ACNS Early Satellite EEG-fMRI Symposium

John Hunter Hospital / University of Newcastle, NSW, AUSTRALIA
20th November 2016

Scope

Concurrent EEG-fMRI can:

- overcome the inherent sensitivity limitations of both EEG and fMRI
- enable the investigation of underlying mechanisms and cortical development
- assist with identification of generators and mapping of the cortical network and cognitive function,

with applications in the fields of epilepsy research, anaesthesiology, pain research and in the greater areas of cognitive science and neuroscience. However, technical and methodological challenges regarding acquisition of good quality data and subject safety can preclude the use of concurrent EEG-fMRI.

This Symposia and workshop aim to provide theoretical and practical training about deriving EEG in the MR environment, and to offer ideas about how concurrent EEG-fMRI can be used to answer scientific and clinical questions.

Organizers

Bryan Paton (University of Newcastle), Dr. Vinh Nguyen (QIMR Berghofer),
Agnieszka Iwasiw (Symbiotic Devices AUST & NZ) and Brain Products GmbH, Germany

Details

When	1pm, 20th November 2016
Location	University of Newcastle
Speakers	› Dr. David Carmichael, UCL Institute of Child Health (United Kingdom)
	› Dr. Vinh Nguyen, QIMR Berghofer (Australia)
	› Dr. Suresh Muthukumaraswamy, University of Auckland (Australia)
	› Aaron Warren, Florey Department of Neuroscience and Mental Health Department (Australia)
	› Dr. Jorge Joao, Laboratory for Functional and Metabolic Imaging, EPFL, Lausanne (Switzerland)
	› Brain Products GmbH (Germany)

› Dr. Vinh Nguyen, Research officer (QIMR Berghofer)

Dr. Nguyen was awarded a PhD degree of Computational Neuroscience at Queensland Brain Institute, The University of Queensland in 2014 under the supervision of A. Prof Ross Cunnington and Prof. Michael Breakspear. The PhD project examined neural responses across modalities with a focus on the integration of EEG and fMRI to inform brain functions of 1) the visual system during face perception, and 2) the motor system during the preparation of voluntary actions. Dr. Nguyen is currently a postdoc research scientist in the System Neuroscience Group at QIMR Berghofer Medical Research Institute working under the lab of Dr. Christine Guo. His recent work involves the use of neuroimaging and physiological recordings to study brain functions during naturalistic experiment paradigms (i.e. movie and music viewing), and the breakdown of those brain functions in patients with mental illnesses.

› Dr. Suresh Muthukumaraswamy, Rutherford Discovery / Senior Research Fellow (Schools of Pharmacy and Psychology, University of Auckland)

Suresh completed his PhD in psychology at the University of Auckland in 2005 after which he joined the newly established Cardiff University Brain Research Imaging Centre as a post-doctoral fellow. In 2014 Suresh received a Rutherford Discovery Fellowship and has returned to Auckland where he works in both the School of Pharmacy (Medicine) and School of Psychology (Science). Suresh's main research interests are in understanding how drugs alter brain activity and in developing methodologies to measure these changes in both healthy individuals and patient groups. His studies have involved a range of compounds including hallucinogens (ketamine, LSD, psilocybin), anaesthetics (propofol, dexmedetomidine), anti-epileptics (vigabatrin, perampanel, tiagabine) and GABA-enhancers (benzodiazepines, zolpidem, gaboxadol). Suresh's research has used a wide-range of neuroimaging techniques including magnetoencephalography, electroencephalography, functional magnetic resonance imaging and magnetic resonance spectroscopy. Since returning to Auckland his research group have been using simultaneous EEG/fMRI to measure drug action in the brain.

› Aaron Warren, Florey Department of Neuroscience and Mental Health Department

Aaron Warren is currently a third year PhD student in the Department of Medicine (Austin Health)/Florey Institute of Neuroscience and Mental Health at the University of Melbourne, under the supervision of Dr John Archer, Dr David Abbott, and Prof Graeme Jackson. His PhD focuses on applying EEG-fMRI techniques to identify markers of neural network dysfunction in children with Lennox-Gastaut syndrome, a severe epilepsy phenotype associated with intractable seizures and cognitive regression ('epileptic encephalopathy').

Brain Products EEG-fMRI Workshop

Hunter Medical Research Institute, NSW, AUSTRALIA / University of Newcastle, NSW, AUSTRALIA
21st - 22nd November 2016

EEG-fMRI Workshop

When:	21st - 22nd November 2016
Location:	Hunter Medical Research Institute / University of Newcastle
Speakers:	› Nicola Soldati, PhD, Brain Products GmbH
	› Dr Vinh Nguyen, QIMR Berghofer
	› Agnieszka Iwasiw, Symbiotic Devices

Preliminary Workshop Programme Day 1 (at Hunter Medical Research Institute)

09:00 – 09:45	Theory and practice of deriving EEG in the MR environment: Limits and possibilities: Introduction to safety related issues in the fMRI
09:45 – 10:30	Interactive demonstration: Subject preparation, safety aspects EEG/MR recording concepts
10:30 – 10:45	Coffee Break
10:45 – 11:30	Environment: Movement-related artefacts *(helium pump, BCG, subject movement, scanner vibration)*
11:30 – 13:00	Introduction to EEG/MR hardware placement, hardware connections, MR EEG clock interaction
13:00 – 14:30	Lunch & Transfer to the MR Centre
14:30 – 15:30	Interactive demonstration: subject preparation, safety aspects EEG/MR recording concepts
15:30 – 17:30	Practical Sessions (2 Groups): combined EEG/fMRI measurement with volunteer

Preliminary Workshop Programme Day 2 (at University of Newcastle)

09:00 – 09:45	Short introduction to concepts working with BrainVision Analzyer 2
09:45 – 10:45	Correction of EEG data derived in the MR (hands-on session): Gradient artefacts and their removal
10:45 – 11:00	Coffee Break
11:00 – 12:30	Correction of EEG data derived in the MR (hands-on session): Cardioballistic artefacts and their removal
12.30 – 13.30	Lunch
13.30 – 15.30	BrainVision Analyzer 2 Session
15.30 – 15:45	Coffee Break
15.45 – 17:00	MATLAB® Session: Hands-on Correction of EEG data derived in the MR: MATLAB® interface, Cardioballistic artefacts and their removal
17:00	Workshop Social

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