

# Jonathan D. Clayden

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Date of birth: 24 July 1981  
Nationality: British

## Education

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| 2004–2007 | <b>University of Edinburgh</b><br><i>PhD, Neuroinformatics</i><br>Thesis: “Comparative analysis of connection and disconnection in the human brain using diffusion MRI: New methods and applications”<br>Supervisors: Dr Mark Bastin (Edinburgh), Dr Amos Storkey (Edinburgh), Dr David Laidlaw (Brown University, RI, USA)                                 |
| 2003–2004 | <b>University of Edinburgh</b><br><i>MSc by Research, Neuroinformatics</i> (pass with distinction)<br>Thesis 1: “Recency and similarity effects in a visual probe recognition task using unfamiliar stimuli” (supervised by Prof. Robert Logie)<br>Thesis 2: “White matter integrity and cognition in childhood and old age” (supervised by Dr Mark Bastin) |
| 1999–2002 | <b>Pembroke College, University of Cambridge</b><br><i>MA (Cantab), Computer Science</i> (final class 2.i)  |

## Employment

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| 2013–     | <b>Literate Science</b><br><i>Scientific Editor</i> (self-employed)<br>I offer scientific copy-editing services to academic clients, and advocate clarity and expressiveness in scientific writing  |
| 2009–     | <b>UCL GOS Institute of Child Health, University College London</b><br><i>Nonclinical Lecturer in Neuroimaging and Biophysics</i><br>I coordinate and carry out research into brain imaging methods and their applications in clinical and nonclinical neuroscience, with a particular interest in brain connectivity |
| 2007–2009 | <b>UCL GOS Institute of Child Health, University College London</b><br><i>Research Fellow, Brain Imaging and Tractography Methods</i>   |

## Editorial Experience

- Certified training in proofreading and copy-editing from the Society for Editors and Proofreaders (SfEP), of which I am an Intermediate Member.
- More than 200,000 words of primary scientific documents (papers, grant proposals, theses) professionally edited for clients.

## Grants

- *Early childhood bilingualism: Effects on brain structure and function.* Co-Investigator (PI: L. Wei). Leverhulme Trust; value £305,748; reference RPG-2017-403 (2018–2021).
- *Development of medical imaging protocols for paediatric applications in the biosciences.* Co-Applicant (with B. de Celis Alonso). Royal Society–Newton Mobility Grant; value £4700; reference NI160219 (2017–2018).
- *Reading networks in the developing brain.* Co-Investigator (PI: C. Clark). Waterloo Foundation; value £52,996; reference 1118-1775.
- *Robust graph analysis of brain connectivity.* Principal Investigator. EPSRC; value £345,156; reference EP/J016292/1 (2012–2015).
- *Improving epilepsy surgery in childhood using functional magnetic resonance imaging and electroencephalography.* Co-Investigator (PI: D. Carmichael). Action Medical Research; value £190,057; reference SP4646 (2012–2016).
- *Hypoxia/ischaemia and patterns of neuropathology associated with memory impairment: From infancy through adolescence.* Co-Investigator (PI: F. Vargha-Khadem). MRC Programme Grant; value £1,433,670; reference G1002276 (2011–2017).

## PhD Students

- WL. Secondary supervisor. PhD underway (2015–).
- LP. Secondary supervisor. PhD underway (2015–).
- TC. Secondary supervisor. PhD underway (2015–).
- CP. Secondary supervisor. PhD completed (2012–2016).
- CG. Secondary supervisor. PhD completed (2011–2015); subsequently a post-doc at the University of Cambridge.
- MGS. Secondary supervisor. PhD completed (2010–2014); subsequently a post-doc at Imperial College London.

