

Ahmad Beyh, PhD

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Research Experience

2023– **Postdoctoral Associate**

Department of Psychiatry, Brain Health Institute, Rutgers University

Mentor: Dr Linden Parkes

- Conducting research into brain network organization and dynamics using simulated and empirical data.
- Developing biologically informed neural network models of brain dynamics.
- Developing advanced multi-shell diffusion MRI sequences for clinical investigations of brain tissue microstructure and integration with neural network models.

2023–2024 **Visiting Researcher**

Donders Institute for Brain, Cognition and Behaviour, Radboud University

Adviser: Dr Stephanie Forkel

- Conducted research into white matter anatomy in the human brain using diffusion MRI.
- Used large, open-source neuroimaging datasets and bespoke data for studies on the neurobiology of language.

2021–2023 **Postdoctoral Fellow**

Department of Cell & Developmental Biology, University College London

Mentor: Prof Semir Zeki

- Conducted primary research on conscious visual perception and neuroaesthetics.
- Coordinated research activities and collected data from patients and controls using various techniques including MRI (structural, functional, diffusion), transcranial magnetic stimulation (TMS), and psychophysics.
- Earned the Qualified User status (equivalent to Level 2 clearance) at the Wellcome Centre for Human Neuroimaging for the independent use of MRI facilities (3 T and 7 T).

2016–2021 **Research Worker**

Centre for Neuroimaging Sciences, King's College London

- Conducted primary research on white matter anatomy and function.
- Developed pipelines for pre-processing and analyzing diffusion MRI data and the integration of multimodal data (diffusion, fMRI, TMS) with cortical surface reconstructions.
- Worked with large open access neuroimaging data from the Human Connectome Project.
- Collaborated with neurosurgeons to use tractography as a pre-surgical planning tool.

2013–2014 **Research Assistant**

Psychology Department, American University of Beirut

- Designed behavioral tasks in E-Prime.
- Collected EEG data in healthy participants.
- Performed data cleaning and inspected data for ERPs.

Education

2022 **PhD, Neuroimaging**

King's College London

Thesis: "The functional anatomy of white matter pathways for visual configuration learning"

Supervisors: Prof Marco Catani, Prof Dominic Ffytche, Dr Flavio Dell'Acqua

2015 **MSc, Neuroscience**

King's College London

Thesis: "A retinotopic connectivity atlas of the human occipital lobe"

Supervisor: Prof Marco Catani

Graduated with distinction

2014 **BA, Psychology**
American University of Beirut
Thesis: "An EEG study of self-control, risk-taking, and the role of the prefrontal cortex"
Supervisors: Prof Charles Harb, Prof Arne Dietrich

Publications

* Contributed equally.

First-Author Peer-Reviewed Articles

Beyh A* & Rasche S*, Leff A, Ffytche D, Zeki S (2024). A clinico-anatomical dissection of the magnocellular and parvocellular pathways in a patient with the Riddoch syndrome. *Brain Structure & Function*.

Beyh A* & Howells H*, Giampiccolo D, ... Vergani F (2024). Connectivity defines the distinctive anatomy and function of the hand-knob area. *Brain Communications*.

Rasche S* & **Beyh A***, Paolini M, Zeki S (2024). Neural correlates of the experience of ugliness. *European Journal of Neuroscience*.

Beyh A* & Rasche S*, Leff A, Ffytche D, Zeki S (2023). Neural patterns of conscious visual awareness in the Riddoch syndrome. *Journal of Neurology*.

Rasche S* & **Beyh A***, Paolini M, Zeki S (2023). The neural determinants of abstract beauty. *European Journal of Neuroscience*.

Beyh A, Dell'Acqua F, Cancemi D, De Santiago Requejo F, Ffytche D, Catani M (2022). The medial occipital longitudinal tract supports early stage encoding of visuospatial information. *Communications Biology*.

Co-Author Peer-Reviewed Articles

Kim JZ, Betzel R, **Beyh A**, ... Parkes L (2025). Inferring macroscopic intrinsic neural timescales using optimal control theory. *Nature Communications*.

Lim L, Radua J, **Beyh A** (2025). Structural connectivity abnormalities in suicidal thoughts and behaviours: a meta-analysis. *Translational Psychiatry*.

Mehra C, **Beyh A**, ... O'Muircheartaigh J (2025). Zero-phase-delay synchrony between interacting neural populations: implications for functional connectivity-derived biomarkers. *Imaging Neuroscience*.

