

Dr Kevin Aquino

BSc PhD

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Current employment

2015 –	Sir Peter Mansfield Imaging Center <i>Research Fellow</i> Employed as a research fellow position on a Leverhulme Trust funded grant “Revealing the origin of human alpha oscillations using ultra high-field fMRI-EEG” with Prof. Susan Francis, Dr. Karen Mullinger, & Dr. Rosa Sanchez-Panchuelo. This includes the following roles: <ul style="list-style-type: none">• Optimising MRI sequences at 7T to uncover the cortical lamination of visual cortex <i>in vivo</i>.• Optimising fMRI sequences at 7T to measure the functional responses with combined EEG.• Apply spatiotemporal hemodynamic models to analyse imaging data• Design, collection and analyses of fMRI experiments in 7T and 3T scanner for various projects.	University of Nottingham, Nottingham UK
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Education

2012	Doctor of Philosophy (Physics) University of Sydney Thesis: <i>Spatiotemporal Hemodynamics: From Theory to Experiment</i> (December) Supervised by Prof. Peter Robinson (principal), Prof. Michael Breakspear (associate), Dr Mark Schira (associate) and Dr Peter Drysdale (associate).
2006	Bachelor of Science (Honors I) University of Sydney, Thesis: <i>Wavelet analysis of Brain activity</i> Supervised by Prof. Peter Robinson (principal), Prof. Michael Breakspear (associate).
2005	Bachelor of Science University of Sydney, Majors in Physics and Mathematics.

Expertise

Research areas fMRI, MRI, Spatiotemporal Hemodynamics, Modeling, Vision, Neural Field Theory, Networks, Data analysis, Image processing, Deconvolution, vistaTools, mrTools & SPM.

Programming: Proficient in MATLAB, & L^AT_EX. Familiar in Python, C, C++, CSS, & Java.

Research experience

2013 – 2015	University of Sydney Research Associate, January 2013 – July 2015 Worked with Prof. Peter Robinson and Dr. Mark Schira on projects with Spatiotemporal hemodynamics, Brain Connectivity, Neural Field Modelling and co-supervised 3 PhD Students.	Camperdown, NSW, Australia
2012 – 2013	Queensland Institute of Medical Research Research Assistant, July 2012 – January 2013 Worked under Part time (0.5) with Prof. Michael Breakspear projects on Deconvolution of fMRI data.	Herston, QLD, Australia
2012 – 2013	University of Sydney Research Associate, July 2012 – January 2013 Worked under Part time (0.5) with Prof. Peter Robinson on projects with Spatiotemporal hemodynamics.	Camperdown, NSW, Australia
2005 – 2006	The Blackdog institute Research Assistant to Prof. Michael Breakspear Casual work to analyse Functional Magnetic Resonance Imaging (fMRI) data, and electrical encephalography (EEG). Also worked on a neural mass model that resulted in a publication.	Randwick, NSW, Australia

Honors and awards

2016	Guarantors of Brain Travel Grant Guarantors of Brain Travel Grant to attend the Organization for Human Brain Mapping Annual Meeting in Geneva, Switzerland travel Award, £600 GBP.
2013	Trainee Abstract Travel Award Organization for Human Brain Mapping Annual Meeting in Seattle, WA, USA travel Award for abstract: "Spatiotemporal neural dynamics from fMRI: Deconvolution with a spatiotemporal HRF", \$700 USD.
2007 – 2010	Australian Postgraduate Award Scholarship Australian government award. Stipend for \$20,000 AUD p/a while taking a research degree.
2006	Science Foundation for Physics, Scholarship No. 3 Faculty of Science, University of Sydney Prize for \$1000 AUD.
2005	Summer student scholarship Neuroscience Institute of Schizophrenia and Allied Disorders (NISAD) award: \$2000 AUD, for work on "Multiscale character of evoked cortical activity" with Prof. Michael Breakspear.
2003 – 2005	Faculty of Science Dean's List of Excellence in Academic Performance University of Sydney award for Years 1–3 of the undergraduate degree for having an average of High Distinction (85/100) or greater.
2003 – 2004	Talented Student Program University of Sydney first and second year program for students to undertake in projects in various research groups. First year: electron microscopy unit (Vicki Keast), Second year: Complex Systems (Michael Breakspear).

Publications

1. Pang, J.C., Robinson, P.A., **Aquino, K.M.**, & N., Vasan. (2016). Effects of astrocytic dynamics on spatiotemporal hemodynamics: Modeling and enhanced data analysis. *Neuroimage*, 147, 994–1005.
2. Lacy, T.C., **Aquino, K.M.**, & Robinson, P.A. (2016). Shock-like BOLD Responses Induced in the Primary Visual Cortex by Moving Visual Stimuli. *J. R. Soc. Interface*, 13 (125), 20160576.
3. Robinson, P.A., Zhao, X., **Aquino, K.M.**, Griffiths, J.D., Sarkar, S., & Pandejee G.M (2016). Eigenmodes of Brain Activity: Neural Field Theory Predictions and Comparison with Experiment. *Neuroimage*, 142, 79–89.
4. Pang, J.C., Robinson, P.A., & **Aquino, K.M.** (2016). Response-mode decomposition of spatio-temporal haemodynamics. *J. R. Soc. Interface*, 13 (118), 20160253.