## Invited Talks

- *The limits of connectivity-based parcellation.* Connect Club, Helsingborg, Sweden (March 2018).
- *Image processing with R.* Inverness R User Group, Inverness, UK (October 2016).
- *Seven years' bad luck?* UK Diffusion MRI Interest Group Meeting, Sheffield, UK (November 2015).
- *Imaging structural and functional networks in the brain.* ICH Developmental Neurosciences Seminar, London, UK (July 2014).
- *Principles of structural and functional connectivity.* British Neuropsychological Society Autumn Meeting, London, UK (November 2013).
- *MRI and the structural networks of the brain.* Neuroinformatics DTC Day, University of Edinburgh, Edinburgh, UK (September 2013).
- *Streamlining the brain: Methods and tools for fibre tractography.* Workshop on "Imaging the brain at different scales: How to integrate multi-scale structural information?". University of Antwerp, Antwerp, Belgium (September 2013).
- *Graph-based analysis of brain connectivity: Principles and scope.* Institute of Neurology, UCL, London, UK (January 2012).

- *Imaging connectivity: Statistical modelling and the wiring of the brain*. Berlin Workshop on Statistics and Neuroimaging, Berlin, Germany (November 2011).
- *Interfacing an existing software library to R: The example of "RNiftyReg"*. LondonR Meeting, London, UK (June 2011).
- *Starting up an independent career: A personal perspective*. UCL Neuroscience Early Career Forum, London, UK (May 2011).
- *Streamline matching in diffusion tractography*. CUBRIC, University of Cardiff, Cardiff, UK (January 2011).
- *Common factors and gender differences in normal white matter tract development*. Centre for Developmental Cognitive Neuroscience, UCL, London, UK (October 2010).
- *Recent advances in diffusion MRI*. 13th Kuopio Bio-NMR Workshop, Kuopio, Finland (December 2009).
- *Basics of diffusion MRI and DTI*. 13th Kuopio Bio-NMR Workshop, Kuopio, Finland (December 2009).
- *A shape modelling approach to tract segmentation and characterisation in groups*. University of Manchester, Manchester, UK (July 2009).
- *Optimising diffusion pulse sequences for in vivo investigation of microstructure*. UK Diffusion MRI Interest Group Meeting, London, UK (June 2009).
- *Neuroinformatics at Edinburgh: A personal perspective*. EPSRC Showcase Event, The Royal Society, London, UK (February 2009).

## Professional Activities

- Professional memberships: International Society for Magnetic Resonance in Medicine (ISMRM) and its British Chapter (2006–2015, 2018); Organisation for Human Brain Mapping (OHBM; 2012, 2014); Society for Editors and Proofreaders (SfEP; 2015–).
- Committee memberships: ICH Equality, Diversity and Inclusion Committee (2018–); ICH Parental Support Network (MADs; 2015–).
- Webmaster, UK Diffusion MRI Interest Group (dMRI-UK; <http://www.diffusion-mri.org.uk>).
- Meeting organiser, dMRI-UK Meeting on Diffusion Along the Lifespan (2016).
- Scientific session moderator, ISMRM Scientific Meeting & Exhibition (2011, 2013).
- Scientific session moderator, ISMRM British Chapter Meeting (2014).
- Programme committee member, MICCAI Workshops on Diffusion Modelling and the Fibre Cup (2009) and Computational Diffusion MRI (2010–2015).
- Reviewer for a range of journals including *NeuroImage*, *Cerebral Cortex*, *Magnetic Resonance in Medicine*, *Human Brain Mapping* and *IEEE Transactions on Medical Imaging* (cf. <https://publons.com/author/1194444/jonathan-d-clayden>).
- Grant reviewer for the UK Medical Research Council, Wellcome Trust and others.

## Teaching

- *Analysis, tractography and applications in diffusion imaging*. Lecture, UCL MSc in Advanced Neuroimaging (2018–).
- *Diffusion tensor imaging and tractography*. Lecture, UCL MSc/PG Diploma in Paediatric Neuropsychology (2017–).

