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About

Dr Bagshaw's main interest is in developing and applying non-invasive neuroimaging methods to questions in clinical and behavioural neuroscience. Current work in the **Multimodal Integration Group (MIG) (/research/activity/psychology/mig/index.aspx)** focuses on using EEG-fMRI to understand the influence of ongoing brain activity on evoked and behavioural responses, and to examine the localisation and functional significance of electrophysiological discharges in epilepsy and sleep. The group is also working on methods to combine structural and functional brain networks in order to shed light on how sleep and epilepsy affect the brain.

Qualifications

1995 – 1998 University of Manchester
Ph.D. Nuclear Physics (High Spin γ-ray Spectroscopy of ^{161,162}Er).

1994 – 1995 University of Birmingham
M.Sc. Applied Radiation Physics. Passed with Distinction and gained the Fremlin Prize.

1991 – 1994 University of Birmingham
B.Sc.(Hons.) Physics with Astrophysics. First Class degree awarded.

Biography

Dr Bagshaw studied Physics with Astrophysics (BSc) and Applied Radiation Physics (MSc) at the University of Birmingham before moving on to a PhD in Nuclear Physics at the University of Manchester. After post-doctoral positions at City University, UCL and the Montreal Neurological Institute he moved back to Birmingham, initially on a RCUK Fellowship and subsequently as Lecturer. He is now a Reader and Scientific Director of the Birmingham University Imaging Centre.

Teaching

Dr Bagshaw is Module Leader for the 3rd year undergraduate Sleep module. From 2008-2012, he was Module Leader for 'Research Methods B' on the Level 1 Psychology undergraduate programme, and taught the Introduction to Statistics in Psychology course. In addition, he lectures on the undergraduate BMedSc degree (Neurobiology of the Brain) and on several Masters level courses across the university and externally (MRes Brain Imaging and Cognitive Neuroscience, MBChB, MRCPsych (Birmingham and Solihull Mental Health Trust), Physical Sciences of Imaging in the Biomedical Sciences).

Postgraduate supervision

Dr Bagshaw currently supervises or co-supervises 6 PhD students and 2 post-doctoral research fellows.

Research

Dr Bagshaw is interested in developing the combination of EEG and fMRI to provide more precise spatial and temporal localisation of brain activity. Measuring both the electrical and haemodynamic responses to a task or neural event offers the possibility of new insights into the basic mechanisms of brain function, and greater understanding of disorders of function, such as epilepsy and sleep disorders. The Multimodal Integration Group (MIG) are using EEG-fMRI to study response covariability in single trials with robust sensory paradigms, developing methods to improve data quality based on independent component analysis and methods to integrate the data based on information theory, as well as using these techniques to study questions in cognitive neuroscience, sleep and epilepsy. They are also examining the link between the information provided by structural and functional imaging and that from neuropsychological testing in order to understand more about the effect of epilepsy on normal brain functions.

Publications

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2. **Bagshaw AP**, Rollings DT, Khalsa S and Cavanna AE. Multimodal neuroimaging investigations of alterations to consciousness: the relationship between absence epilepsy and sleep. *Epilepsy and Behaviour*. 30 33 – 37 (2014)
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4. Mayhew SD, Ostwald D, Porcaro C and **Bagshaw AP**. Spontaneous EEG alpha oscillation interacts with positive and negative BOLD responses in the visual-auditory cortices and default-mode network. *Neuroimage* 76 362 – 372 (2013)
5. Mayhew SD, Hylands-White N, Porcaro C, Derbyshire SW and **Bagshaw AP**. Intrinsic variability in the human response to pain is assembled from multiple, dynamic brain processes. *Neuroimage* 75(1) 68 – 78 (2013)

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7. Braithwaite JJ, Broglia E, **Bagshaw AP** and Wilkins AJ. Evidence for elevated cortical hyperexcitability and its association with out-of-body experiences in the non-clinical population: New findings from a pattern-glare task. *Cortex* 49(3) 793 – 805 (2013)

8. Ostwald D, Porcaro C, Mayhew SD and **Bagshaw AP**. EEG-fMRI based information theoretic characterization of the human perceptual decision system. *PLoS One* 7(4) e33896 (2012)