5. Puckett, A., **Aquino, K.M.**, Robinson, P.A., Breakspear, M., & Schira, M.M. (2016). The 3D hemodynamic response function for depth-dependent fMRI of human cortex. *Neuroimage*, 139, 240–248.
6. **Aquino, K.M.**, Robinson, P.A., Schira, M.M., & Breakspear, M. (2014). Deconvolution of neural dynamics from fMRI data using a spatiotemporal hemodynamic response function. *Neuroimage*, 94, 203–215.
7. **Aquino, K.M.**, Robinson, P.A., & Drysdale, P.M. (2014). Spatiotemporal hemodynamic response functions derived from physiology. *Journal of Theoretical Biology*, 347, 118–136.
8. **Aquino, K.M.**, Schira, M.M., Robinson, P.A., Drysdale, P.M., & Breakspear, M. (2012). Hemodynamic traveling waves in Human Visual Cortex. *PLoS - Computational Biology*, 8, e1002435.
9. Drysdale, P.M., Huber, J.P., Robinson, P.A., & **Aquino, K.M.** (2010). Spatiotemporal BOLD hemodynamics from a poro-elastic hemodynamic model. *The journal of Theoretical Biology*, 265, 523–534.
10. Freyer, F., **Aquino, K.M.**, Robinson, P.A., Ritter P., & Breakspear, M. (2009). Bistability and non-Gaussian fluctuations in spontaneous cortical activity. *The Journal of Neuroscience*, 29, 8512–8524.
11. Breakspear, M., Bullmore, Ed T., **Aquino, K.M.**, Das, P., & Williams, L. M. (2006). The multiscale character of evoked cortical activity. *Neuroimage*, 30, 1230–1242.

Oral presentations

1. **Aquino, K.M.**, Robinson, P.A., Puckett, A., Breakspear, M., & Schira, M.M. (June 2014). From Visual Stimulus to BOLD Measurements, a complete spatiotemporal model derived from submillimetre fMRI. *Morning workshop: The hemodynamic response and neurovascular coupling: From sources to measures to models, 20th Annual Meeting of the Organization for Human Brain Mapping*, Hamburg, Germany.
2. **Aquino, K.M.**, Robinson, P.A., Schira, M.M., Lacy, T., & Breakspear, M. (November 2013). Spatiotemporal hemodynamics from a physiological model: Deconvolution of fMRI data, and interactions of BOLD responses. *Meeting for the Society for Neuroscience*, San Diego, CA, USA.
3. **Aquino, K.M.**, Robinson, P.A., Schira, M.M., & Breakspear, M. (June 2013). Spatiotemporal neural dynamics from fMRI: Deconvolution with a spatiotemporal HRF. *19th Annual Meeting of the Organization for Human Brain Mapping*, Seattle WA, USA. (Recipient of the trainee abstract travel award).
4. **Aquino, K.M.**, Schira, M.M., Robinson, P.A., & Breakspear, M. (February 2013). A physiologically plausible spatiotemporal model of BOLD allows deconvolution of hemodynamic and neuronal response components. *ANS 2013: the 33rd Annual Meeting of the Australian Neuroscience Society*, Melbourne, VIC, Australia.
5. **Aquino, K.M.** (December 2012). Spatiotemporal Neural Dynamics from fMRI: Deconvolution using a spatiotemporal hemodynamic response function. *Brain Modes, Large-scale models of the brain*, Queensland Institute of Medical Research, QLD, Australia.
6. **Aquino, K.M.**, Schira, M.M., Robinson, P.A., Drysdale, P.M., & Breakspear, M. (December 2011). Spatiotemporal Hemodynamics: From theory to Experiment. *5th Australian Workshop on Computational Neuroscience*, University of Western Sydney, NSW, Australia.

Poster presentations

1. **Aquino, K.M.**, Sanchez-Panchuelo, R. S., Mullinger, K.J., Hanslmayr, S., Mayhew S., Sokoliuk, R., & Francis, S.T. (June 2016). In vivo segmentation of layer IV in primary visual cortex using anatomy. *22nd Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 1256, Geneva, Switzerland.
2. Lacy, T.C., **Aquino, K.M.**, Robinson, P.A.,& Schira, M.M. (June 2015). Induction of Hemodynamic Shocks by Moving Stimuli in the Primary Visual Cortex. *21st Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 3739, Honolulu, Hawaii, USA.
3. **Aquino, K.M.**, Lacy, T.C., Robinson, P.A.,& Schira, M.M. (June 2015). Using models to design fMRI experiments – not just fit data. *21st Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 3729, Honolulu, Hawaii, USA.