- *Imaging of the nervous system*. Lecture, UCL MSc in Neurophysiotherapy (2017–).
- *Modelling the relationship between structural and functional connectomes*. Short project, UCL MSc in Physics and Engineering in Medicine (2016–).
- *Diffusion MRI in neuroimaging*. Lecture, UCL MSc in Advanced Biomedical Imaging (2016–).
- *Tractography workshop*. Workshop, UCL MSc in Advanced Neuroimaging (2009–).
- *Multimodal MRI workshop*. Workshop, UCL MSc in Advanced Neuroimaging (2009–).
- *DTI imaging and network connectivity*. Lecture, UCL MSc in Neuroscience (2011–2014).
- *Introducing tractography*. Lecture, Edinburgh MSc in Neuroscience (2005–2006).

## Communication, Outreach & Policy

- Written on science and research policy in spare time, including for the London School of Economics' popular impact blog (<http://blogs.lse.ac.uk/impactofsocialsciences/>).
- Science communication experience as part of an Edinburgh Medical Physics student initiative which had contact with some 8000 schoolchildren and members of the public over two years. Partly funded by an EPSRC Partnership for Public Engagement grant.

## Software & Other Outputs

- Main author and maintainer of TractoR, a robust and flexible R-based software platform for medical image analysis (<http://www.tractor-mri.org.uk>). Used for routine image processing, and to build and disseminate methodological developments.
- Contributed several standalone R packages for image processing and other scientific computing applications.
- Published an open-access normative dataset of magnetic resonance images and electroencephalography (<https://osf.io/94c5t/>).

## Publications

### REVIEWS

1. **J.D. Clayden** (2013). Imaging connectivity: MRI and the structural networks of the brain. *Functional Neurology* **28**(3):197–203. [Invited paper]

### ORIGINAL JOURNAL PAPERS

1. J. Muschelli, A. Gherman, J.-P. Fortin, B. Avants, B. Whitcher, **J.D. Clayden**, B.S. Caffo & C.M. Crainiceanu (in press). Neuroconductor: An R platform for medical imaging analysis. To appear in *Biostatistics*.
2. E.A. Webb, L. Elliott, D. Carlin, M. Wilson, K. Hall, J. Netherton, J. Reed, T.G. Barrett, V. Salwani, **J.D. Clayden**, W. Arlt, N. Krone, A.C. Peet & A.G. Wood (2018). Quantitative MRI brain in congenital adrenal hyperplasia: In vivo assessment of the cognitive and structural impact of steroid hormones. *The Journal of Clinical Endocrinology & Metabolism* **103**(4):1330–1341.