Zeki S, Hale ZF, **Beyh A**, Rasche S (2024). Perceptual axioms are irreconcilable with Euclidean geometry. *European Journal of Neuroscience*.

O' Brien S & Sethi A, Blair J, Viding E, **Beyh A**, ... Craig MC (2023). Rapid white matter changes in children with conduct problems during a parenting intervention. *Translational Psychiatry*.

Mackes N, Mehta M, **Beyh A**, ... Sonuga-Barke E (2022). A prospective study of the impact of severe childhood deprivation on brain white matter in adult adoptees: widespread localized reductions in volume but unaffected microstructural organization. *eNeuro*.

Rajashekar D & Lavrador JP, Ghimire P, Keeble H, Harris L, Pereira N, Patel S, **Beyh A**, Gullan R, Ashkan K, Bhangoo R, Vergani F (2022). Simultaneous motor and visual intraoperative neuromonitoring in asleep parietal lobe surgery: dual-strip technique. *Journal of Personalized Medicine*.

Brogna C, Lavrador JP, Kandeel HS, **Beyh A**, Ribas EC, Vergani F, Toliaş CM (2021). Medial-tonsillar telovelar approach for resection of a superior medullary velum cerebral cavernous malformation: anatomical and tractography study of the surgical approach and functional implications. *Acta Neurochirurgica*.

Mirchandani AS, **Beyh A**, Lavrador JP, Howells H, Dell'Acqua F, Vergani F (2021). Altered corticospinal microstructure and motor cortex excitability in gliomas: an advanced tractography and transcranial magnetic stimulation study. *Journal of Neurosurgery*.

Howells H, Thiebaut de Schotten M, Dell'Acqua F, **Beyh A**, Zappalà G, Leslie A, Simmons A, Murphy DG, Catani M (2018). Frontoparietal tracts linked to lateralized hand preference and manual specialization. *Cerebral Cortex*.

Catani M, Robertsson N, **Beyh A**, ... Dell'Acqua F (2017). Short parietal lobe connections of the human and monkey brain. *Cortex*.

Published Book Chapters

Beyh A, Ohlerth AK, Forkel SJ (2025). Harnessing advanced tractography in neurosurgical practice. In: Krieg SM & Picht T (Eds.), *Navigated Transcranial Magnetic Stimulation in Neurosurgery*.

Forkel SJ, Bortolami C, Dulyan L, Barrett R, **Beyh A** (2025). Dissecting white matter pathways: a neuroanatomical approach. In: Dell'Acqua F, Descoteaux M, Leemans A (Eds.), *Handbook of Diffusion MRI Tractography*.

Preprints & Articles Under Review

Ozker M, Giglio L, **Beyh A**, Forkel S, Hagoort P (2025). Individual differences in speech monitoring: functional and structural correlates of delayed auditory feedback. *BioRxiv*.

Dell'Acqua F* & **Beyh A***, ... Catani M (2025). MegaTrack: a framework for the anatomically accurate and time-efficient virtual dissection and analysis of large-scale tractography datasets. *BioRxiv*.

Matsulevits A, Alvez P, Atzori M, **Beyh A**, ... Thiebaut de Schotten M (2025). A global effort to benchmark predictive models and reveal mechanistic diversity in long-term stroke outcomes. *BioRxiv*.

Citro S, Dawson M, **Beyh A**, ... Catani M. Structural evolution of the frontal aslant tract: implications for primate vocalization and human speech. *Under review at Nature Communications*.

Works in Progress

Beyh A, Kim JZ, Larson B, Parkes L. Using anatomo-functional constraints to train biologically informed recurrent neural networks.

Fellowships, Awards, & Scholarships

Fellowships

2025 Fellow, The Philadelphia Symposium for Postdoctoral Initiatives in Neuroscience Excellence

Awards & Honors

2025 Best Poster Award, Brain Health Institute, Rutgers University

2018 Best Abstract Award, European Workshop on Cognitive Neuropsychology

2017 Finalist, Wellcome Image Awards, The Wellcome Trust

2015 The Henry Mc Ilwain Best Poster Award, King's College London

Scholarships & Travel Support

2025 Travel Grant, Brain Health Institute, Rutgers University

2022 Scholarship, CIFAR Neuroscience of Consciousness Winter School

2019 Travel Grant, Centre for Doctoral Studies, King's College London

2019 Travel Grant, Guarantors of Brain

Teaching & Speaking Engagements

Mentorship

2025– Emily Heilner, PhD Student, Rutgers University

2023–2024 Eva Guzmán-Chacón, Master's Student, Radboud University

2021–2023 Samuel Rasche, PhD Student, University College London

2023 Deividas Sauchatas, Master's Student, University College London

2021 Vanesa van Vlerken, Master's Student, King's College London

2018 Anam Saifullah, Master's Student, King's College London

Guest Lectures

2020–2022 Introduction to neuroimaging (University College London)

