

Kirstie Whitaker

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		GitHub	@KirstieJane

Personal Profile

I am an Alan Turing Institute research fellow studying child and adolescent brain development and the emergence of mental health disorders during the teenage years. My research questions include how change in an individual's brain predicts their risk of mental health disorders and neural markers of individual differences in cognitive skills or psychiatric diagnoses. I am excited to understand how we can harness the tools of data science to support personalised talking therapies to nurture young people's mental health.

A passionate advocate for reproducible neuroscience, I have a proven track record of publishing analyses with all supporting data and analysis code required to verify the results. *A manuscript without the evidence is just a nice story.* I support my colleagues in sharing their data while maintaining participant confidentiality and provide trainings for anyone looking to build the skills needed to ensure all their research outputs can be remixed and reused by others. I define open science to include being welcome to everyone and advocate for the promotion of traditionally under-represented groups (women, LGBTQ, people of colour and people with disabilities) in STEM.

Research and Education

July 2017 - present **[Alan Turing Institute](#)**
Research fellow

Reproducible research at the Turing

- Principle investigator, collaborating with the Research Software Engineering team, seeking to position The Alan Turing Institute as a world leader for reproducible research.
- Reproducibility ensures that the wider academic, industry and governmental communities we operate in can easily validate, replicate and build on the work we produce. The project will help extend the Turing's impact beyond the immediate outputs of the institute itself, providing a "force multiplier" effect on the progress of Data Science in the UK and beyond.
- Project goals are to develop protocols and customisable guidelines to support Turing researchers share their data while conforming to the highest standards of research ethics and participant and business confidentiality. From September 2017 we will encourage all researchers to share code as openly as possible.

Oct 2012 - present **[Brain Mapping Unit, Department of Psychiatry, University of Cambridge](#)**
Postdoctoral fellow/Research associate

UCHANGE: Understanding and Characterising Healthy Adolescent-to-Adult Neurodevelopmental Growth Effects

- Part of the [Neuroscience in Psychiatry Network](#), a Wellcome Trust funded, multi-site collaborative project between the University of Cambridge and University College London.
- Found in two independent cohorts age related intra-cortical myelination increases and cortical thickness decreases during adolescence, along with gene expression patterns related to developmental change. Network analyses showed the hubs of the structural brain connectome change most and that genes associated with a risk of Schizophrenia are preferentially expressed in these regions (Whitaker*, Vértés* et al., 2016).
- Current work is extending these analyses to incorporate follow up scans 1-2 year after the baseline assessment. We are also incorporating questionnaire data from 2400 young people at three assessments across four years to understand the relationship between developmental trajectories and risk of depression or psychosis.

OpenNSPN: Sharing NSPN data with the wider academic community

- Currently working with the NSPN Data Management team to provide access for the scientific community to questionnaire measures of family environment and risk of mental health disorders from 2400 young people (14-24 years) who have been followed longitudinally for three years, genetic data from 1500 of these participants, and brain scans at two timepoints for a subset of 300 people.
- Closely collaborating with the [University of Cambridge Office for Scholarly Communications](#) to ensuring that we comply with ethical standards across both universities and protect the anonymity of our participants. Collections of NSPN [scholarly works](#) and managed access [research data](#) are hosted at the University of Cambridge repository.
- Ensured all members of the MRI analysis team were able to integrate analyses across different statistical methods. Designed, managed and documented pre-processing and quality control procedures for longitudinal multi-modal structural MRI scans from 300 participants (14 to 24 years). Prepared data for release to wider community.

MR-IMPACT: MRI arm of the Improving Mood with Psychoanalytic and Cognitive Therapies clinical trial

- Found differences in developmental trajectories in brain structure and function between adolescents currently diagnosed with major depressive disorder and healthy controls (Chuang et al., 2016; Hagan et al., 2015; Holt et al., 2015).
- Showed deviation from prescribing guidelines of SSRIs to adolescents with major depressive disorder based on self-report of antisocial and self-harm practises, irrespective of symptom severity (Cousins et al., 2016).
- Mentored skills in experimental and statistical design of MRI studies and practical implementation of analysis code for doctoral and masters students and visiting clinical fellows.

Technical skills: Cortical thickness analyses and quantitative structural imaging using multi-parametric mapping in Freesurfer, diffusion tensor imaging in FSL, NiPy and DiPy, graph theoretical approaches in NetworkX and statistical analyses in Python's scipy, numpy and statsmodels packages. Data visualisation in Matplotlib, Seaborn and Pysurfer. Code shared openly on GitHub. Database design and management in RedCap.

Aug 2007 - Sep 2012 **Helen Wills Neuroscience Institute, University of California at Berkeley**
Doctor of Philosophy in Neuroscience

Thesis: Individual differences in white matter integrity: Linking brain structure to cognition in children and adults.

