

Luke Thompson

St. Leonards, NSW | AU Citizen | luke-a-thompson@outlook.com | 0403 780 447 |
linkedin.com/in/luke-thompson | github.com/luke-a-thompson | luke-a-thompson.github.io/Portfolio

Education

University of Sydney, Ph.D July 2024 – Present

- Applied graph diffusion methods and hypergraph representation to model complex systems.
- Used renal hydrodynamics data for diffusion-based tissue-graph generation.

University of Sydney, Bachelor of Science (Honours) - Pharmacology February 2020 – June 2024

- WAM: 86, First Class Honours (Transcript)
- **Thesis:** AmesFormer - A Graph Transformer Neural Network for Mutagenicity Prediction
 - **World #3** for carcinogenicity prediction from chemical structure.
 - Novel combination of a graph transformer neural network with a finite admixture model.
 - Bayesian uncertainty estimation via determinantal point process Monte Carlo dropout.
 - Implemented from scratch using PyTorch, PyTorch-Geometric and custom Rust libraries.

Experience

Casual Academic, The University of Sydney – Camperdown, NSW June 2024 – Present

- Led three capstone project groups focusing on medicinal chemistry and *in silico* toxicity assessment.
- Tutored cardiovascular and renal pharmacology wet-lab practicals.

Geographic Data Analyst, Kumon – Chatswood, NSW February 2024 – Present

- Saved \$28 800 per annum by bringing population time-series forecasting in-house using a weighted ensemble of regressors achieving 93.9% accuracy 5-years out.
- Built a web GUI data ingestion and cleaning system using PostgreSQL and Python automating approximately 12 hours of weekly work. Hosted with Docker.
- Designed a new student number forecasting model using SARIMAX incorporating proprietary geographic and public economic data. Achieved best-in-company accuracy.

Projects

Video Game Mod: Cold War: Iron Curtain [GitHub Link](#)

- **Attained 600 000 unique users**, currently #1 most popular Cold War political strategy game worldwide.
- Led a team of 30+ volunteer developers, producing >1m lines of code since 2017.

Eigen² [GitHub Link](#)

- A from-scratch Python numerical linear algebra library focusing on eigenpair computation.
- Implemented >15 algorithms using only base Numpy functions, no linear algebra libraries.

FastDAQ (Link): #1 Fastest open-source NASDAQ ITCH message parser. Zero-allocation, parallel, built with Rust.

Additional Experience And Awards

ACTRA Student Prize (2024): I was awarded the student prize and presented my research at the Annual Scientific meeting of the Australasian College of Toxicologists and Risk Assessors. Valued at ≈ \$2000.

Personal Portfolio: Manage a stock and cryptocurrency portfolio realising approximately 2600% gains since 2017.

Technologies

Languages: Rust, Python (PyTorch, Torch-Geometric, SKLearn, Pandas, Riskfolio-lib, Optuna), PostgreSQL, ~~TeX~~.

Software: Microsoft Office suite (incl. Access), Dragon & related cheminformatics software.