Daniel Andrew Coulson

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EDUCATION

Cornell University **August 2022 - Present**
PhD in Statistics, 4.0 GPA Ithaca, NY, USA
Thesis Committee: David S. Matteson, Martin T. Wells, and Y. Samuel Wang.
Relevant Courses: Bayesian Statistics and Data Analysis (A+), Time Series and Spatial Data Science (A), Mathematical Statistics 2 (A+), and Statistical Computing 1 (A).

Newcastle University **September 2019 - June 2022**
BSc Hons Mathematics and Statistics, First Class Honours (88.3%) Newcastle Upon Tyne, UK
Relevant courses: Stochastic Financial Modelling (94%), Time Series (91%), Bayesian Inference (97%), and Statistical Inference (94%). 70% UK = A/A+ U.S.

RESEARCH EXPERIENCE

Bayesian Deep Learning for time series forecasting and classification, PhD student **August 2024 – March 2025**
- Independently ideated a novel **machine learning** problem named ForeClassing**.**
- Formulated this problem mathematically and proved a motivating theorem.
- Proposed two novel **neural network** layers, Boltzmann Convolutions and Welford mean-variance layers.
- Created a novel **deep Bayesian neural network** named **ForeClassNet**.
- Computationally implemented this in **Python** using the functional **TensorFlow** API.
- Evaluated the performance of **ForeClassNet** through several experiments.
- Achieved comparable, to superior, performance when compared to existing state of the art methods.
- Presented findings in a paper which can be found at: https://danielcoulson.github.io/research/.

Time varying correlation matrices with an Application to Financial Crises, PhD student **May 2023 - October 2024**
- Developed a novel framework for modelling time varying correlation matrices.
- Ideated a novel scalar score to summarize the information in correlation matrices.
- Utilized **R** to implement an **MCMC** algorithm and a simulation study.
- Provided insights beyond measures such as the VIX index and portfolio level diversification information.
- Demonstrated empirically that portfolio diversification does not help in times of financial crisis.
- Presented findings in a paper which can be found at: https://danielcoulson.github.io/research/.

Bayesian methods in Road Safety, Undergraduate Research assistant **June 2021 - September 2021**
- Collaborated with Dr Lee Fawcett to predict road traffic casualties for a real-world road safety project.
- Developed a large simulation study to analyze road traffic casualties using a bespoke **MCMC** algorithm in **R**.
- Used real world data to help assess where new road safety measures should go and what type they should be.

Culture and Financial Reporting, Research assistant at Northumbria University (UK) **June 2018**
- Collaborated with an Assistant Professor in the Accounting and Finance department on a research project.
- Statistically analyzed - using SPSS – companies' financial statements from different countries to investigate the impact of culture on the ordering of information.

ACADEMIC PROJECTS

- Developed bespoke **R** code for several online learning algorithms, reviewed theory and compared performance.
- Utilized **Python**, with **TensorFlow** to implement several **Deep learning** models for applications in Soil Science.
- Developed bespoke **R** code to compute the Rumor Centrality of a network and assess its performance in detecting the true rumor source in a simulation study and real social network.

AWARDS AND HONOURS

- Cornell CALS Outstanding Teaching Assistant 2024-2025 **May 2025**
- Statistics Graduate Summer Research assistant at Cornell University. **May - August 2023 & 2024**
- Reverend Gilbert Robertson Prize from Newcastle University for academic excellence. **July 2022**
- Accepted onto the London Mathematical Society undergraduate summer school. **July 2021**
- Academic Excellence Scholarship from Newcastle University. **November 2019**
- LAMDA Speaking in Public Grade 8 achieved with distinction (95%). **May 2019**

TEACHING EXPERIENCE

- Teaching assistant for a two-semester class on Statistical Methods for Graduate students at Cornell University from non-quantitative backgrounds which includes teaching labs (45+ students each) and holding office hours.
- Economics mentor at Emmanuel College, Gateshead, UK, teaching economic theory.
- Tutor at Success4All, mentoring children from areas of low academic achievement in Math and English including some children whose first language was not English.