WILLIAM UNDERWOOD

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EDUCATION

PhD, Operations Research & Financial Engineering **Sep 2019 – May 2023**
Princeton University

- Awarded the prestigious Francis Robbins Upton Fellowship in Engineering.
- Served as a representative on the ORFE Graduate School Student Committee.

MMath, Mathematics & Statistics **Oct 2015 – Jun 2019**
University of Oxford

- Dissertation: Motif-Based Spectral Clustering of Weighted Directed Networks.
- Supervisor: Mihai Cucuringu, Department of Statistics.
- Graduated with first-class honours.

Computational and statistical projects:

- Application of hidden Markov models to array CGH data 2018
- Non-parametric tests and smoothing methods for the weights of beetle larvae 2018
- Modelling prison deaths in Australia with logistic regression and GLMs 2017
- Modelling performance during a hand-eye coordination exercise with linear regression 2017
- Applications of PCA and *k*-means clustering 2016
- Numerical analysis of damped pendula 2016
- Recursion and Legendre polynomials 2015

Other activities:

- Senior Choral Scholar and Librarian, St John's College Chapel Choir.
- St John's College Mathematics Social Secretary.

RESEARCH INTERESTS

Stochastic analysis, probability and mathematical statistics.

PUBLICATIONS & PRESENTATIONS

Articles

- L. Smallman, W. G. Underwood, and A. Artemiou. Simple Poisson PCA: an algorithm for (sparse) feature extraction with simultaneous dimension determination. *Computational Statistics*, June 2019. doi: 10.1007/s00180-019-00903-0

Preprints

- W. G. Underwood, A. Elliott, and M. Cucuringu. Motif-based spectral clustering of weighted directed networks. April 2020. arXiv:2004.01293

Presentations

- W. G. Underwood and M. Cucuringu. Motif-based spectral clustering of weighted directed networks, December 2019. The 8th International Conference on Complex Networks and their Applications. Presented by MC. Extended abstract available at 2019.complexnetworks.org
- W. G. Underwood. The Borel-Kolmogorov paradox, March 2017. St John's College Mathematics Seminar, University of Oxford

AWARDS & FUNDING

- Francis Robbins Upton Fellowship in Engineering, Princeton University 2019
- Royal Statistical Society Prize, University of Oxford 2019
- Gibbs Statistics Prize for outstanding academic achievement, University of Oxford 2019
- Research grant, James Fund for Mathematics, St John's College, University of Oxford 2017
- Casberd Scholarship for performance in exams, St John's College, University of Oxford 2016
- Jeston University Scholarship, Haberdashers' Company 2015

EMPLOYMENT

Machine Learning Consultant, Mercury Digital Assets **Oct 2018 – Nov 2018**

- Developed a recurrent neural network to predict cryptocurrency prices.
- Modelled short/long positions for Bitcoin prices on the Bitfinex exchange.

Statistics Researcher, Cardiff University **Aug 2017 – Oct 2017**

- Developed a dimension reduction technique to improve classification of healthcare documents.
- Investigated Markov blanket estimation algorithms for biostatistics.

Data Science Intern, Rolls-Royce **Jun 2017 – Aug 2017**

- Solved problems in jet engine health management using machine learning tools.
- Delivered a new diagnostic, reducing the need for costly regular maintenance.

TEACHING EXPERIENCE

Educational Consultant, Polaris & Dawn **Feb 2018 – Sep 2018**

- University entrance consultant and high school mathematics tutor.

Premium Tutor, MyTutor **Jan 2016 – Oct 2018**

- High school mathematics tutor.
- Gave over 150 tutorials and consistently rated 5* by students and parents.

TECHNOLOGIES

R (igraph, ggplot2), Python (numpy, scikit-learn, keras, matplotlib, seaborn), LaTeX, Git, MATLAB.

REFERENCES

References are available upon request.