3. C.R. Gibbard, J. Ren, D.H. Skuse, **J.D. Clayden** & C.A. Clark (2018). Structural connectivity of the amygdala in young adults with autism spectrum disorder. *Human Brain Mapping* **39**(3):1270–1282.
4. S. Muñoz Maniega, M.E. Bastin, I.J. Deary, J.M. Wardlaw & **J.D. Clayden** (2018). Reference tracts and generative models for brain white matter tractography. *Journal of Imaging* **4**(1):8.
5. C.S. Parker, **J.D. Clayden**, M.J. Cardoso, R. Rodionov, J.S. Duncan, C. Scott, B. Diehl & S. Ourselin (2018). Structural and effective connectivity in focal epilepsy. *NeuroImage: Clinical* **17**:943–952.
6. J.M. Kawadler, **J.D. Clayden**, C.A. Clark & F.J. Kirkham (2016). Intelligence quotient in paediatric sickle cell disease: A systematic review and meta-analysis. *Developmental Medicine & Child Neurology* **58**(7):672–679.
7. F.J. Liégeois, J. Butler, A.T. Morgan, **J.D. Clayden** & C.A. Clark (2016). Anatomy and lateralization of the human corticobulbar tracts: An fMRI-guided tractography study. *Brain Structure and Function* **221**(6):3337–3345.
8. F. Deligianni, D.W. Carmichael, G.H. Zhang, C.A. Clark & **J.D. Clayden** (2016). NODDI and tensor-based microstructural indices as predictors of functional connectivity. *PLoS ONE* **11**(4):e0153404.
9. K.K. Seunarine, **J.D. Clayden**, S. Jentschke, M. Muñoz, J.M. Cooper, M.J. Chadwick, T. Banks, F. Vargha-Khadem & C.A. Clark (2016). Sexual dimorphism in white matter developmental trajectories using tract-based spatial statistics. *Brain Connectivity* **6**(1):37–47.
10. **J.D. Clayden**, Z. Nagy, N. Weiskopf, D.C. Alexander & C.A. Clark (2016). Microstructural parameter estimation in vivo using diffusion MRI and structured prior information. *Magnetic Resonance in Medicine* **75**(4):1787–1796.
11. J.M. Kawadler, F.J. Kirkham, **J.D. Clayden**, M. Hollocks, E. Seymour, R. Edey, P. Telfer, A. Robins, O. Wilkey, S. Barker, T. Cox & C.A. Clark (2015). White matter damage relates to oxygen saturation in children with sickle cell anemia without silent cerebral infarcts. *Stroke* **46**(7):1793–1799.
12. D. Anblagan, M.E. Bastin, S. Sparrow, C. Piyasena, R. Patakya, E.J. Moore, A. Serag, A.G. Wilkinson, **J.D. Clayden**, S.I. Semple & J.P. Boardman (2015). Tract shape modeling detects changes associated with preterm birth and neuroprotective treatment effects. *NeuroImage: Clinical* **8**:51–58.
13. M. Grech-Sollars, P.W. Hales, K. Miyazaki, F. Raschke, D. Rodriguez, M. Wilson, S.K. Gill, T. Banks, D.E. Saunders, **J.D. Clayden**, M.N. Gwilliam, T.R. Barrick, P.S. Morgan, N.P. Davies, J. Rossiter, D.P. Auer, R. Grundy, M.O. Leach, F.A. Howe, A.C. Peet & C.A. Clark (2015). Multi-centre reproducibility of diffusion MRI parameters for clinical sequences in the brain. *NMR in Biomedicine* **28**(4):468–485.
14. S. Muñoz Maniega, M. Valdés Hernández, **J.D. Clayden**, N.A. Royle, C. Murray, Z. Morris, B.S. Aribisala, A.J. Gow, J.M. Starr, M.E. Bastin, I.J. Deary & J.M. Wardlaw (2015). White matter hyperintensities and normal-appearing white matter integrity in the ageing brain. *Neurobiology of Aging* **36**(2):909–918.
15. C.S. Parker, F. Deligianni, M.J. Cardoso, P. Daga, M. Modat, M. Dayan, C.A. Clark, S. Ourselin & **J.D. Clayden** (2014). Consensus between pipelines in structural brain networks. *PLoS ONE* **9**(10):e111262.
16. F. Deligianni, M. Centeno, D.W. Carmichael & **J.D. Clayden** (2014). Relating resting-state fMRI and EEG whole-brain connectomes across frequency bands. *Frontiers in Neuroscience* **8**:258.

