Luke Thompson

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

Education

University of Sydney, Ph.D — July 2024 – Present

- Using 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 wet-lab practicals covering cardiovascular pharmacology.

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 GUI data ingestion and cleaning system using PostgreSQL and Python to automate approximately 20 hours of weekly work.
- 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

- **Achieved 600 000 downloads**, currently #1 most popular Cold War strategy game worldwide.
- Led a team of 30+ volunteer mod developers, producing >1m lines of code since 2017.
- Tools Used: Python, LUA, PDXScript.

Eigen$^{\text{Squared}}$

- A Python library for calculating eigenpairs implementing >10 unique algorithms. Implemented only using base Numpy functions, no linear algebra libraries.
- Tools Used: Python, NumPy.

Additional Experience And Awards

ASCEPT Student Travel Grant (2024): Awarded an all-expenses-paid trip to present my research at the Annual Scientific meeting of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists.

Personal Portfolio: Manage a portfolio of stocks, cryptocurrency and ETFs realising approximately 2600% gains since 2016. Currently using the Black-Litterman model for risk optimisation.

Technologies

Languages: Python (PyTorch, Torch-Geometric, SKLearn, Pandas, RDKit, Riskfolio-lib, Optuna), PostgreSQL, LaTeX.

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