NORA: Neurodevelopment of Reasoning Ability

- Described development in behaviour and brain function of analogical reasoning ability between age 6 and 18 (Whitaker*, Vendetti* et al., 2017).
- Showed relationship between cognitive processing speed and reasoning is mediated by white matter integrity between ages 6 and 18 (Ferrer*, Whitaker* et al., 2013).
- Worked as part of multi-site interdisciplinary team to progress understanding of neural underpinnings of cognitive development across childhood and adolescence using longitudinal and multi-modal behavioural and neuroimaging analyses (Wendelken et al. 2011, 2015).
- Developed custom analysis pipelines for structural and functional longitudinal MRI analyses, along with skills in experimental and statistical design of multi-modal MRI studies. Shared code within the research group and Neuroscience institute.

Collaborations

- Showed that grapheme-colour synesthetes have more diverse white matter connectivity and better visual imagery than control participants, and provided supportive evidence for a spectrum of brain structural biomarkers for synesthetic experience (Whitaker et al., 2014).
- Demonstrated white matter plasticity as a result of real world reasoning training in young adults (Mackey et al., 2012).

Technical skills: Experimental design for longitudinal diffusion tensor imaging and functional MRI analyses in FSL. Custom analysis scripts written in bash and VisualBasic. Database design management in Microsoft Access.

Sept 2004 - **Department of Physics, University of British Columbia**

Aug 2007 **Master of Science in Medical Physics**

Thesis: *Quantifying development: A novel analysis technique investigating myelination of the corpus callosum in preadolescents.*

- Linked quantitative measure myelin to intelligence in children and developed new analysis technique to minimise statistical noise in the quantification of the myelin water fraction (Whitaker et al., 2008).

Technical skills: Coursework in physics of MRI, data analysis in Matlab.

Sept 2001 - **Department of Physics, University of Bristol**

May 2004 **Bachelor of Science in Physics**

Dissertation: *Do information effects cause cancer?*

1st class honours.

Publications

Preprints Romero Garcia, R., **Whitaker, K. J.**, Váša, F., Seidlitz, J., Shinn, M., Fonagy, P., Dolan, R., Jones, P., Goodyer, I., Bullmore, E., & Vértes, P. E. (2017, July). Structural covariance networks are coupled to expression of genes enriched in supragranular layers of the human cortex. *bioRxiv*. doi:[10.1101/163758](https://doi.org/10.1101/163758)

- Pre-processed and quality controlled structural MRI; contributed code to create figures; managed MRI data for research team; critically reviewed manuscript

Váša, F., Seidlitz, J., Romero-Garcia, R., **Whitaker, K. J.**, Rosenthal, G., Vértes, P. E., Shinn, M., Alexander-Bloch, A., Fonagy, P., Dolan, R., Jones, P., Goodyer, I., Sporns, O., & Bullmore, E. T. (2017). Adolescent Tuning Of Association Cortex In Human Structural Brain Networks. *bioRxiv*. doi:[10.1101/126920](https://doi.org/10.1101/126920)

- Pre-processed and quality controlled structural MRI; contributed code to create figures; managed MRI data for research team; critically reviewed manuscript

Seidlitz, J., Váša, F., Shinn, M., Romero-Garcia, R., **Whitaker, K. J.**, Vértes, P. E., Reardon, P. K., Clasen, L., Messinger, A., Leopold, D. A., Fonagy, P., Dolan, R. J., Jones, P. B., Goodyer, I. M., Raznahan, A., & Bullmore, E. T. (2017). Morphometric Similarity Networks Detect Microscale Cortical Organisation And Predict Inter-Individual Cognitive Variation. *bioRxiv*. doi:[10.1101/135855](https://doi.org/10.1101/135855)

- Pre-processed and quality controlled structural MRI; contributed code to create figures; managed MRI data for research team; critically reviewed manuscript

2017 **Whitaker, K. J.***, Vendetti, M. S.*, Wendelken, C., & Bunge, S. A. (2017, March). Neuroscientific insights into the development of analogical reasoning. *Developmental science*. doi:[10.1111/desc.12531](https://doi.org/10.1111/desc.12531)

- Wrote and revised paper (with MV), interpreted findings (with MV, CW and SB); pre-processed, designed and conducted functional MRI and behavioural analyses; wrote code to ensure all figures are created reproducibly from original data; publicly shared MRI statistical maps on [Neurovault](#) and code to reproduce figures and tables on [GitHub](#); collected MRI data from approx 100 children aged 6 to 18 years; managed longitudinal behavioural and MRI data for research team.