9. Schwartz TH, Hong S-B, **Bagshaw AP**, Chauvel P and Bénar C-G. Preictal changes in cerebral haemodynamics: review of findings and insights from intracerebral EEG. *Epilepsy Res* 97(3) 252 – 266 (2011)

10. Ostwald D and **Bagshaw AP**. Information theoretic approaches to functional neuroimaging. *Magn Reson Imag* 29 1417 – 1428 (2011)

11. Lei X, Ostwald D, Hu J, Qiu C, Porcaro C, **Bagshaw AP** and Yao D. Multimodal functional network connectivity: an EEG-fMRI fusion in network space. *PLoS One* 6(9) e24642 (2011)

12. Porcaro C, Ostwald D, Hadjipapas A, Barnes GR and **Bagshaw AP**. The relationship between the visual evoked potential and the gamma band investigated by blind and semi-blind methods. *Neuroimage* 56(3) 1059 – 1071 (2011)

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14. Duncan KK, Hadjipapas A, Li S, Kourtzi Z, **Bagshaw A**, Barnes G. Identifying spatially overlapping local cortical networks with MEG. *Hum Brain Mapp*. 31(7) 1003 – 1016 (2011)

15. Ostwald D, Porcaro C and **Bagshaw AP**. Voxel-wise information theoretic EEG-fMRI feature integration. *Neuroimage* 55(3) 1270 – 1286 (2011)

16. Cauda F, Geminiani G, D'Agata F, Sacco K, Duca S, **Bagshaw AP**, Cavanna AE. Functional connectivity of the posteromedial cortex. *PLoS One* 5(9) e13107 (2010)

17. Porcaro C, Ostwald D and **Bagshaw AP**. Functional source separation improves the quality of single trial visual evoked potentials recorded during concurrent EEG-fMRI. *Neuroimage* 50(1) 112 – 123 (2010)

18. Ostwald D, Porcaro C and **Bagshaw AP**. An information theoretic approach to EEG-fMRI integration of visually evoked responses. *Neuroimage* 49(1) 498 – 516 (2010)

19. Cavanna AE, **Bagshaw AP**, McCorry D. The neural correlates of altered consciousness during epileptic seizures. *Discov Med* 8(40) 31 – 36 (2009)

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21. Warbrick T, Derbyshire SWD and **Bagshaw AP**. Optimizing the measurement of contact heat evoked potentials. *J Clin Neurophysiol* 26(2) 117 – 122 (2009)

22. Warbrick T and **Bagshaw AP**. Scanning strategies for simultaneous EEG-fMRI evoked potential studies at 3T. *Int J Psychophysiol* 67(3) 169 – 177 (2008)

23. Grova C, Daunizeau J, Kobayashi E, **Bagshaw AP**, Lina JM, Dubeau F, Gotman J. Concordance between distributed EEG source localization and simultaneous EEG-fMRI studies of epileptic spikes. *Neuroimage* 39(2) 755 – 774 (2008)

24. **Bagshaw AP** and Warbrick T. Single trial variability of EEG and fMRI responses to visual stimuli. *Neuroimage* 38(2) 280 – 292 (2007)

25. Hawco CS, **Bagshaw AP**, Lu Y, Dubeau F, Gotman J. BOLD changes occur prior to epileptic spikes seen on scalp EEG. *Neuroimage* 35(4) 1450 – 1458 (2007)

26. Kobayashi E, **Bagshaw AP**, Gotman J and Dubeau F. Metabolic correlates of epileptic spikes in cerebral cavernous angiomas. *Epilepsy Res* 73(1) 98 – 103 (2007)

27. **Bagshaw AP**, Torab L, Kobayashi E, Hawco C, Dubeau F, Pike GB, Gotman J. EEG-fMRI using z-shimming in patients with temporal lobe epilepsy. *J Magn Reson Imag* 24 1025 – 1032 (2006)

28. Lu Y, **Bagshaw AP**, Grova C, Kobayashi E, Dubeau F, Gotman J. Using voxel-specific hemodynamic response functions in EEG-fMRI data analysis. *Neuroimage* 32(1) 238 – 247 (2006)

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