James McAllister – CV

PhD Researcher – Mathematical Neuroscience

Website: https://jajmcallister.github.io/

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 GitHub Profile

 LinkedIn Profile

EDUCATION

PhD, Mathematics & Computational Neuroscience   *2023 – present*

Intelligent Systems Research Centre, Magee College, University of Ulster

Mathematical & computational spectral graph theory-based analysis & modelling of heterosynaptic plasticity

MRes (Masters of Research), Queen's University, Belfast   *2022–2023*

Distinction

PGCE (Mathematics), Queen's University, Belfast   *2018–2019*

GTCNI Star Award and E. Fulton Prize for Mathematics

MA (Dubl) Mathematics, Trinity College Dublin   *2014–2018*

First Class Honours with Gold Medal

EXPERIENCE

Visiting Researcher: University of Bristol   *February 2024 – present*

Applied Mathematics, Intelligent Systems Research Lab

Postgraduate Teaching Assistant: University of Ulster   *September 2023 – present*

Mathematics and algorithms modules

Teacher of Mathematics: Wellington College Belfast   *2019–2022*

Mathematics, Further Mathematics, and Physics

RESEARCH PROJECTS, PUBLICATIONS, AND PRESENTATIONS

Heterosynaptic plasticity rules induce small-world network topologies   *Due June 2024*

Poster: International Conference of Mathematical Neuroscience, Dublin

Connectome-inspired multi-task reservoir networks   *Due July 2024*

Possible Poster: Neural Computation Conference, Sheffield (to be submitted)

Graph-theory perspectives on network structure in reservoir computing   *2024*

Ongoing research collaboration with University of Bristol

Algebraic topology and simplicial Hopfield networks   *2024*

Presentation to COIN Book Club

Mathematical modelling of synaptic maturation & circuit formation   *2024*

Ongoing research collaboration with University of Bristol

The capacity and accuracy of a triple-well Hopfield model   *2023*

Research Project & Presentation: Intelligent Systems Research Centre

A discrete attractor model of decision making   *2023*

Research Project & Presentation: Using dynamical systems to model decision-making processes

The topology of autistic heterogeneity   *2023*

Research Project: Using topological data analysis to examine autism neuropsychological data

The impact of formative assessment on student attitudes to mathematics *2023*
Research Project: A synthesis of the literature

A multilevel analysis of high-stakes examination results in mathematics *2021*
Cantley, I., & McAllister, J. https://doi.org/10.1007/s11199-021-01234-5
Cambridge University: Talk at British Society for Research into Learning Mathematics (BSRLM) *2020*

Trigonometric series and the emergence of transfinite set theory *2018*
Final Year Research Dissertation & Poster. First class (distinction). Trinity College Dublin

Complex numbers in mathematics education *2018*
Mathematics Education Research Project. First class (distinction). Trinity College Dublin

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 AND TRAINING

Deep Learning Neuromatch Academy Summer School

Computational Neuroscience Autumn School, Intelligent Systems Research Centre, Ulster University

Computational Neuroscience Neuromatch Academy Summer School

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

British Sign Language Level 1

REFEREES

References available on request.