Leonard, J., Flournoy, J., Lewis-de los Angeles, C. P., & **Whitaker, K. J.** (2017). How much motion is too much motion? Determining motion thresholds by sample size for reproducibility in developmental resting-state MRI. *Research Ideas and Outcomes*, 3. doi:[10.3897/rio.3.e12569](https://doi.org/10.3897/rio.3.e12569)

- Conceived split-half analysis; developed and [shared](#) analysis code (with JL, JE, CPdLA); ran and documented analyses (with JL, JE, CPdLA); interpreted results (with JL, JE, CPdLA); wrote the paper (with JL, JE, CPdLA); mentored project from its conception.

2016 Vértes, P. E., Rittman, T., **Whitaker, K. J.**, Romero-Garcia, R., Váša, F., Kitzbichler, M. G., Wagstyl, K., Fonagy, P., Dolan, R. J., Jones, P. B., Goodyer, I. M., NSPN Consortium, & Bullmore, E. T. (2016, October). Gene transcription profiles associated with inter-modular hubs and connection distance in human functional magnetic resonance imaging networks. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences*, 371(1705), 20150362. doi:[10.1098/rstb.2015.0362](https://doi.org/10.1098/rstb.2015.0362)

- Pre-processed and quality controlled structural MRI; managed MRI data for research team.

- Whitaker, K. J.***, Vértes, P. E. *, Romero-Garcia, R., Váša, F., Moutoussis, M., Prabhu, G., Weiskopf, N., Callaghan, M. F., Wagstyl, K., Rittman, T., Tait, R., Ooi, C., Suckling, J., Inkster, B., Fonagy, P., Dolan, R. J., Jones, P. B., Goodyer, I. M., NSPN Consortium, & Bullmore, E. T. (2016). Adolescence is associated with transcriptionally patterned consolidation of the hubs of the human brain connectome. *Proceedings of the National Academy of Sciences*. doi:[10.1073/PNAS.1601745113](https://doi.org/10.1073/PNAS.1601745113)
- Wrote and revised paper (with PV and EB); interpreted findings (with PV, EB); pre-processed, quality controlled, designed and conducted structural MRI and network analyses; wrote code to ensure all figures and tables are created reproducibly from original data; publicly shared data and analysis code; managed MRI data for research team.
- Cousins, L., **Whitaker, K. J.**, Widmer, B., Midgley, N., Byford, S., Dubicka, B., Kelvin, R., Reynolds, S., Roberts, C., Holland, F., Barrett, B., Senior, R., Wilkinson, P., Target, M., Fonagy, P., & Goodyer, M. I. (2016). Clinical characteristics associated with the prescribing of ssri medication in adolescents with major unipolar depression. *European Child & Adolescent Psychiatry*, 1–9. doi:[10.1007/s00787-016-0849-y](https://doi.org/10.1007/s00787-016-0849-y)
- Revised paper (with LC); interpreted findings (with LC, IG); advised on design of statistical analyses and methods reporting.
- Wagstyl, K., Ronan, L., **Whitaker, K. J.**, Goodyer, I. M., Roberts, N., Crow, T. J., & Fletcher, P. C. (2016, April). Multiple markers of cortical morphology reveal evidence of supragranular thinning in schizophrenia. *Translational psychiatry*, 6(4), e780. doi:[10.1038/tp.2016.43](https://doi.org/10.1038/tp.2016.43)
- Advised on design of MRI analyses; contributed code to reproducibly generate statistical images of the cortical surface.
- Chuang, J.-Y., **Whitaker, K. J.**, Murray, G. K., Elliott, R., Hagan, C. C., Graham, J. M., Ooi, C., Tait, R., Holt, R. J., van Nieuwenhuizen, A. O., Reynolds, S., Wilkinson, P. O., Bullmore, E. T., Lennox, B. R., Sahakian, B. J., Goodyer, I., & Suckling, J. (2016, January). Aberrant brain responses to emotionally valent words is normalised after cognitive behavioural therapy in female depressed adolescents. *Journal of Affective Disorders*, 189, 54–61. doi:[10.1016/j.jad.2015.09.008](https://doi.org/10.1016/j.jad.2015.09.008)
- Advised on statistical design and interpretation of longitudinal MRI analyses (with JC); contributed to data management of study (with CH, JG, RH, CO, and RT).
- 2015** Holt, R. J., Graham, J., **Whitaker, K. J.**, Hagan, C. C., Ooi, C., Wilkinson, P., van Nieuwenhuizen, A. O., Lennox, B., Sahakian, B., Goodyer, I. M., Bullmore, E., & Suckling, J. (2015). Functional MRI of emotional memory in adolescent depression. *Developmental Cognitive Neuroscience*, 19, 31–41. doi:[10.1016/j.dcn.2015.12.013](https://doi.org/10.1016/j.dcn.2015.12.013)
- Wrote and revised paper (with RH and JG), interpreted findings (with RH and JG), pre-processed, designed and conducted functional MRI analyses (with JG), wrote code to ensure all figures are created reproducibly from original data; publicly shared MRI statistical maps on [Neurovault](#); contributed to data management of study (with CH, JG, RH, CO, and RT).
- Hagan, C. C., Graham, J. M. E., Tait, R., Widmer, B., van Nieuwenhuizen, A. O., Ooi, C., **Whitaker, K. J.**, Simas, T., Bullmore, E. T., Lennox, B. R., Sahakian, B. J., Goodyer, I. M., & Suckling, J. (2015). Adolescents with current major depressive disorder show dissimilar patterns of age-related differences in ACC and thalamus. *NeuroImage Clinical*, 7, 391–399. doi:[10.1016/j.nicl.2014.12.019](https://doi.org/10.1016/j.nicl.2014.12.019)
- Advised on design and interpretation of structural MRI analyses (with CH); contributed to data management of study (with CH, JG, RH, CO, and RT).
- Wendelken, C., Ferrer, E., **Whitaker, K. J.**, & Bunge, S. A. (2015, March). Fronto-Parietal Network Re-configuration Supports the Development of Reasoning Ability. *Cerebral cortex*, bhv050–. doi:[10.1093/cercor/bhv050](https://doi.org/10.1093/cercor/bhv050)
- Critically appraised manuscript; interpreted findings (with CW, EF and SB); collected MRI data from approx 100 children aged 6 to 18 years; managed longitudinal behavioural and MRI data for research team.
- 2014** **Whitaker, K. J.**, Kang, X., Herron, T. J., Woods, D. L., Robertson, L. C., & Alvarez, B. D. (2014, April). White matter microstructure throughout the brain correlates with visual imagery in grapheme-color synesthesia. *NeuroImage*, 90, 52–9. doi:[10.1016/j.neuroimage.2013.12.054](https://doi.org/10.1016/j.neuroimage.2013.12.054)
- Set up independent collaboration; wrote and revised manuscript (with BA); interpreted findings (with BA); pre-processed, quality controlled, designed and conducted diffusion MRI analyses.

