

James McAllister – CV

PhD Researcher: Mathematics, Neuroscience, & Machine Learning

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

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🐙 [GitHub Profile](#)

🌐 [LinkedIn Profile](#)

EDUCATION

PhD, Mathematical & Computational Neuroscience <i>Intelligent Systems Research Centre, Magee College, University of Ulster</i>	<i>2023 – present</i>
MRes (Masters of Research), Queen's University, Belfast <i>Distinction</i>	<i>2022–2023</i>
PGCE (Mathematics), Queen's University, Belfast <i>GTCNI Star Award and E. Fulton Prize for Mathematics</i>	<i>2018–2019</i>
MA (Dubl) Mathematics, Trinity College Dublin <i>First Class Honours with Gold Medal</i>	<i>2014–2018</i>

EXPERIENCE

Delivering lectures in Mathematics Modules <i>Linear Algebra, Differential Equations, Calculus, Set Theory, Statistics</i>	<i>2024 – present</i>
Co-Supervision of Final Year Undergraduate Projects <i>Applied maths, neuroscience, computer science, machine learning</i>	<i>2024 – present</i>
Postgraduate Teaching Assistant <i>Undergraduate and postgraduate tutorials in mathematics, algorithms, and data science</i>	<i>2023 – present</i>
Visiting Researcher: University of Bristol <i>Intelligent Systems Research Lab, Neural Dynamics, Applied Mathematics</i>	<i>2024</i>
Teacher of Mathematics: Wellington College Belfast <i>Mathematics, Further Mathematics, and Physics</i>	<i>2019–2022</i>

RESEARCH PROJECTS AND PUBLICATIONS

Topological and simplicial features in reservoir computing <i>Paper: United Kingdom Computational Intelligence, Belfast</i>	<i>Sep 2024</i>
Random and biological network connectivity for reservoir computing <i>Poster: Neural Computation Conference, Sheffield, https://doi.org/10.5281/zenodo.13303677</i>	<i>July 2024</i>
Heterosynaptic plasticity rules induce small-world network topologies <i>Poster: Int. Conf. Mathematical Neuroscience, Dublin, https://doi.org/10.5281/zenodo.13303384</i>	<i>June 2024</i>
Graph-theory perspectives on network structure in reservoir computing <i>Ongoing research collaboration with University of Bristol</i>	<i>2024 –</i>
Mathematical modelling of synaptic maturation & circuit formation <i>Ongoing research collaboration with University of Bristol</i>	<i>2024 –</i>
The capacity and accuracy of a triple-well Hopfield model <i>Research Project & Presentation: Intelligent Systems Research Centre</i>	<i>Oct 2023</i>

A discrete attractor model of decision making	<i>July 2023</i>
<i>Research Project & Presentation: Using dynamical systems to model decision-making processes</i>	
A multilevel analysis of high-stakes examination results in mathematics	<i>2021</i>
<i>Cantley, I., & McAllister, J. https://doi.org/10.1007/s11199-021-01234-5</i>	
<i>Cambridge University: Talk at British Society for Research into Learning Mathematics (BSRLM)</i>	
Trigonometric series and the emergence of transfinite set theory	<i>2018</i>
<i>Final Year Research Dissertation & Poster. First class (distinction). Trinity College Dublin</i>	

TALKS, PRESENTATIONS, AND SEMINARS

Topological and simplicial features of reservoir networks	<i>Sep 2024</i>
<i>Presentation: Workshop UK Computational Intelligence, UKCI 2024</i>	
Network structure in reservoir computing and brain connectomes	<i>May 2024</i>
<i>Seminar: Intelligent Systems Research Centre</i>	
Algebraic topology, simplicial complexes, and Hopfield networks	<i>May 2024</i>
<i>Seminar: Intelligent Systems Research Centre</i>	

SKILLS AND INTERESTS

Languages: English, German, French, British Sign Language
Programming Languages: Python, Julia, MATLAB, SPSS
Other Developer Tools: High Performance Computing, LaTeX, Microsoft, Google Suite
Areas of Interest: Graph & network theory, mathematical modelling, applications of topology & topological data analysis, functional analysis, learning & memory, assessment theory

ACHIEVEMENTS AND AWARDS

Best Student Paper Award, UK Computational Intelligence, Belfast	<i>Sep 2024</i>
Visiting Scholarship, University of Bristol	<i>Feb 2024</i>
Gold Medal, Trinity College Dublin	<i>2018</i>
Naughton Foundation Scholarship	<i>2014–2018</i>
Exhibition Award, Trinity College Dublin	<i>2014</i>
Trinity College Dublin Sizarship	<i>2014–2018</i>
Trinity College Dublin First Class Prize	<i>2015, 2016, 2017</i>
E. Fulton Prize for Mathematics, QUB	<i>2019</i>

COURSES AND TRAINING

Computational Neuroscience Autumn School, Intelligent Systems Research Centre, Ulster University
Computational Neuroscience Neuromatch Academy Summer School
INCF (International Neuroinformatics Coordinating Facility): Python-based modelling course
British Sign Language Level 1

REFEREES

References available on request.