James McAllister

PhD Researcher – Mathematical Neuroscience
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GitHub Profile
LinkedIn Profile

Education

- **Ulster University, Intelligent Systems Research Centre** *2023 – present*
  PhD, Mathematical Neuroscience
- **Queen's University, Belfast** *2022–2023*
  MRes (Research Methods) – Distinction
- **Queen's University, Belfast** *2018–2019*
  PGCE (Mathematics) – GTCNI Star Award and E. Fulton Prize for Mathematics
- **Trinity College Dublin** *2014–2018*
  MA (Dubl) Mathematics – First class honours with Gold Medal

Experience

- **Ulster University** *September 2023 – present*
  Postgraduate Teaching Assistant Magee Campus
  – Leading tutorials in Mathematics modules for computing, engineering, and artificial intelligence
- **Wellington College** *2019–2022*
  Teacher of Mathematics, Further Mathematics and Physics Belfast

Research Projects and Conferences

- **Heterosynaptic plasticity rules induce small-world network topologies** *Due 06/24*
  International Conference of Mathematical Neuroscience
- **The capacity and accuracy of a triple well Hopfield model** *10/2023*
  Intelligent Systems Research Centre Computational Neuroscience Autumn School Project
- **The topology of autistic heterogeneity**
  Dissertation
- **A discrete attractor model of decision making** *07/2023*
  Using dynamical systems to model the decision-making processes of individuals with psychosis.
- **Insights from a multilevel analysis of high-stakes examination results in mathematics** *07/2021*
  Cantley, I., & McAllister, J. https://doi.org/10.1007/s11199-021-01234-5

Skills and Interests

Languages: English, German, French, British Sign Language

Programming Languages: Python, Julia, MATLAB, SPSS

Other Developer Tools: LaTeX, Microsoft, Google Suite

Areas of Interest: Mathematical modelling of synaptic plasticity, network theory, applications of topology and geometry, functional analysis, mathematical biology, assessment theory

Achievements

- **Gold Medal, Trinity College Dublin** *2018*
- **Naughton Foundation Scholarship** *2014–2018*
- **Exhibition Award, Trinity College Dublin** *2014*
- **Trinity College Dublin Sizarship** *2014–2018*

Courses, Essays and Talks

Computational Neuroscience Autumn School (1 week): 10/23, Intelligent Systems Research Centre, Ulster University

Computational Neuroscience Neuromatch Academy Summer School (3 weeks): 07/2023

INCF (International Neuroinformatics Coordinating Facility): Computational Modelling of Neuronal Plasticity - Python-based modelling course

2022-2023 Masters Dissertation. Title: The topology of autistic heterogeneity: A topological data analysis of neurocognitive functioning in autism spectrum disorder

Faculty of Education, Cambridge University: 03/ 2020. Title: The gender similarities hypothesis: Insights from a multilevel analysis of high-stakes examination results in mathematics, 07/03/2020, research article and presentation.

2017-2018 Mathematics Final Year Research Dissertation. Title: Georg Cantor: Trigonometric Series and the Emergence of Transfinite Set Theory. First class (distinction). Academic poster display.

2017-2018 Mathematics Education Research Project. Title: Complex Numbers in Mathematics Education. First class (distinction)

Referees

Referee 1: Dr Cian O'Donnell, PhD Supervisor, Computational Neuroscience, School of Computing, Engineering & Intelligent Systems, Ulster University. c.odonnell2@ulster.ac.uk

Referee 2: Prof Paschalis Karageorgis, Associate Professor, Pure & Applied Mathematics, School of Mathematics, Trinity College Dublin, karageop@tcd.ie