

# WILLIAM G. UNDERWOOD

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## EDUCATION

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**PhD, Operations Research & Financial Engineering (ORFE)** **Sep 2019 – May 2024**  
**Princeton University**

- Advisor: Matias Cattaneo, ORFE Department.
- Research interests: statistical methodology, data science and mathematical statistics, with a focus on modern statistical inference, nonparametric estimation and random forest procedures.

**MA, Operations Research & Financial Engineering (ORFE)** **Sep 2019 – Sep 2021**  
**Princeton University**

**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 honors and ranked top of the class.

## RESEARCH AND PUBLICATIONS

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### Articles

- Uniform inference for kernel density estimators with dyadic data, with M. D. Cattaneo and Y. Feng. *Journal of the American Statistical Association*, forthcoming, 2024. [arXiv:2201.05967](#)
- Motif-based spectral clustering of weighted directed networks, with A. Elliott and M. Cucuringu. *Applied Network Science*, 5(62), 2020. [doi:10.1007/s41109-020-00293-z](#)
- Simple Poisson PCA: an algorithm for (sparse) feature extraction with simultaneous dimension determination, with L. Smallman and A. Artemiou. *Computational Statistics*, 35:559–577, 2019. [doi:10.1007/s00180-019-00903-0](#)

### Preprints

- Inference with Mondrian random forests, with M. D. Cattaneo and J. M. Klusowski. [arXiv:2310.09702](#)
- Yurinskii's coupling for martingales, with M. D. Cattaneo and R. P. Masini. *Annals of Statistics*, reject and resubmit, 2023. [arXiv:2210.00362](#)

### Works in progress

- Higher-order extensions to the Lindeberg method, with M. D. Cattaneo and R. P. Masini
- Adaptive Mondrian random forests, with M. D. Cattaneo, R. Chandak and J. M. Klusowski

### Presentations

- Two Sigma PhD Poster Session, Two Sigma Investments, July 2023
- Two Sigma PhD Research Symposium, Two Sigma Investments, June 2022
- Princeton Statistics Laboratory, Princeton University, September 2021

## Software

- MondrianForests: Mondrian random forests in Julia, 2023.  
GitHub: WGUNDERWOOD/MondrianForests.jl
- DyadicKDE: dyadic kernel density estimation in Julia, 2022. GitHub: WGUNDERWOOD/DyadicKDE.jl
- motifcluster: motif-based spectral clustering of weighted directed networks in R, Python and Julia, 2020.  
GitHub: 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, University of Oxford   | 2019 |
| • James Fund for Mathematics Research Grant, St John's College, University of Oxford   | 2017 |
| • Casberd Scholarship, St John's College, University of Oxford                         | 2016 |

## PROFESSIONAL EXPERIENCE

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### Assistant in Instruction, Princeton University

Sep 2020 –

- ORF 499: Senior Thesis, Spring 2024
- ORF 498: Senior Independent Research Foundations, Fall 2023
- SML 201: Introduction to Data Science, Fall 2023
- ORF 363: Computing and Optimization, Spring 2023
- ORF 524: Statistical Theory and Methods, Fall 2022
- ORF 526: Probability Theory, Fall 2022
- ORF 524: Statistical Theory and Methods, Fall 2021
- ORF 245: Fundamentals of Statistics, Spring 2021
- ORF 363: Computing and Optimization, Fall 2020

### Quantitative Research Intern, Two Sigma Investments

Jun 2023 – Aug 2023

### Machine Learning Consultant, Mercury Digital Assets

Oct 2018 – Nov 2018

### Educational Consultant, Polaris & Dawn

Feb 2018 – Sep 2018

### Premium Tutor, MyTutor

Feb 2016 – Oct 2018

### Statistics and Machine Learning Research Intern, Cardiff University

Aug 2017 – Sep 2017

### Data Science Intern, Rolls-Royce

Jun 2017 – Aug 2017

## PEER REVIEW

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Econometric Theory, Journal of the American Statistical Association, Journal of Business and Economic Statistics, Journal of Causal Inference, Operations Research.

## REFERENCES

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- Matias D. Cattaneo, Professor, ORFE, Princeton University
- Jason M. Klusowski, Assistant Professor, ORFE, Princeton University
- Jianqing Fan, Professor, ORFE, Princeton University
- Ricardo P. Masini, Assistant Professor, Statistics, University of California, Davis