Owain Thorp

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Education

Imperial College London — London, UK
MSc Artificial Intelligence — *Sep 2025 – Present*

University of St Andrews — St Andrews, UK
MPhys Mathematics and Theoretical Physics — *Sep 2021 – July 2025*

- Graduated with an 18.6/20.0 GPA, placing 2nd among final-year students in both Mathematics and Physics
- Awarded the Principal's Medal for ranking among the top 25 final year students university-wide
- Nominated for the Duncan Prize for a dissertation on phase transitions in Ergodic dynamical systems, awarded a grade of 18.7/20.0
- Relevant Modules: Measure Theory, Ergodic Theory, Linear Algebra I & II, Analysis I & II, Advanced Ring Theory

Experience

Researcher (Part-time) — Sep 2025 – Present
MarineAI — *Remote*

- Promoted from intern to part-time Researcher to continue development of USV path-planning agents
- Currently working on risk-indices, automated environment generation and benchmarking for advancing USV path-planning

Research Intern — July 2025 – Sep 2025
MarineAI — *Plymouth, UK*

- Developed a reinforcement learning environment for conducting research into intelligent USV path-planning
- Utilised *pufferlib* and highly optimised C code to achieve 500K environment steps per second
- Trained agent capable of path-following, obstacle avoidance and COLREGS-compliance in multi-ship scenarios
- Outperformed previous RRT/RRT^* approaches in both speed and adaptability

Research Intern — June 2023 – Aug 2023
St Andrews University — *St Andrews, UK*

- Developed computational models for implementing mean-field methods in open quantum systems
- Contributed to *OQuPy*, an open-source Python library for simulating open quantum systems with process tensors
- Models matched analytic calculations for small N systems, but also allowed for the exploration of the large N limit

Projects

Conjure-Oxide | *Rust, Python, Bash* — Jan 2025 – June 2025

- Contributed to *conjure-oxide*, an open-source constraint programming tool written entirely in Rust
- Helped develop *tree-morph*, a type-generic Rust crate for tree transformations
- Improved algorithmic efficiency 10x by introducing a skeleton tree to remove unnecessary rule checks
- Developed wall-clock and instruction count benchmarks, integrating into CI/CD workflows via GitHub Actions

Dissertation: *Thermodynamic Formalism in Dynamical Systems* — Sep 2024 – March 2025

- Conducted a systematic review of recent advances in *thermodynamic formalism*, focusing on phase transitions in countable Markovian systems
- Formulated more streamlined proofs for foundational theorems than those found in seminal texts
- Gained knowledge across a wide area of advanced topics, linking graph theory, linear algebra and statistical physics to analyse Ergodic dynamical systems

Technical Skills

Languages: Python, C, Rust
Developer Tools: Linux, Git, GitHub, GitHub Actions, CI/CD, Vim
Libraries: PyTorch, TensorFlow, raylib

Prizes

- **Principal's Medal**: Awarded to the top 25 final-year students across all departments
- **William David Brodie Prize**: For the highest performance in 3rd-year Physics (19.2/20.0)
- **Research Prize**: Recognising outstanding undergraduate summer research projects
- **Theoretical Physics Medal**: For exceptional performance in 3rd-year Theoretical Physics
- **Music Scholarship**: Awarded for the duration of studies.