- Menzies, L., Goddings, A.-I., **Whitaker, K. J.**, Blakemore, S.-J., & Viner, R. M. (2014, February). The effects of puberty on white matter development in boys. *Developmental Cognitive Neuroscience*, 11, 1–13. doi:[10.1016/j.dcn.2014.10.002](https://doi.org/10.1016/j.dcn.2014.10.002)
- Set up independent collaboration; critically appraised manuscript; interpreted findings (with LM, ALG); advised on pre-processing and diffusion MRI analyses.
- 2013** Ferrer, E.*, **Whitaker, K. J.***, Steele, J. S., Green, C. T., Wendelken, C., & Bunge, S. A. (2013, November). White matter maturation supports the development of reasoning ability through its influence on processing speed. *Developmental science*, 16(6), 941–51. doi:[10.1111/desc.12088](https://doi.org/10.1111/desc.12088)
- Wrote and revised manuscript (with EF, JS and SB); interpreted findings (with EF, JS, SB); pre-processed, quality controlled, designed and conducted diffusion MRI analyses; collected MRI data from approx 100 children aged 6 to 18 years; managed behavioural and MRI data for research team.
- 2012** Mackey, A. P., **Whitaker, K. J.**, & Bunge, S. A. (2012, January). Experience-dependent plasticity in white matter microstructure: reasoning training alters structural connectivity. *Frontiers in neuroanatomy*, 6(August), 32. doi:[10.3389/fnana.2012.00032](https://doi.org/10.3389/fnana.2012.00032)
- Critically appraised manuscript; interpreted findings (with CW, EO, EF and SB); collected MRI data from approx 100 children aged 6 to 18 years; managed longitudinal behavioural and MRI data for research team.
- Bunge, S. A. & **Whitaker, K. J.** (2012, September). Brain Imaging: Your Brain Scan Doesn't Lie About Your Age. *Current biology*, 22(18), R800–1. doi:[10.1016/j.cub.2012.07.032](https://doi.org/10.1016/j.cub.2012.07.032)
- Wrote invited commentary on Brown et al. (2012) (with SB).
- 2011** Wendelken, C., O'Hare, E. D., **Whitaker, K. J.**, Ferrer, E., & Bunge, S. A. (2011, November). Increased Functional Selectivity over Development in Rostrolateral Prefrontal Cortex. *Journal of Neuroscience*, 31(47), 17260–17268. doi:[10.1523/JNEUROSCI.1193-10.2011](https://doi.org/10.1523/JNEUROSCI.1193-10.2011)
- Critically appraised manuscript; interpreted findings (with AM and SB); designed and wrote analysis code that pre-processed, quality controlled, and conducted diffusion MRI analyses (implemented by AM).
- 2010** Bunge, S. A., Mackey, A. P., & **Whitaker, K. J.** (2010). Brain changes underlying the development of cognitive control and reasoning. In M. Gazzaniga (Ed.), *The cognitive neurosciences* (4th). MIT Press
- Wrote book chapter (with SB and AM).
- 2008** **Whitaker, K. J.**, Kolind, S. H., MacKay, A. L., & Clark, C. M. (2008, December). Quantifying development: Investigating highly myelinated voxels in preadolescent corpus callosum. *NeuroImage*, 43(4), 731–5. doi:[10.1016/j.neuroimage.2008.07.038](https://doi.org/10.1016/j.neuroimage.2008.07.038)
- Wrote and revised manuscript (with SK, AM and CC); interpreted findings (with SK, AM, CC); designed and conducted myelin water fraction MRI analyses.

