

# WILLIAM G. UNDERWOOD

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## EDUCATION

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**PhD, Operations Research & Financial Engineering (ORFE)**  
**Princeton University**

Sep 2019 –

- Advisor: Matias Cattaneo, ORFE Department.
- Research interests: mathematical statistics, probability theory and machine learning, with a focus on robust nonparametric inference and network data.

**MA, Operations Research & Financial Engineering (ORFE)**  
**Princeton University**

Sep 2019 – Sep 2021

- Francis Robbins Upton Fellow in Engineering.

**MMath, Mathematics & Statistics**  
**University of Oxford**

Oct 2015 – Jun 2019

- Dissertation: Motif-Based Spectral Clustering of Weighted Directed Networks.
- Supervisor: Mihai Cucuringu, Department of Statistics.
- Graduated with first-class honors and ranked top of the class.

## PUBLICATIONS

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### Articles

- W. G. Underwood, A. Elliott, and M. Cucuringu. Motif-based spectral clustering of weighted directed networks. *Applied Network Science*, 5(62), September 2020. doi:10.1007/s41109-020-00293-z.
- L. Smallman, W. G. Underwood, and A. Artemiou. Simple Poisson PCA: an algorithm for (sparse) feature extraction with simultaneous dimension determination. *Computational Statistics*, 35:559–577, June 2019. doi:10.1007/s00180-019-00903-0.

### Preprints

- M. D. Cattaneo, Y. Feng, and W. G. Underwood. Uniform inference for kernel density estimators with dyadic data. arXiv:2201.05967, January 2022.

### Working papers

- M. D. Cattaneo, R. P. Masini, and W. G. Underwood. Martingale coupling and strong approximation for martingale processes. *Working paper*, 2022.
- M. D. Cattaneo, J. M. Klusowski, and W. G. Underwood. Uniform estimation and inference with Mondrian trees and forests. *Working paper*, 2022.

### Presentations

- M. D. Cattaneo, Y. Feng, and W. G. Underwood. Uniform inference for kernel density estimators with dyadic data, June 2022. Two Sigma PhD Research Symposium.
- M. D. Cattaneo, Y. Feng, and W. G. Underwood. Uniform approximation and inference with dyadic kernel density estimation, September 2021. Princeton Statistics Laboratory, Princeton University.

- 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 M.C. Extended abstract available at [2019.complexnetworks.org](https://2019.complexnetworks.org).

## Software

- W. G. Underwood. DyadicKDE: dyadic kernel density estimation in Julia, January 2022. GitHub: <https://github.com/WGUNDERWOOD/DyadicKDE.jl>.
- W. G. Underwood and A. Elliott. motifcluster: motif-based spectral clustering of weighted directed networks in R and Python, May 2020. GitHub: <https://github.com/WGUNDERWOOD/motifcluster>.

## AWARDS & FUNDING

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| • School of Engineering and Applied Science Award for Excellence, Princeton University  | 2022 |
| • Francis Robbins Upton Fellowship in Engineering, Princeton University                 | 2019 |
| • Royal Statistical Society Prize, Royal Statistical Society & 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 & Monmouth School                | 2015 |

## EMPLOYMENT

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### Assistant in Instruction, Princeton University Sep 2020 –

- ORF 524: Statistical Theory and Methods, Fall 2021
- ORF 245: Fundamentals of Statistics, Spring 2021
- ORF 363: Computing and Optimization, Fall 2020

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

- Developed a recurrent neural network to predict cryptocurrency prices.

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

- University entrance consultant and high school mathematics tutor.

### 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.

## TECHNOLOGIES

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Python, R, Julia, Latex, Git, Bash, Unix, Emacs, Matlab, HTML, CSS.

## REFERENCES

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*References are available upon request.*