

# James McAllister – CV

PhD Researcher – Mathematical Neuroscience

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🐙 [GitHub Profile](#)

🌐 [LinkedIn Profile](#)

## EDUCATION

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- **PhD, Mathematics and Computational Neuroscience, Magee College** 2023 – present  
*Intelligent Systems Research Centre, 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

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

## RESEARCH PROJECTS, PUBLICATIONS, AND PRESENTATIONS

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- **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** Due June 2024  
*Poster: International Conference of Mathematical Neuroscience, Dublin*
- **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: Using topological data analysis to examine autism neuropsychological data*
- **The impact of formative assessment on student attitudes to mathematics** 2023  
*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** 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

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**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

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- **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

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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): Mathematical & 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. British Society for Research into Learning Mathematics (BSRLM).

## REFEREES

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References available on request.