Presentations

Intra-cortical myelination during adolescence: linking MRI networks with gene transcription profiles.

European College of Neuropsychopharmacology Congress, 2017. Slides doi:[10.6084/m9.figshare.5373886](https://doi.org/10.6084/m9.figshare.5373886)

A how to guide to reproducible research.

International Conference for Cognitive Neuroscience, 2017. Slides doi:[10.6084/m9.figshare.4244996](https://doi.org/10.6084/m9.figshare.4244996)

Adolescence is associated with genomically patterned consolidation of the hubs of the human brain connectome.

Society of Biological Psychiatry Annual Meeting, 2017. Slides doi:[10.6084/m9.figshare.5024930](https://doi.org/10.6084/m9.figshare.5024930)

Making Connections in the Adolescent Brain.

Plenary speaker at Endocrine Society Annual Meeting, 2017. Slides doi:[10.6084/m9.figshare.4810603](https://doi.org/10.6084/m9.figshare.4810603)

Publishing a reproducible paper.

Cambridge Brainhack-Global, 2017. Slides doi:[10.6084/m9.figshare.4720996](https://doi.org/10.6084/m9.figshare.4720996)

The (still) developing adolescent brain.

Keynote speaker at Teenage Cancer Trust 9th International Conference and 1st Global AYA Cancer Congress, 2016. Slides doi:[10.6084/m9.figshare.4288151](https://doi.org/10.6084/m9.figshare.4288151)

Showing your working: A guide to reproducible neuroimaging analyses.

MRC Cognition and Brain Sciences Unit Open Science Workshop, 2016.

Slides doi:[10.6084/m9.figshare.4244996](https://doi.org/10.6084/m9.figshare.4244996)

Structural brain development during adolescence and its relation to psychiatric disorders.

University of Bristol Department of Psychology, 2016. Slides doi:[10.6084/m9.figshare.3843405](https://doi.org/10.6084/m9.figshare.3843405)

The (still) developing adolescent brain.

The Educated Brain at School: Late Childhood and Adolescence Seminar, 2016.

Slides doi:[10.6084/m9.figshare.4087509](https://doi.org/10.6084/m9.figshare.4087509)

Structural brain development during adolescence and its relation to psychiatric disorders.

University of Edinburgh Department of Psychiatry Special Seminar Series, 2016.

Slides doi:[10.6084/m9.figshare.384340](https://doi.org/10.6084/m9.figshare.384340)

Making your research reproducible.

University of Cambridge PostDoc Masterclass, 2016.

Slides doi:[10.6084/m9.figshare.3203929](https://doi.org/10.6084/m9.figshare.3203929)

Introducing the STEMM Role Models database.

Achieving Diversity in Tech, 2016.

Slides doi:[10.6084/m9.figshare.3188422](https://doi.org/10.6084/m9.figshare.3188422)

Adolescent myelination of association cortical hubs of the human brain connectome .

NSPN International Scientific Advisory Board Meeting, 2015.

Do teenagers really have no prefrontal cortex? Using MRI to study the developing brain.

Clare College After Dinner Talk Series, 2015.

Longitudinal changes in white matter microstructure predict reasoning ability.

Society for Neuroscience Annual Meeting, 2012.

Longitudinal development of analogical reasoning through childhood and adolescence.

Society for Neuroscience Annual Meeting, 2011.

Structural connections underlying reasoning development.

Conference on Neurocognitive Development, 2009.

Software Development

STEMM Role Models (2016-date)

- Founder and lead developer of the [STEMM Role Models](#) database: a tool to support conference organisers ensure their invited speakers represent the best and most diverse academic researchers or professional engineers/developers working in the field.
- Openly developed on [GitHub](#), featured in Mozilla Science's [Collaborate](#) project database.
- Runner up of the Rosalind Franklin Appathon in February 2016 [Prize: £500].

Brains for Publication (2016-date)

- Founder and lead developer of the [Brains for Publication](#) software package: a tool to facilitate reproducible, informative and beautiful visualisations of neuroimaging results.
- Openly developed on [GitHub](#), started at OHBM BrainHack in June 2016.

