project using FRPs to compare sentence processing in Austrian and Australian readers.

McArthur and Prof Coltheart are collaborating with Prof Lindy Rae (Prince of Wales Medical Research Institute, Australia) and A/Prof Michael Breakspear (Black Dog Institute, Australia) on an fMRI study that is investigating the lexical and non-lexical routes in the brain in children with developmental dyslexia.

**Lars Marstaller** is collaborating with Prof Chris Adami and Dr Arend Hintze (Keck Graduate Institute for Applied Life Sciences, Claremont, CA, USA / California Institute of Technology, Pasadena, CA, USA) on an informal project that is aimed at establishing a quantifiable definition of representation in cognitive systems.

**Associate Professor Lyndsey Nickels** collaborates with Dr Karen Croot (University of Sydney, Australia) and Ms. Catheen Taylor (War Memorial Hospital, Australia) on intervention for individuals for progressive language disorders.

Nickels is collaborating Dr David Copland, Dr Anthony Angwin, Dr Katie McMahon, Ms Shiree Heath, Dr Anna Holmes (University of Queensland, Australia) on a project using functional brain imaging (fMRI) to provide insights into whether different treatments for word retrieval impairments following brain damage (anomia) are working in the same way. The project is funded by a successful ARC Discovery grant from 2008. This research is reaching its conclusion with papers currently being prepared for publication.

Nickels is also collaborating with Dr Wendy Best (University College London, UK) and Prof David Howard (Newcastle University, UK), and is reviewing common methodological failings in single case study treatment research, and writing a paper on this issue.

Nickels, Dr Kati Renvall and Dr Britta Biedermann collaborate with a large network of researchers nationally and internationally through the Centre for Clinical Research Excellence in aphasia rehabilitation.

**Dr Anina Rich** collaborated with Prof Jeremy Wolfe (Harvard University/B Brigham & Women’s Hospital, USA), Dr Melina Kunar (Warwick University, UK), & A/Prof Todd Horowitz (Harvard University/B Brigham & Women’s Hospital, USA) on the effect of low target prevalence on visual search. This topic is of particular interest given the number of real-world searches in which the target is rare, such as baggage screening at the airport, or cytopathology screening. The results of this collaboration have been accepted for publication in Visual Cognition.

Rich also collaborates with Prof Jeremy Wolfe (Harvard University/B Brigham & Women’s Hospital, USA), Dr Ester Reijnen (University of Basel, Switzerland), and Ass. Profs. Angela Brown & Delwin Lindsay (Ohio State University, USA). This project explored the role of colour categories in guiding attention, and is currently under review.

Rich collaborated with A/Prof Todd Horowitz (Harvard University/B Brigham & Women’s Hospital, USA) on (1) the extent to which salient distracting information can impair the ability to track moving objects; and (2) the effect on visual search of segregating moving and stationary stimuli. A/Prof Horowitz and Rich were successful in an ARC APD+Discovery Project grant, which started in June 2009.

Rich collaborated with Dr David Fencsik (California State University, USA) on the effect of synaesthesia on visual working memory. The results of this project will be presented at the Vision Sciences Society conference in Florida, USA in May 2010.

Rich also collaborated with Dr Nicolas Bullot (Research Center for the Arts and Language, France) on integrated tracking of agents. Dr Bullot was successful
in gaining a Macquarie University Postdoctoral Fellowship and will be joining MACCS in 2010.

Rich collaborated with Dr Irina Harris (University of Sydney, Australia), Dr Mark Williams (MACCS) Dr David Whitney & Mr Jason Haberman (University of California Davis, USA), & Dr Will Hayward (University of Hong Kong, China) on a project which explores the cognitive and neural mechanisms underlying recognition of individual objects and sets.

Rich collaborated with A/Prof Richard Stevenson (Department of Psychology, MQ) & Mr Alex Russell (University of Sydney, Australia) on olfactory synaesthesia.

Dr Rachel Robbins has an ongoing collaboration with Prof Daphne Maurer and Prof Terri Lewis of McMaster (University, Ontario, Canada) looking at the role of early visual experience in face and object recognition. We test patients who have had their sight restored after being born blind from cataracts, as well as visually normal controls. I have also started collaboration with Dr John Grigg, an Ophthalmologist (University of Sydney, Australia) to test such patients in Australia.

