Conn Breathnach

Curriculum Vitae

Dublin, Ireland
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Education

2023–2024	**M.Sc. in Computer Science**, *Trinity College Dublin*
Thesis	*Applications of Reinforcement Learning to Automated Theorem Proving*
2019–2023	**B.A. (Mod) in Computer Science**, *Trinity College Dublin*

Employment

Jun 2024–Present — **Software Engineer**, *Stripe*
- Implemented and analysed performance of fraud detection models on large-scale, real-time systems.
- Developed data engineering solutions for expansive time series data and iterated on model features based on insights from this data engineering and model outputs.

Feb 2023–Aug 2023 — **Research Intern**, *ADAPT Center*
- Designed and trained state of the art Graph Neural Network and Deep Neural Network models in the field of education research.
- Performed research into various machine learning methods for personalized learning curricula for students.
- Collaborated with industry leaders in education research to perform feature engineering and used ablation testing to analyse these features in our models.

July 2021–Aug 2023 — **Reinforcement Learning Team Lead**, *Formula Trinity*
- Led a team of student researchers in designing and implementing reinforcement learning based systems for autonomous vehicles as part of Formula Student competitions.
- Ran workshops for beginners and experienced researchers alike on topics such as multi-armed bandits, reinforcement learning, deep learning which included both theoretical basis for the topics as well as code to implement any algorithms.

Jun 2022–Aug 2022 — **Software Engineer Intern**, *Virtu Financial*
- Introduced optimizations into low level C++ code based on data analysis to improve latency into critical high frequency trading systems.
- Analysed performance using statistical testing and computing baselines for control.

Jun 2021–Jun 2022	**Student Researcher**, *Robotics and Innovation Lab*, Trinity College Dublin ○ Developed novel computer vision techniques for autonomous and teleoperated robots. ○ Implemented stochastic algorithms for pathfinding and mapping in complex environments.

Publications

○ Wade Qian Breathnach (2023). "Who Is Lagging Behind: Profiling Student Behaviors with Graph-Level Encoding in Curriculum-Based Online Learning Systems". Preprint

○ Breathnach (2024). "Applications of Reinforcement Learning to Automated Theorem Proving". M.Sc. Trinity College Dublin

Research Interests

Machine Learning for Mathematics (Formal and Informal)

Reinforcement Learning for Optimization

Machine Learning for Reasoning with Natural Language

Skills

Programming	Python, Java, C++, Rust, Lean, SQL, Ruby, Go, Isabelle
Tools	PyTorch, TensorFlow, Pytorch Geometric, scikit-learn, Numpy
Other	LaTeX, Git, Linux/Unix

Languages

English	Native
Irish	Native
German	C1
Japanese	N3

Awards

Student Entrepreneurship Awards, Enterprise Ireland, 2023

Huawei Seeds for the Future, 2021

Lynq LLM Hackathon, 2nd place