4. Puckett, A. M., **Aquino, K.M.**, Isherwood, Z., & Schira, M.M. (June 2015). Laminar Differences in Retinotopic Maps: Measured and Modeled. *21st Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 4049, Honolulu, Hawaii, USA.
5. Robinson, P.A., Zhao, X., **Aquino, K.M.**, Griffiths, J.D., Sarkar, S., & Pandejee G.M (June 2015). Neural Field Theory of Eigenmodes of Brain Activity. *21st Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 3870, Honolulu, Hawaii, USA.
6. Puckett, A., **Aquino, K.M.**, Robinson, P.A., Breakspear, M., & Schira, M.M. (June 2014). Laminar analysis: The spatiotemporal profile of the BOLD response changes with depth. *20th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 2062, Hamburg, Germany.
7. **Aquino, K.M.**, Robinson, P.A., Puckett, A., Breakspear, M.& Schira, M.M. (June 2014). From Visual Stimulus to BOLD Measurements, a complete spatiotemporal model derived from sub millimetre fMRI. *20th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 1702, Hamburg, Germany.
8. **Aquino, K.M.**, Robinson, P.A., Schira, M.M., & Breakspear, M. (June 2013). Spatiotemporal neural dynamics from fMRI: Deconvolution with a spatiotemporal HRF. *19th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 1752, Seattle, WA, USA. (Recipient of the trainee abstract travel award).
9. **Aquino, K.M.**, Breakspear, M., Robinson, P.A., & Schira, M.M. (November 2011). Disambiguating between neural and hemodynamic effects. *Annual meeting for the Society for Neuroscience*, Poster No. 619.12/YY4, Washington, DC, USA.
10. Schira, M.M., Breakspear, M., Paxinos, G., & **Aquino, K.M.** (November 2011). High resolution characterisaton of spatiotemporal point spread of BOLD: Vascular versus neuronal spread in human V1 and V2. *Annual meeting for the Society for Neuroscience*, Poster No. 271.14/JJ5, Washington, DC, USA.
11. **Aquino, K.M.**, Drysdale, P.M., & Breakspear, M. (June 2010). A spatiotemporal HRF derived from physiology. *16th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 2456, Barcelona, Spain.
12. Drysdale, P.M., Huber J.P., Robinson, P.A., & **Aquino, K.M.** (June 2010). Spatiotemporal BOLD hemodynamics from a poroelastic hemodynamic model. *16th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 1080, Barcelona, Spain.
13. **Aquino, K.M.**, Schira, M.M., Drysdale, P.M., Robinson, P.A., & Breakspear, M. (June 2010). BOLD travelling waves in primary visual cortex. *16th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 2460, Barcelona, Spain.
14. **Aquino, K.M.**, Robinson, P.A., Schira, M.M., Drysdale, P.M., & Breakspear, M. (June 2008). Characterization of physiologic and neural fluctuations in sensory-evoked fMRI of the primary visual cortex. *14th Annual Meeting of the Organization for Human Brain Mapping*, Poster No. 491, Melbourne, VIC, Australia.

Teaching & supervision

2016	Modeling Seminar Series Co-organized and gave 2 Lectures of a Modeling seminar series at the Sir Peter Mansfield Imaging center. Six lectures were scheduled with an attendance of ≈ 20 members that included staff from around the University of Nottingham.
2013 –	Associate Supervisor Honors Student (4th year) Thomas Lacy (2013), PhD Candidate Thomas Lacy (from 2014) and PhD Candidate James Pang (from 2015).
2014	First year informatics course: INFO 1903 Guest Lecture: "Hemodynamics: from Theory to experiment."
2011 – 2013	Supervisor Third year Physics special project students: Thomas Lacy (2011) & Nikhil Vasan (2013).
2011 – 2012	Teaching Assistant Redesign of Computational Physics module in Physics II.
2010 – 2012	Laboratory Supervisor Physics II, Computational Physics.
2006 – 2009	University Tutor Computational Physics II, Physics I, and Computational Science (First year course).

Academic Service

1. Organizer of Complex systems seminar series. (2013–2015)
2. Webmaster, Complex Systems group <http://physics.usyd.edu.au/complex-systems/> (2015)
3. Reviewer: Neuroimage (5 papers), Neural Networks (1 paper), Frontiers in Neuroscience (1 paper), Human Brain Mapping (Conference Abstracts) (60 Abstracts in total), Human Brain mapping (1 paper), PLoS Computational Biology (1 paper), & Journal of Neuroscience Methods (1 paper).
4. Volunteer for University of Sydney Open day.