2022 Occipital lobe anatomy & function (The London Neuromonitoring and Brain Mapping Course)

2020 Neuroanatomy for neuroimagers (King's College London)

2019 Introduction to diffusion MRI (King's College London)

Attendee score: 4.7/5

2016–2018 Networks of the visual system (King's College London)

Workshops & Technical Instruction

2025 Introduction to diffusion MRI preprocessing, NEURAL Workshop (virtual)

Attendee score: 5/5

2023–2024 Diffusion MRI, Neuroanatomy, and Tractography Workshop (University of Auckland)

Attendee score: 4.6/5

2018 Diffusion MRI preprocessing, Symposium on Diffusion Imaging (UCLouvain)

2016–2018 Neuroanatomy and Tractography Workshop, NatBrainLab (King's College London)

Invited Talks & Research Seminars

2025 Bridging neuroscience & AI with biologically constrained neural networks (University of Pennsylvania)

2025 bioRNNs: toward more biologically plausible neural network models of the brain (Rutgers University)

2023 Medial occipito-temporal networks (NEURAL Bordeaux)

2023 Callosal connections and visual motion processing (Neuroccino, Clinical Neuroanatomy Seminars)

2022 Occipital lobe anatomy & function (The London Neuromonitoring and Brain Mapping Course)

2022 GPS and spatial memory (Neuroccino, Clinical Neuroanatomy Seminars)

Academic Service & Leadership

Editorial Roles

2025– Consulting Editor, Cortex

Peer Review

Brain Research UK · Brain Communications · Brain Structure & Function · Communications Biology · Cortex · eLife · The French National Research Agency · Human Brain Mapping · Nature Communications · Network Neuroscience · NeuroImage · Neurosurgical Review · PNAS · Scientific Reports.

Committee Roles

2024– Secretary, Neuroscience Alliance

2023– Organizer, Neural Networks Journal Club, Rutgers University

2016–2021 Member, Organizing Committee, Neuroanatomy and Tractography Workshop, NatBrainLab

2015–2018 Member, Organizing Committee, Clinical Neuroanatomy Seminars

2017 Member, Organizing Committee, London BrainHack

Outreach & Community Engagement

2023 Scientific Consultant, National Art Pass Campaign, Art Fund UK

2021 Panelist, Discover Careers in Clinical Practice, King's College London

2017 Participant, Wellcome Image Awards, Wellcome Trust

2015 Panelist, IoPPN Alumni Career Event, King's College London

2014 Member, Organizing Committee, Autism Awareness Campaign, American University of Beirut

Conference Presentations

Contributed Talks

2025 American Physical Society (Anaheim, CA, USA)

2022 CIFAR Neuroscience of Consciousness Winter School (Cancun, Mexico)

- 2021 International Society for Magnetic Resonance in Medicine, Diffusion Study Group (virtual)
- 2018 Gray's Neuroanatomy Conference (Siracusa, Sicily, Italy)
- 2018 European Workshop on Cognitive Neuropsychology (Bressanone, Italy)

Posters

- 2025 Rutgers Brain Health Institute Annual Symposium (New Brunswick, NJ, USA)
- 2019 Organization for Human Brain Mapping (Rome, Italy)
- 2017 Organization for Human Brain Mapping (Vancouver, Canada)
- 2016 Organization for Human Brain Mapping (Geneva, Switzerland)
- 2015 Neuroimaging and Experimental Medicine Advances (London, UK)

Professional Development

- 2024 Deep Learning Course, Neuromatch Academy
- 2018 The Human Connectome Project Course
- 2016 Preparing to Teach in Higher Education, King's College London
- 2016 The FSL Course, Oxford Centre for Functional MRI of the Brain

Coding and Software Skills

Python · PyTorch · Matlab · bash · git · FSL · SPM · PsychToolbox · ANTs · TrackVis · TORTOISE · Connectome Workbench.