17. M. Grech-Sollars, D.E. Saunders, K.P. Phipps, R. Kaur, S.M. Paine, T.S. Jacques, **J.D. Clayden** & C.A. Clark (2014). Challenges for the functional diffusion map in pediatric brain tumors. *Neuro-Oncology* **16**(3):449–456.
18. C.R. Gibbard, J. Ren, K.K. Seunarine, **J.D. Clayden**, D.H. Skuse & C.A. Clark (2013). White matter microstructure correlates with autism trait severity in a combined clinical–control sample of high-functioning adults. *NeuroImage: Clinical* **3**:106–114.
19. A. Ranpura, E. Isaacs, C. Edmonds, M. Rogers, J. Lanigan, A. Singhal, **J.D. Clayden**, C.A. Clark & B. Butterworth (2013). Developmental trajectories of grey and white matter in dyscalculia. *Trends in Neuroscience and Education* **2**(2):56–64.
20. J.M. Kawadler, **J.D. Clayden**, F.J. Kirkham, T.C. Cox, D.E. Saunders & C.A. Clark (2013). Subcortical and cerebellar volumetric deficits in paediatric sickle cell anaemia. *British Journal of Haematology* **163**(3):373–376.
21. J. Bathelt, H. O'Reilly, **J.D. Clayden**, J.H. Cross & M. de Haan (2013). Functional brain network organisation of children between 2 and 5 years derived from reconstructed activity of cortical sources of high-density EEG recordings. *NeuroImage* **82**:595–604.
22. **J.D. Clayden**, M. Dayan & C.A. Clark (2013). Principal networks. *PLoS ONE* **8**(4):e60997.
23. E.A. Webb, M.A. O'Reilly, **J.D. Clayden**, K.K. Seunarine, N. Dale, A. Salt, C.A. Clark & M.T. Dattani (2013). Reduced ventral cingulum integrity and increased behavioral problems in children with isolated optic nerve hypoplasia and mild to moderate or no visual impairment. *PLoS ONE* **8**(3):e59048.
24. M. Grech-Sollars, D.E. Saunders, K.P. Phipps, **J.D. Clayden** & C.A. Clark (2012). Survival analysis for apparent diffusion coefficient measures in children with embryonal brain tumours. *Neuro-Oncology* **14**(10):1285–1293.
25. **J.D. Clayden**, S. Jentschke, M. Muñoz, J.M. Cooper, M.J. Chadwick, T. Banks, C.A. Clark & F. Vargha-Khadem (2012). Normative development of white matter tracts: Similarities and differences in relation to age, gender and intelligence. *Cerebral Cortex* **22**(8):1738–1747.
26. E.A. Webb, M.A. O'Reilly, **J.D. Clayden**, K.K. Seunarine, W.K. Chong, N. Dale, A. Salt, C.A. Clark & M.T. Dattani (2012). Effect of growth hormone deficiency on brain structure, motor function and cognition. *Brain* **135**(1):216–227.
27. J.M. Wardlaw, M.E. Bastin, M.C. Valdés Hernández, S. Muñoz Maniega, N.A. Royle, Z. Morris, **J.D. Clayden**, E.M. Sandeman, E. Eadie, C. Murray, J.M. Starr & I.J. Deary (2011). Brain ageing, cognition in youth and old age, and vascular disease in the Lothian Birth Cohort 1936: Rationale, design and methodology of the imaging protocol. *International Journal of Stroke* **6**(6):547–559.
28. M. Cutajar, **J.D. Clayden**, C.A. Clark & I. Gordon (2011). Test-retest reliability and repeatability of renal diffusion tensor MRI in healthy subjects. *European Journal of Radiology* **80**(3):e263–e268.
29. **J.D. Clayden**, S. Muñoz Maniega, A.J. Storkey, M.D. King, M.E. Bastin & C.A. Clark (2011). TractoR: Magnetic resonance imaging and tractography with R. *Journal of Statistical Software* **44**(8):1–18.
30. K. Tabelow, **J.D. Clayden**, P. Lafaye de Micheaux, J. Polzehl, V.J. Schmid & B.J. Whitcher (2011). Image analysis and statistical inference in neuroimaging with R. *NeuroImage* **55**(4):1686–1693.
31. L. Penke, S. Muñoz Maniega, C. Murray, A.J. Gow, M.C. Valdés Hernández, **J.D. Clayden**, J.M. Starr, J.M. Wardlaw, M.E. Bastin & I.J. Deary (2010). A general factor of brain white matter integrity predicts information processing speed in healthy older people. *The Journal of Neuroscience* **30**(22):7569–7574.