Scholarships & Prizes

Alan Turing Institute Seed Funding Reproducible research at the Turing	August 2017 - July 2018	£ 36,000
Alan Turing Institute Research Fellowship	July 2017 - June 2020	£ 187,000
OHBM Hackathon Travel Award	June 2017	\$ 500 (US)
Foreign Policy 2016 Global Thinker	December 2016	
Mozilla Science Fellowship	September 2016 - June 2017	\$ 63,000 (US)
OHBM Hackathon Travel Award	June 2016	\$ 500 (US)
Rosalind Franklin Appathon Runner Up Prize for STEMM Role Models	February 2016	£ 500
Elizabeth Roboz Einstein Fellowship	January 2011 - June 2011	\$ 3,000 (US)
T.I. Liu Fellowship	August 2009 - July 2010	\$ 30,000 (US)

Fulbright Scholarship	August 2007 - July 2008	\$ 100,000 (US)
Commonwealth Scholarship	September 2004 - August 2006	\$ 80,000 (CAD)

Research Mentorship

Graduate

- Supervised visiting PhD student investigating structural brain imaging analyses and graph theoretic approaches to understanding differences in brain development related to first episode psychosis and child abuse (January 2015 to May 2015).
- Responsibilities included welcoming and orienting student on arrival in Cambridge, teaching concepts and practical implementations of cortical thickness and network analyses, facilitating logistical challenges, hypothesis formation and holding regular meetings.

Undergraduate

- Supervised 3rd year undergraduate Neuroscience honours project *Quantifying reproducibility in white matter brain imaging: a travelling heads study*, awarded upper second class honours (November 2015 - June 2016).
- Responsibilities included teaching concepts and practical implementations of multi-modal structural brain analyses, training skills for effective review, comprehension and application of the current academic literature, guidance and editing of the written manuscript, facilitating logistical challenges, study design and hypothesis formation, and holding regular meetings.

Teaching

Affiliated Lecturer, Department of Psychology, University of Cambridge

- Designed and lead lab course on *Brain Structure and Measurement* for first year undergraduates in Psychology and Behavioural Sciences (Michaelmas term 2013,2014,2015). Extended course for second year undergraduates in Experimental Psychology program (Michaelmas term 2014,2015)
- Responsibilities included designing the curriculum, providing learning materials and laboratory exercises to facilitate understanding of functional and structural brain imaging (MRI, EEG, ECoG) and basic neuroanatomy using openly available software ([MRIcron](#)), online tools ([NeuroSynth](#)) and in person demonstrations with a preserved human brain.

Academic Supervisor, Department of Psychology, University of Cambridge

- Planned and lead small group (1-4 students) tutorials for second year undergraduates in Experimental Psychology (January 2013 - May 2016).
- Responsibilities include setting and grading essay questions each week, ensuring that students are understanding the broad range of topics covered in the lectures and stimulating their breadth and depth of understanding through external readings and discussion.

Guest Lecturer, Department of Psychology, University of Cambridge

- Instructed small group of students on *Neuroimaging of typical and atypical brain development and the emergence of mental health disorders* as part of the *Human Brain Mapping – Methods and Results from functional Magnetic Resonance Imaging* workshop for final year undergraduate students in Neuroscience (Michaelmas term 2013,2014,2015).

Laboratory Instructor, Summer Institute in Cognitive Neurosciences

- Designed and instructed afternoon lab sessions on analysing task-based functional MRI data in FSL for 70 graduate and post-doctoral fellows (July 2011).
- Responsibilities included designing an curriculum that was appropriate to a wide array of abilities, providing data and instructions for both statistical analyses and the use of a specific software tool ([FSL](#)).

Graduate Student Instructor, Department of Molecular and Cellular Biology, University of California at Berkeley

- Planned and lead discussions for first and second year undergraduates for *Mind, Brain and Behaviour* (Spring 2010) and *Exploring the Brain* (Fall 2008).
- Responsibilities included teaching to large (more than 100 students) and small (20-30 students) groups, conducting weekly office hours for individual students, creating and grading weekly assignments and working collaboratively with other instructors to design, administer and grade three examinations each term.

Teaching Assistant, Department of Physics, University of British Columbia

- Planned and lead tutorials for first and second year undergraduates in *Mechanics for Engineers* (Spring 2005,2006) and marked assignments for final year students taking *Applied Optics* (Fall 2006).

Professional and University Service

Chair elect of the Organization for Human Brain Mapping [Open Science Special Interest Group](#)

- The mission of the OHBM Open Science SIG is to advance neuroimaging research by fostering the open sharing of ideas, data, and tools between members of the OHBM community. The president is responsible for organising educational events, supporting collaborative initiatives, and providing mentorship to junior researchers.
- Specific responsibilities include organising a Hackathon to precede the annual meeting, leading a "Brain-hacking 101" educational session at the annual meeting and hosting hands-on tutorials in the Open Science room during the annual meeting.

