View the full CV on my website:
tsbinns.com/CV

Thomas S. Binns

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EDUCATION

09/2021 – Present Charité – Universitätsmedizin Berlin, Germany
Ph.D. Neuroscience Fellow
For my fellowship-funded Ph.D. I am investigating biomarkers of Parkinson's disease for use in brain-computer interfaces for next generation adaptive deep brain stimulation treatments, with a focus on connectivity between the cortex and basal ganglia, supervised by Prof. Wolf-Julian Neumann (Charité – Universitätsmedizin Berlin) and Prof. Stefan Haufe (Technische Universität Berlin).

09/2016 – 07/2021 University of Aberdeen, UK
M.Sci. (Hons) Neuroscience with Psychology with Industrial Placement, First-Class Honours
Master's (Industrial Placement) thesis – "Investigating neural precursors of self-initiated action using machine learning techniques". Placement at the Bernstein Center for Computational Neuroscience, Germany. Supervisors: Dr. Matthias Schultze-Kraft and Prof. John-Dylan Haynes. First-Class.
Bachelor's (Honours) thesis – "Investigating the neuromodulation of striatal activity *in silico*". Supervisor: Dr. Antonio Gonzalez. First-Class.

SELECTED WORK EXPERIENCE

07/2021 – Present Cognitive Neuromodulation Group, Charité – Universitätsmedizin Berlin, Germany
Role: Researcher Supervisors: Prof. Wolf-Julian Neumann, Prof. Stefan Haufe
I am studying cortical-subthalamic connectivity using invasive recordings from Parkinson's disease patients, with the goal of identifying biomarkers for use in adaptive deep brain stimulation. Through this work, I am developing my data analysis and programming skills, including with the contribution to and development of open-source packages for advanced signal analyses.

08/2019 – 08/2020 Haynes Group, Bernstein Center for Computational Neuroscience, Germany
Role: Researcher Supervisors: Dr. Matthias Schultze-Kraft, Prof. John-Dylan Haynes
I investigated choice-predictive brain signals and movement initiation using machine learning techniques and brain-computer interfaces. My tasks involved designing and conducting experiments, with extensive data analysis. Accordingly, I developed an in-depth understanding of brain-computer interfaces and machine learning techniques. Additionally, I co-authored a research article published in *eNeuro*.

SELECTED PUBLICATIONS

Binns, T.S., Köhler, R.M., Vanhoecke, J., …, Haufe, S., Kühn, A.A., Neumann, W.-J. (Pre-print). Shared pathway-specific network mechanisms of dopamine and deep brain stimulation for the treatment of Parkinson's disease. *bioRxiv*. DOI: 10.1101/2024.04.14.586969.

Binns, T.S., Orabe, M., Nguyen, T.D., Köhler, R.M., Pellegrini, F., Haufe, S. (2024). Multivariate connectivity methods in the MNE-Python toolbox. *Neural Traces*, Berlin, Germany.

Binns, T.S., Pellegrini, F., Jurhar, T., Haufe, S. (2023). PyBispectra: an open-source toolbox for advanced electrophysiological signal processing based on the bispectrum. *Bernstein Conference*, Berlin, Germany. DOI: 10.12751/NNCN.BC2023.149.

SELECTED FUNDING

2021 – 2024 ***Ph.D. Fellowship*, €63,000.** Einstein Center for Neurosciences Berlin.

2024 ***Google Summer of Code – MNE-Python: Implement decoding and statistical tools for advanced connectivity analyses*, $6,000.** Google, Python Software Foundation.

2019 – 2020 ***Investigating choice-predictive brain signals using EEG-based brain-computer interfaces*, €5,000.** Erasmus+ Traineeship grant, British Council.

SELECTED MEMBERSHIPS

11/2023 – Present MNE-Connectivity, MNE-Python Ecosystem
Role: Maintainer
I am a maintainer for MNE-Connectivity, a toolbox for analysing effective connectivity in electrophysiological data in the MNE-Python ecosystem totalling over 2,500 stars on GitHub and citations in over 4,000 peer-reviewed scientific papers. My contributions have involved the addition of new features, bug fixes, project maintenance, and user support, including through the Google Summer of Code programme.

12/2022 – Present Code Clinic, ReTune International Research Consortium, Germany
Role: Co-founder
I co-founded the Code Clinic of the ReTune International Research Consortium, with the goal of improving the quality and openness of programming to address issues with the quality and reproducibility of research. Towards this, the clinic organises reviews for code being used for data analysis projects and open-source packages, promoting programming best practices to ensure efficient, understandable, and error-free code.

RELEVANT SKILLS

Technical & Programming
I am highly confident programming in Python and MATLAB, and have further experience with C++, CSS, Java, and HTML. I am also familiar with Git, SPSS, and the Microsoft Office suite. Crucially, I can quickly familiarise myself with new software and programming languages, and learn new techniques to add to my repertoire.

Research & Data Analysis
Through my Ph.D. Fellowship, Honours project, industrial placement, and work as a researcher, I have been involved in all facets of the research process, from literature review, experimental design, and writing ethics proposals, to data collection, data analysis, and write-up. This has instilled within me the confidence, independence, and critical thinking required to devise and undertake successful, rigorous research projects.

Communication & Teamwork
Proficient communication and teamwork skills have played an essential part of my work in academic and professional settings, such as in my inter-group research, my teaching roles, and as Class Representative. With this diverse experience, I am able to communicate information effectively to a range or audiences, as well as work cohesively with others in both smaller and larger groups.

ACHIEVEMENTS AND INTERESTS

Open-Source Software
I am an active developer of open-source software, including: a maintainer of the MNE signal analysis toolbox, referenced in over 4,000 peer-reviewed articles; lead developer of PyBispectra, a toolbox for advanced time- and frequency-domain signal analyses; and lead developer of PyPARRM, a signal analysis package for handling periodic artefacts in time-series data. Accordingly, I have experience with software development, including in large teams where the use of continuous integration and deployment are a necessity.

Neuroscience Student Prize
Upon completion of my M.Sci. degree I was honoured to receive the University of Aberdeen's prize for best neuroscience student, a yearly prize presented to a student on the Neuroscience degree programme in recognition of the individual's excellent performance during their time at the university.

Music
I have played the drum kit for sixteen years, achieving a Distinction at Grade 8 in 2016. Currently I am a drummer for the Berlin Pipe Company, for which I have regular performances, and whilst studying at Aberdeen I was the drummer for the University's Jazz Band where I played at numerous concerts, including yearly performances at the Aberdeen Jazz Festival. I was also involved in the African Drumming Group and Samba Band of my borough's music centre in London. My participation in these activities has enhanced my communication and teamwork skills greatly, and attests to my dedication and well-rounded character.

References Available Upon Request