Robbins also collaborates with Dr Romina Palermo (ANU), exploring navigation abilities in people with face recognition problems (prosopagnosia). And also collaborates with Dr Kevin Brooks (Macquarie University, Australia) looking at the effects of instructions on face adaptation.
On irrationality of human behaviour: Evolutionary game theory and psychopathology. [13th January]
Martin Brüne
Centre for Psychiatry, Psychotherapy, Psychosomatics and Preventative Medicine, University of Bochum, Germany

The cognitive neuropsychiatry of schizophrenia: hallucinations and delusions. [20th January]
Todd Woodward
Department of Psychiatry, University of British Columbia, Canada

Mirror neurons and the representation of word meaning. [6th February]
Greig de Zubicaray
Centre for Magnetic Resonance, University of Queensland, Australia

Individual differences in face processing ability reveal a dissociation between identity and expression recognition. [12th February]
David White
Department of Psychology, University of Glasgow, UK

Neural mechanisms of attention: Insights from TMS and concurrent TMS-fMRI. [20th February]
Christopher Chambers
School of Psychology, Cardiff University, UK

Resolving Visual Conflict. [5th March]
Randolph Blake
Department of Psychology, Vanderbilt University, USA

Bilateral and contralateral maintenance of visual information in the parietal cortex: convergence and complementarity of MEG, EEG and fMRI results. [24th March]
Nicolas Robitaille
School of Psychology, University of Sydney, Australia

Masked Priming. [25th March]
Ken Forster
Department of Psychology, University of Arizona, USA

Learning to read words: what’s meaning got to do with it? [31st March]
Kate Nation
Department of Experimental Psychology, University of Oxford, UK

Topic, focus and quantifiers in Hungarian. [3rd April]
Kriszta Szendroi
Department of Human Communication Science, University College London, UK

What do colour experiences represent? [7th April]
Liz Schier
MACCS, Macquarie University, Australia

Information Acquisition, Diagnosis, and Sensemaking in High Consequence Environments. [21st April]
Mark Wiggins
Department of Psychology, Macquarie University, Australia

The cognitive consequences of cultural variation: a neuropsycholinguistic perspective from sports. [28th April]
Greg Downey
Department of Anthropology, Macquarie University, Australia

The dynamics of decision processes: Evidence from the finger. [5th May]
Matthew Finkbeiner
MACCS, Macquarie University, Australia

Nativism, Knowledge and Belief. [19th May]
Drew Khlentzos
Language and Cognition Research Centre, University of New England, Australia

Emotions and Appraisals. [26th May]
Philip Gerrans
Department of Philosophy, The University of Adelaide, Australia

Behavioural Dissociation but Neural Unity in an English-Japanese Bilingual with Monolingual Dyslexia. [9th June]
Taeko Wydell
Centre for Cognition and Neuroimaging, Brunel University, UK

Eight Illusions of colour & motion. [1st July]
Stuart Anstis
Department of Psychology, University of California, San Diego, USA

It’s Alive! Perceiving Animacy, and the Psychophysics of Chasing. [1st July]
Brian Scholl
Department of Psychology, Yale University, USA

Code-switching in bilingual aphasia: experimental evidence of grammatical impairment. [1st July]
Amanda Miller-Amberber
MACCS, Macquarie University, Australia

The Body In Mind. [7th July]
Peter Halligan
School of Psychology, Cardiff University, UK

Spatial Cognition and Foraging Ecology: Exploring the adaptive nature of cognitive mechanisms. [14th July]
Danielle Sulikowski
Centre for the Integrative Study of Animal Behaviour, Macquarie University, Australia

Seeing the minds eye: mental imagery and conscious vision. [4th August]
Joel Pearson
Pearson Lab, University of New South Wales, Australia

Grasping: insights into a redundant motor system. [25th August]
Jason Friedman
MACCS, Macquarie University, Australia

Latest happenings in the MACCS ERP-FFP lab: Using event-related potentials (ERPs) to measure automatic processing of speech, music, words, and faces. [8th September]
Genevieve McArthur, Varghese Peter, Yatin Mahajan, Peter de Lissa
MACCS, Macquarie University, Australia

The importance of being there: Memory conformity for passive and actively experienced events. [8th September]
Richard Kemp
School of Psychology, University of New South Wales, Australia
Speaking with pruned trees: The syntactic tree as a cognitive model.
[15th September]
Naama Friedmann
School of Education,
Tel Aviv University, Israel