32. M.E. Bastin, S. Muñoz Maniega, K.J. Ferguson, L.J. Brown, J.M. Wardlaw, A.M. MacLulich & **J.D. Clayden** (2010). Quantifying the effects of normal ageing on white matter structure using unsupervised tract shape modelling. *NeuroImage* **51**(1):1–10.
33. L. Penke, S. Muñoz Maniega, L.M. Houlihan, C. Murray, A.J. Gow, **J.D. Clayden**, M.E. Bastin, J.M. Wardlaw & I.J. Deary (2010). White matter integrity in the splenium of the corpus callosum is related to successful cognitive aging and partly mediates the protective effect of an ancestral polymorphism in *ADRB2*. *Behavior Genetics* **40**(2):146–156.
34. **J.D. Clayden**, A.J. Storkey, S. Muñoz Maniega & M.E. Bastin (2009). Reproducibility of tract segmentation between sessions using an unsupervised modelling-based approach. *NeuroImage* **45**(2):377–385.
35. E. Sprooten, G.K.S. Lymer, S. Muñoz Maniega, J. McKirdy, **J.D. Clayden**, M.E. Bastin, D.J. Porteous, E.C. Johnstone, S.M. Lawrie, J. Hall & A.M. McIntosh (2009). The relationship of anterior thalamic radiation integrity to psychosis risk associated neuregulin-1 variants. *Molecular Psychiatry* **14**(3):237–238.
36. M.E. Bastin, **J.D. Clayden**, A. Pattie, I.F. Gerrish, J.M. Wardlaw & I.J. Deary (2009). Diffusion tensor and magnetization transfer MRI measurements of periventricular white matter hyperintensities in old age. *Neurobiology of Aging* **30**(1):125–136.
37. A.M. McIntosh, S. Muñoz Maniega, G.K.S. Lymer, J. McKirdy, J. Hall, J.E.D. Sussmann, M.E. Bastin, **J.D. Clayden**, E.C. Johnstone & S.M. Lawrie (2008). White matter tractography in bipolar disorder and schizophrenia. *Biological Psychiatry* **64**(12):1088–1092.
38. M.E. Bastin, J.P. Piątkowski, A.J. Storkey, L.J. Brown, A.M. MacLulich & **J.D. Clayden** (2008). Tract shape modelling provides evidence of topological change in corpus callosum genu during normal ageing. *NeuroImage* **43**(1):20–28.
39. **J.D. Clayden**, A.J. Storkey & M.E. Bastin (2007). A probabilistic model-based approach to consistent white matter tract segmentation. *IEEE Transactions on Medical Imaging* **26**(11):1555–1561.
40. **J.D. Clayden**, M.E. Bastin & A.J. Storkey (2006). Improved segmentation reproducibility in group tractography using a quantitative tract similarity measure. *NeuroImage* **33**(2):482–492.
41. I.J. Deary, M.E. Bastin, A. Pattie, **J.D. Clayden**, L.J. Whalley, J.M. Starr & J.M. Wardlaw (2006). White matter integrity and cognition in childhood and old age. *Neurology* **66**(4):505–512.

#### FULL LENGTH CONFERENCE PAPERS

1. S. Muñoz Maniega, M.E. Bastin, I.J. Deary, J.M. Wardlaw & **J.D. Clayden** (2017). Improved reference tracts for unsupervised brain white matter tractography. In M. Valdés Hernández & V. González-Castro (eds), *Medical Image Understanding and Analysis (MIUA). Communications in Computer and Information Science*, vol. 723, pp. 425–435. Springer, Cham.
2. F. Deligianni, C.A. Clark & **J.D. Clayden** (2013). A framework to compare tractography algorithms based on their performance in predicting functional networks. In L. Shen, T. Liu, P.-T. Yap, H. Huang, D. Shen & C.-F. Westin (eds), *Proceedings of the 3rd International Workshop on Multimodal Brain Image Analysis (MBIA). Lecture Notes in Computer Science*, vol. 8159, pp. 211–221. Springer-Verlag.
3. **J.D. Clayden**, M.D. King & C.A. Clark (2009). Shape modelling for tract selection. In G.-Z. Yang, D.J. Hawkes, D. Rueckert, A. Noble & C. Taylor (eds), *Proceedings of the 12th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI). Lecture Notes in Computer Science*, vol. 5762, pp. 150–157. Springer-Verlag.

4. **J.D. Clayden**, Z. Nagy, M.G. Hall, C.A. Clark & D.C. Alexander (2009). Active imaging with dual spin-echo diffusion MRI. In J.L. Prince, D.L. Pham & K.J. Myers (eds), *Proceedings of the 21st International Conference on Information Processing in Medical Imaging (IPMI)*. *Lecture Notes in Computer Science*, vol. 5636, pp. 264–275. Springer-Verlag.