James McAllister – CV

PhD Researcher – Mathematical Neuroscience
Website: https://jajmcallister.github.io/
Intelligent Systems Research Centre, Magee College
Dynamic and Spectral Graph Theory meets Synaptic Plasticity

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GitHub Profile
LinkedIn Profile

Education

- **Magee College, Ulster University, Intelligent Systems Research Centre** *2023 – present*
  PhD, Mathematical Neuroscience
- **Queen's University, Belfast** *2022–2023*
  MRes (Masters of Research) – 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

- **University of Bristol, Applied Mathematics, Intelligent Systems Lab** *February 2024 – present*
  Visiting Researcher: Mathematics and Neuroscience
- **Magee College, Ulster University** *September 2023 – present*
  Postgraduate Teaching Assistant in mathematics and algorithms modules
- **Wellington College Belfast** *2019–2022*
  Teacher of Mathematics, Further Mathematics, and Physics

Research Projects, Publications, and Presentations

- **Graph-theory perspectives on recurrent neural network structure in reservoir computing** *2024*
  Ongoing research collaboration with University of Bristol
- **Heterosynaptic plasticity rules induce small-world network topologies** *2024*
  Poster due at International Conference of Mathematical Neuroscience
- **The capacity and accuracy of a triple well Hopfield model** *2023*
  Research Project: Intelligent Systems Research Centre
- **A discrete attractor model of decision making** *2023*
  Research Project: Using dynamical systems to model decision-making processes
- **The topology of autistic heterogeneity** *2022/23*
  Research Project
- **The impact of formative assessment on student attitudes to mathematics** *2022/23*
  A synthesis of the literature
- **Insights from a multilevel analysis of high-stakes examination results in mathematics** *2021*
  Cantley, I., & McAllister, J. https://doi.org/10.1007/s11199-021-01234-5
- **Trigonometric Series and the Emergence of Transfinite Set Theory** *2017/18*
  Final Year Research Dissertation. First class (distinction). Academic poster display
- **Complex Numbers in Mathematics Education** *2017/18*
  Mathematics Education Research Project. First class (distinction)

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: Graph & network theory, mathematical modelling of synaptic plasticity, applications of topology & topological data analysis, functional analysis, 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*
- **Trinity College Dublin First Class Prize** *2015, 2016, 2017*
- **E. Fulton Prize for Mathematics (PGCE), QUB** *2019*
- **GTCNI Star Award** *2019*

Courses, Training, 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

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

Referees

References available on request.