Memory – Classifications, Neural Correlates and Pathological Aspects.
[29th September]
Hans J. Markowitsch
Physiological Psychology,
University of Bielefeld, Germany

Making sense of group cognition.
[6th October]
Georg Theiner
Department of Philosophy,
University of Alberta, Canada

The role of anterior insula in risk-sensitive learning.
[13th October]
Kerstin Preuschoff
Institute for Empirical Research in Economics,
University of Zurich

The epidemiology of memory: An interdisciplinary approach to the study of collective memories
[3rd November]
Charles Stone
MACCS,
Macquarie University, Australia

Genetic influences on school achievement: Implications for parents, educators, and policy-makers.
[24th November]
Brian Byrne
School of Behavioural, Cognitive and Social Sciences,
University of New England, Australia

Practicing Perfection: Memory for Music Performance.
[26th November]
Roger Chaffin
Department of Psychology,
University of Connecticut, USA

Slow Looking: whatever happened to selective attention?
[27th November]
Barbara Maria Stafford
Department of Art History,
University of Chicago, USA

The essential nature of human consciousness and the personal acquisition of mind.
[17th December]
Peter Burton
Quality of Life and Social Justice Research Department,
Australian Catholic University, Australia
Publications

Language

Books


Book Chapters


Journal Articles


Published Abstract


Belief

Book Chapters


Visual Cognition

Books


Book Chapters


Journal Articles


Belief

Book Chapters


Published Abstracts


Symposia 2009

Keynotes and Invited Symposia


Schmalzl, L. (2009, September). Case studies of prosopagnosia and fMRI investigations of visual face and body perception. Invited presentation given at the Laboratoire de Cognitive Neuroscience, Brain-Mind Institute, École Polytechnique Federale de Lausanne, Switzerland.


Conference Papers


Colloquia and other presentations


Baggott, S., Williams, M., & Palermo, R. (2009, April). The lion, the face, and the processing of distractors. Presentation given at the 36th Australasian Experimental Psychology, University of Wollongong, Australia.


Nickels, L. (2009, April). Word retrieval impairments - more on dissecting treatment approaches. Presentation given at the Professional Development seminar, Royal Rehabilitation Centre Sydney, Sydney, Australia.


Ursini, F. (2009, October). The Semantics Of Space: From Theory To Experiment. Presentation given at the MARCS MMN seminar, University of Western Sydney, Australia.


Posters


Media Publicity

21 May 2009 - Body Identity
http://www.abc.net.au/catalyst/stories/2576978.htm

Anne Castles
Channel 7, Today Tonight
4 November 2009
Your Baby Can Read

Max Coltheart
Central Coast Express – Advocate,
2 October 2009
Help to Overcome Dyslexia

Central Coast Express Advocate
2 Oct 2009

The Australian
29 September 2009
Only one state makes right sounds on
learning to read

Herald Sun
27 September 2009
Funding Calls on Dyslexia
Awards & Recognition

Awards
Macquarie University Innovation Awards
Highly Commended
Dr Genevieve McArthur and Professor Anne Castles
Testing Cognitive Skills Online: The Macquarie Online Test Interface (MOTIf).

Higher Degree Research Excellence Award
Peng Zhou
Faculty of Human Sciences, Macquarie University

