

# Thomas Walker

Rice University - Electrical and Computer Engineering

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🔗 <https://thomaswalker1.github.io/>

## EDUCATION

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### Doctor of Philosophy in Electrical and Computer Engineering

January 2025 - Present

Rice University

- Supervised by Professor Richard Baraniuk, focusing on machine learning.

### BSc Mathematics

September 2021 - June 2024

Imperial College London

- First Class Honours: 89% Final Grade

### A-levels

September 2019 - June 2021

Reading School

- Mathematics: A\*, Further Mathematics: A\*, Physics: A\*, Extended Project Qualification: A\*

## EXPERIENCE

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### Research Assistant

September 2024 - December 2024

Imperial College London - Dr Anthea Monod

- Developing the use of tropical geometry to represent and investigate the properties of neural networks.

### Student Researcher

June 2024 - September 2024

Helmholtz Munich - AIDOS Lab - Professor Bastian Rieck

- Understanding how transformer models represent concepts in their latent representations.

### Student Researcher

July - September 2023

Imperial College London - Safe Artificial Intelligence Lab - Professor Alessio Lomuscio

- Investigating neural network generalization with a focus on PAC learning theory. Refined the evaluation of PAC bounds using testing certificates on regions of the input space.

### Student Researcher

September - October 2022

Imperial College London - Dr Dean Bodenham

- Investigating how programming languages (Python, R, C++) generate pseudo-random numbers. Developing a repository of functions to align pseudo-random number generators across languages.

### Data Consultant

June - September 2022

BAE Digital Intelligence

- Investigating project operations and developing strategies to improve resource utilization. Tasks involved working with database infrastructure (SQL, Java), AWS and developing a data dashboard in Python (Dash, Selenium).

### Website Administrator

December 2021 - June 2024

Imperial Wiki Society

- Working on a student-led initiative to develop an online platform to host supplementary material for modules taught at the university. Focusing on managing the project and developing resources for the mathematics modules.

## SELECTED PAPERS

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### GrokAlign: Geometric Characterisation and Acceleration of Grokking

July 2025

ICML 2025 - HiDL Workshop

### Tropical Expressivity of Neural Networks

October 2024

ArXiv Preprint

## AWARDS

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### IBM Prize For Excellence In Pure Mathematics

August 2024

Imperial College London Department of Mathematics

- Awarded to a final year student of Mathematics in recognition of high academic achievement and excellence in Pure Mathematics.

### Dean's List for Academic Excellence

August 2022/3/4

Imperial College London Department of Mathematics

- Awarded to students to the top 10% in the year group for overall academic performance.

## FUNDING

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### Graduate Fellowship

*Rice University - Department of Electrical and Computer Engineering*

*January 2025 - Present*

### Undergraduate Research Project Funding

*Imperial College London - Department of Mathematics and Department of Computer Science*

*July - August 2023*

## ARTICLES

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### The Prime Minister's Mathematical Propositions

*Imperial College London - Faculty of Natural Sciences Blog Post*

*July 2023*

## WORKSHOPS

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### AI Alignment - BlueDot Impact

*October 2024 - February 2025*

- A 12-week online course, covering a range of technical AI alignment research agendas. Involving an 8-week learning phase followed by a 4-week project phase.

### Human Aligned AI Summer School - Centre for Theoretical Study at Charles University

*July 2024*

- Four intensive days of talks, workshops, and discussions covering the latest trends in AI alignment research and broader framings of AI alignment research.

### X-Risk - Global Challenges Project

*May 2023*

- A workshop on investigating approaches taken to AI safety research.

### AI Safety Fundamentals - Imperial Effective Altruism Society

*October - December 2022*

- Comprised of eight group discussion sessions on the literature surrounding the concerns of powerful AI systems and the research on AI safety.

## VOLUNTEERING

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### Treasurer

*Imperial College London - Linstead Halls*

*October 2021 - July 2022*

### Dog Fosterer

*Royal Society for the Prevention of Cruelty to Animals (RSPCA), The Responsible Dog Rescue*

*May 2020 - August 2022*

## TECHNICAL SKILLS AND INTERESTS

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**Spoken Languages (Fluent):** English, Italian

**Programming Languages (Intermediate):** Python, Julia, Latex, Markdown

**Miscellaneous Qualifications :** Royal Life Saving Society National Pool Lifeguarding Qualification, Bronze Duke of Edinburgh

**Extracurricular Activities:** Tough Mudder 2021, Hyde Park Relay 2022, Rome Marathon 2024