Chair of the [Cambridge Brainhack-Global](#) organising committee

- Built a committee of early career researchers to develop a three day satellite hackathon and unconference in Cambridge as part of Brainhack-Global 2017. Responsible for fund-raising (£4,000), creating the schedule, building the website, and coordinating logistics around registration. Mentored the invitation of six speakers and financial management. Responsible on all days for hosting the event (March 2017).

Chair of the [OpenCon Cambridge](#) conference organising committee

- Lead team members in planning programme goals, inviting speakers, raising sponsorship (£6,000), co-ordinating logistics and promoting event. Grew workshop from afternoon to full day seminar from first to second year. Responsible for opening and closing remarks, and to introduce presentations on the day (2015-17).

Co-leader of the [MozFest](#) Open Science space

- A key member of the organising team responsible for designing and shaping the experience of more than 14,000 participants of the annual Mozilla Festival in London. Participated in the three day leadership retreat in Berlin . Responsible for promoting call for applications, reviewing 250 abstracts, selecting 60 workshop proposals and mentoring successful applicants through event facilitation training to ensure an interactive and multi-disciplinary event (2016-17).

External member of the Mozilla Foundation Strategy retreat

- Joined Mozilla Foundation leadership in Toronto for two day strategy retreat as invited external expert.
- Specifically provided feedback on how academic scientific research can benefit from Mozilla's efforts in supporting the open web both technologically and with a focus on community building and inclusivity.

Member of the [Summer Institute in Neuroimaging and Data Science](#) advisory committee

- Responsible for directing, advising and improving the SINDS (NeuroHackWeek) over its five year granting period (2017-21).

Member of the [Open Educational Resources 2016: Open Culture](#) conference programme committee

- Responsible for coordinating peer review of 60 (from a total 180) abstracts, curating responses and working with team members to decide on final accepted presentation list (2015-16).

Secretary of the University of Cambridge [Women's Staff Network](#)

- Coordinated online surveys and in person meetings at multiple locations around Cambridge to solicit feedback on equality and diversity initiatives from staff members at all levels (2014-16).

Peer reviewer

- Completed reviews of original research and review articles for Cerebral Cortex, Current Biology, Nature Human Behaviour, NeuroImage, Developmental Cognitive Neuroscience, Social Cognitive and Affective Neuroscience, Psychological Medicine, British Medical Journal Psychiatry, Network Neuroscience, Acta Psychiatrica Scandinavica and F1000 Research.
- Where permitted, reviews are openly available via [Publons](#).
- Completed funding application reviews for the US-UK Fulbright Association and Alan Turing Institute seed funding programme.

Examiner

- Internal examiner for MPhil student in Department of Psychiatry (2016).
- Responsible for coordinating examination with external examiner, giving feedback on thesis and evaluating corrections.

College Research Associate at Clare College Cambridge (2014-15)

Professional Development

Open Science Leadership

- Attended, by selection, the first [NeuroHackWeek](#) in Seattle. The five day hands-on workshop in neuroimaging and data science taught technologies used to analyse human neuroscience data, and developed skill sharing around making analyses and results shareable and reproducible. A mix of hands-on tutorials and projects, the week lead to first senior author publication (Leonard et al, 2017) and an on-going collaboration (September 2016).
- Attended, by selection, the Organization for Human Brain Mapping [Hackathon](#) in Lausanne in 2016 and Vancouver in 2017. Received travel award (\$500) for both years. Lead development of [Brains for Publication](#) software (June 2016) and taught Open Leadership (June 2017).
- Mentor, by selection, for Mozilla's [Open Leadership Training](#), supporting the open development for four separate projects: [GirlScript](#), [Altruism in Tech](#), [Detroit Music Box](#) and [Open Innovation Lab](#) (July 2016-date).
- Attended, by invitation, Mozilla Science Lab's [Working Open Workshop](#) in Berlin. The three day workshop covered essentials of working openly, bringing on contributors, using collaboration tools such as Git and GitHub, and growing an active community around an open project (February 2016).
- Member of the inaugural [Open Leader's Cohort](#) receiving mentorship in the development of the [STEMM Role Models](#) project (February-June 2016).
- Advisor for [Mendeley](#) reference manager (2014-date).
- Advisor for [Overleaf](#) collaborative writing system (2017-date).
- Contributor to [StackOverflow](#) (2016-date).