Appointments and Promotions
External Appointments
Associate Professor Amanda Barnier - Fellow, Australian Research Council. (2007 - 2011)
Associate Professor Amanda Barnier - Editor, Memory Studies. (2006 continuing)
Associate Professor Amanda Barnier - Associate Editor, Australian Journal of Clinical and Experimental Hypnosis. (2004 continuing)
Professor Anne Castles - Associate Editor, Journal of Research in Reading. (2006 continuing)
Professor Anne Castles - Editorial Board, Scientific Studies of Reading. (2002 continuing)
Professor Anne Castles - Editorial Board, European Journal of Cognitive Psychology. (2006 continuing)
Professor Anne Castles - Invited Guest Editor, Orthographic processes in reading. Special Issue of Journal of Research in Reading. (2006 continuing)
Professor Anne Castles - Fellow, Academy of the Social Sciences in Australia. (2010 continuing)
Emeritus Professor Max Coltheart - Honorary Professor, School of Psychology, School of Health and Rehabilitation Sciences and the Queensland Brain Institute. (2004 - 2014)
Emeritus Professor Max Coltheart - Academic Director, Childrens Hospital Education Research Institute (CHERI), The Childrens Hospital at Westmead. (2004 - 2009)
Associate Professor Veronika Coltheart - Consulting Editor, Journal of Experimental Psychology. (2002 continuing)
Emeritus Professor Max Coltheart - Chair, National Committee for Brain and Mind, Australian Academy of Science. (2007 - 2009)
Emeritus Professor Max Coltheart - Member, Council, Macquarie University. (2007 - 2009)
Emeritus Professor Max Coltheart - President, Learning Difficulties Australia. (2008 - 2009)
Emeritus Professor Max Coltheart - Chair, International Benchmarking Review of UK Psychology Panel. (2010)
Distinguished Professor Stephen Crain - Editorial Board, Journal of Child Language. (2005 continuing)
Distinguished Professor Stephen Crain - Editorial Board, Biolinguistics. (2006 continuing)
Distinguished Professor Stephen Crain - Advisory Board, Language Acquisition. (2003 continuing)
Distinguished Professor Stephen Crain - Executive Board, Society for Language Development. (2002 continuing)
Distinguished Professor Stephen Crain - Federation Fellow, Australian Research Council. (2004 - 2009)
Distinguished Professor Stephen Crain - Fellow, Academy of the Social Sciences in Australia. (2006 continuing)
Distinguished Professor Stephen Crain - Director, Centre for Language Sciences, Macquarie University, Australia. (2007 - 2011)
Distinguished Professor Stephen Crain - Editorial Board, Semantics and Pragmatics. (2008 continuing)
Distinguished Professor Stephen Crain - Advisory Board, Tokyo Conference on Psycholinguistics (TCP). (2011 continuing)
Distinguished Professor Stephen Crain - Editorial Advisory Board, English Linguistics, English Linguistics Society of Japan. (2010 continuing)
Dr Matthew Finkbeiner - Guest Editor, Cognitive Neuropsychology. (2008 continuing)
Dr Matthew Finkbeiner - Guest Editor, Acta Psychologica. (2008 continuing)
Dr Celia Harris - Editorial Assistant, Memory Studies. (2007 continuing)
Associate Professor Sachiko Kinoshita - Associate Editor, Quarterly Journal of Experimental Psychology. (2005 continuing)
Associate Professor Sachiko Kinoshita - Consulting Editor, Journal of Memory and Language. (2010 continuing)
Associate Professor Robyn Langdon - Adjunct Visiting Fellow, School of Psychiatry, University of New South Wales. (2006 - 2009)
Associate Professor Robyn Langdon - Member, Cognition & Connectivity Research Panel, schizophrenia Research Institute, Australia. (2005 continuing)
Associate Professor Robyn Langdon - Member, Schizophrenia Research Unit, Sydney South West Area Health Service. (2005 continuing)
Associate Professor Genevieve McArthur - Editorial Board, Scientific Studies of Reading. (2009 continuing)
Associate Professor Genevieve McArthur - Panel Member, NHMRC Review Panel. (2010)
Associate Professor Genevieve McArthur - Academic Editor, PLoS-One. (2011 continuing)
**Professor Lyndsey Nickels** - Associate Editor, Aphasiology. (2003 continuing)


**Professor Lyndsey Nickels** - Clinical Consultant, Royal Rehabilitation Centre Sydney. (2006 - 2009)


**Associate Professor Greg Savage** - Adjunct Senior Research Fellow, School of Psychology & Psychiatry, Monash University. (2007 - 2012)

**Associate Professor Greg Savage** - Clinical Neuropsychologist, Macquarie Neurosurgery and Macquarie University Hospital. (2007 continuing)

**Dr Charlie Stone** - Editorial Assistant, Memory Studies. (2007 continuing)

**Professor John Sutton** - Co-Editor, Memory Studies (Sage). (2006 continuing)

**Professor John Sutton** - Editorial Board, Philosophical Psychology. (2006 continuing)

**Professor John Sutton** - Editorial Board, Neuroethics. (2008 continuing)

**Professor John Sutton** - Editorial Board, Scan: journal of media arts culture. (2004 continuing)


**Professor John Sutton** - Co-Editor, Memory Studies (Palgrave Macmillan book series). (2009 continuing)

**Associate Professor Mark Williams** - Academic Editor, PLoS-One. (2009 continuing)

**Associate Professor Mark Williams** - Conjoint Senior Lecturer, School of Psychiatry, University of New South Wales. (2008 - 2010)


Grants


ARC Discovery Project Grant (2009 - 2013) “How does the brain process facial expressions?” Williams, M.A. ($609,610)

ARC Discovery Project Grant (2009 - 2014) “Integrating holistic processing and face-space approaches to the perception of facial identity.” McKone, E., Edwards, M., & Aimola Davies, A. ($4,950,000)


ARC Discovery Project Grant (2009 - 2011) “A new theory of visual word recognition and reading aloud.” Coltheart, M. ($2,824,000)

ARC Discovery Project Grant (2009 - 2011) “Learning to read words: Beyond alphabetic skills.” Castles, A., & Nation, K. ($2,000,000)

ARC Discovery Project Grant (2009 - 2011) “The human face as an evolved signalling system.” Burke, D., Palermo, R., Williams, M.A., & Favelle, S. ($1,850,000)


ARC Discovery Project Grant (2008 - 2011) “The meaning of OR in logic and human languages.” Thornton, R. ($2,870,000)

ARC Discovery Project Grant (2008 - 2010) “Masked Priming in the Bayesian Reader.” Kinoshita, S., & Norris, D. ($130,000)


ARC Discovery Project Grant and Australian Research Fellowship (2007 - 2011) “From autobiographical memory to collective memory: An interdisciplinary study of individual and group cognition.” Barrier, A., & Sutton, J. ($4,100,000)


ARC Linkage Project grant, with Yokogawa Electric Co. as a partner organisation (2006 - 2009) “An MEG (brain imaging) system to study cognitive processes in children.” (Total grant contribution $970,000) Crain, S., Coltheart, M., Thornton, R., & Kado, H. ($220,000)


NHMRC Project Grant (2008 - 2010) “Selective attention and the processing of observed actions”. Cunnington, R., Mattingley, J., & Williams, M.A. ($326,000)


NICHD R01 HD057606 (2008 - 2013) Constraints on phonological and morphological development. Demuth, K., & Shattuck-Hufnagel, S. ($1)


NSF PIRE international training program in computational linguistics (2009 - 2014) “Collaborative investigation of meaning representation in language processing.” Johnson, M. & Charniak, E. ($1,064,990)

NSF PIRE international training program in computational linguistics (2009 - 2014) “Collaborative investigation of meaning representation in language processing.” Johnson, M. & Charniak, E. ($1,064,990)

NSF PIRE international training program in computational linguistics (2009 - 2014) “Collaborative investigation of meaning representation in language processing.” Johnson, M. & Charniak, E. ($1,064,990)

NSF PIRE international training program in computational linguistics (2009 - 2014) “Collaborative investigation of meaning representation in language processing.” Johnson, M. & Charniak, E. ($1,064,990)

NSW Office for Science & Medical Research Life Sciences Award (2007 - 2011) Hodges, J. ($400,000)


International Grants

SKF (Stichting Kohnstamm Fonds [Kohnstamm Foundation Fund for Educational Research]) (2005 - 2010) “Travel grants for visiting national and international conferences.” Marinus, E. ($6,000)


Internal Research Grants

MACCS Postgraduate Grant (2009) Ursini, F. ($2,200)

MACCS Postgraduate Grant (2009) Beyersmann, A.E. ($606)

MACCS Postgraduate Grant (2008 - 2012) Huang, A. ($12,000)

MACCS Postgraduate Grant (2008 - 2009) Su, Y. ($12,000)

Macquarie International Student Travel Grant (2009) Beyersmann, A.E. ($1,500)

Macquarie University International Travel Scholarship (2009) Koolewijn, L. ($1,000)

Macquarie University Division of Linguistics and Psychology International Visiting Research Fellowship (2008 - 2009) “Professor Peter Halligan.” Bari, N. ($6,000)

Macquarie University International Travel Grant (2009) Huang, A. ($1,500)


Macquarie University PGF Grant (2009) Dumitru, M. ($4,000)


Macquarie University Research Fellowship (MQRF) (2008 - 2010) “Informing spoken word production theories using data from brain-impaired speakers.” Biedermann, B. ($267,100)