Public Policy and Neuroethics

- Member, by selection, of the Science Policy Fellowship 2016 cohort. Included half day policy impact training for early career researchers on *The Educated Brain: from the Neuroscience to the Practice of Lifelong Learning*. Responsibilities include producing policy documents for three research day seminars and workshops. One has been published to date: [Late Childhood and Adolescence](#). Funded by the Economic and Social Research Council and run by the [Cambridge Public Policy Strategic Research Initiative](#) and [Cambridge Neuroscience](#) (April 2016).
- Was selected for and completed a full day professional development policy workshop for behavioural scientists run by the [Centre for Science and Policy](#). Focus was on providing scientists with the tools required to ensure their work has the highest impact at the national level, by educating researchers on the processes and challenges involved in actioning government initiatives, and how to communicate clearly with policy makers (December 2014).
- Participated by invitation in a [Cambridge Neuroscience neuroethics panel discussion](#) of the effects of adolescent gaming on adolescent brain development (February 2016).
- Completed an online course on [Neuroethics](#) run by the University of Pennsylvania through Coursera (2013).

Undergraduate Teacher Training

- Completed, with distinction, the online course [An Introduction to Evidence-Based Undergraduate STEM Teaching](#) run by Vanderbilt University through Coursera (2014).

The course explored effective teaching strategies for college or university STEM classrooms and required weekly quizzes and essays and lesson plans as peer-graded assignments for successful completion.

Data Science

- Completed, with distinction, two online courses, [The Data Scientist's Toolbox](#) and [R Programming](#), run by Johns Hopkins University through Coursera (2015).
- Completed, with distinction, [Python Programming for Everybody](#) online course run by University of Michigan through Coursera (2015).
- Completed, with distinction, [Data Management for Clinical Research](#) online course run by Vanderbilt University through Coursera (2013).

The courses cover skills required by data scientists and including automated statistical analyses in R, text mining and big data manipulations in Python and data management using the Research Electronic Data Capture ([REDCap](#)) toolkit.

Neuroimaging Analyses

- Completed the week long FSL and Freesurfer course (2009).
- Was selected for and completed the highly competitive two week residential Advanced Neuroimaging Training Program at the University of California at Los Angeles (2009).

These courses teach experimental design, functional and structural neuroimaging analyses techniques through lectures and hands-on tutorials. UCLA summer school also covered neuroanatomy and MRI acquisition.

Outreach

Women in Science and Technology - mentoring and leadership

- One of three members on the leadership team for the [Cambridge Women in Technology](#) meet up group which organizes networking opportunities, professional development and all levels of computer coding instruction for our 400+ members (2014-2016).
- Organiser of and Python coding coach for [Codebar Cambridge](#) workshops that enable underrepresented groups to learn programming in a safe and collaborative environment and expand their career opportunities (2014-2016).
- Speed mentor at the [Women of the World in Cambridge Festival](#) and [Cambridge Science Festival](#) (March 2016).

Integrating the arts and sciences

- Biomedical collaborator for [Wellcome Trust](#) funded theatre projects [I AM BEAST](#) and [Woyzeck](#).
- Participated in workshops discussing young people's experiences of mental health disorders lead by 20 students from four schools in Haringey, London, in collaboration with [Young Minds](#) (I AM BEAST; March 2017).
- Participated in post-show question and answer session for two performances, one for 100+ teenage students, the other an adult theatre-going audience (I AM BEAST; March 2017).
- Ran pre-performance interactive quiz and facilitated discussion about schizophrenia with a group of 20 school students, in collaboration with Dr James Kirkbride (Woyzeck; November 2013).

Presentations - career development

- Spoken as a Fulbright alumna to new outgoing Fulbright and Sutton Trust awardees, as well as senior school educators and career development advisors at various events in London and Cambridge. I focus on my experiences as a cultural and academic ambassador on behalf of the United Kingdom to the United States and Canada and the diversification of academic science, particularly encouraging women to pursue careers in STEM fields (2013-date).

Presentations - science

- Presented to many (>10) school groups in the San Francisco Bay Area and Cambridge about scientific methods to image the human brain and how neuroimaging may elucidate psychological behaviours. More recently presentations have included discussions of mental illness and its treatment. Many talks were at the request of student lead organisations and/or for schools supporting students from a low socio-economic status background (2008-date).
- Funded by a Society for Neuroscience outreach grant I participated in seven *Mind and Brain Nights* at four schools in the San Francisco Bay Area. I designed, constructed and presented a booth focusing on pre- and post-natal brain development and childhood cognitive milestones (2008-2012).
- Provided lab tours to showcase developmental cognitive neuroscience research to school students, teachers and education policy makers. These often included tours of the UC Berkeley Brain Imaging Center and demonstrations of MRI acquisition and analysis (2008-2012).

Referees

Name Prof Ed Bullmore
Position Head of Dept of Psychiatry
Institution University of Cambridge
Contact etb23@cam.ac.uk

Name Prof Ian Goodyer
Position Professor of Child & Adolescent Psychiatry
Institution University of Cambridge
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