James Thornton

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Education

PhD Research Student, Computational Statistics and Machine Learning — **2019 - 2023**
University of Oxford
Supervised by George Deligiannidis and Arnaud Doucet
Optimal Transport • Time-Series • Generative Modeling

Probationary Researcher, Statistical Science — **2018 - 2019**
University of Oxford
Centre for Doctoral Training, Taught year

Master's in Statistics with Mathematics — **2015 - 2016**
University of Warwick, **Distinction**, supervised by Anthony Lee
Tukey Award for top dissertation (89%) • Statistics Department Scholarship

BSc Mathematics, Operational Research, Statistics and Economics — **2012 - 2015**
University of Warwick, **First Class Honors (85%)**
Rank 1-3 each year • Pearson Award for top performance (91%) 2014 • EY Scholarship

A-Levels — **2010 - 2012**
5 A*: Mathematics **(2 years early)**, Further Mathematics, Physics, Chemistry, Economics

Experience

ML Research Intern — **09/2021 -**
Arabesque AI (start-up)
Time-series generative modeling, nowcasting and imputation using score-based methods, GPs and state-space models.

Analyst | Markets and Analytics Group — **2016 - 2018**
BlackRock

- Built out time-series, portfolio analysis, and optimization frameworks for €4-300bn portfolios.
- Worked across > 15 engagements from data-wrangling ~ 100GB datasets to predictive modeling, delivering over $\$10$mil revenue using SQL, Perl, Python, R, C++ and Aladdin.
- Communicated methodology to CEO and board-level clients.
- Developed and deployed software, sold for ∼€1mil.

Scholarship Intern — **2012 - 2014**
EY
Scholarship award including consulting work during studies.

Publications

- Differentiable Particle Filtering via Entropy-Regularized Optimal Transport.
  J Thornton*, A Corenflos*, G Deligiannidis, A Doucet
  International Conference on Machine Learning 2021. Oral/ Long talk, Top 3%, * First Author. Link
- Diffusion Schrödinger Bridge with Applications to Score-Based Generative Modeling.
  V De Bortoli, **J Thornton**, J Heng, A Doucet
  NeurIPS 2021, Spotlight, Top 3%. Link
- The Masked Bouncy Particle Sampler: Parallelized, Piecewise-Deterministic MCMC.
  J Thornton, G Deligiannidis, A Doucet Link

Technical Skills

- Python, R, C++ (order of proficiency)
- SQL, Unix, git, Slurm, AWS, GCP
- PyTorch, Jax (Flax), TensorFlow

Seminars and Workshops

- Diffusion Generative Modeling and the Schrodinger Bridge
  Aalto, Advances in Probabilistic ML 2021. Invited talk.
- Diffusion Generative Modeling and the Schrodinger Bridge
  DataSig: Rough Path Interest Group. Invited talk.
- End-to-End Learning via Differentiable Particle Filtering
  CIRM: End-to-end Bayesian Learning Methods. Workshop, contributed talk.
- Applications of Optimal Transport
  Arabesque AI, 2021. Invited talk.
- Differentiable Particle Filtering with Optimal Transport
  Waymo, Oxford 2021. Invited talk.
- Differentiable Particle Filtering with Optimal Transport
  Warwick University 2020. Seminars in Computer Intensive Statistics. Invited talk.

Academic Service and Teaching

Reviewer **2020 -**

- AISTATS 2021
- NeurIPS 2021: *Outstanding Reviewer Award*
- NeurIPS 2020

Class Tutor **2019 - 2020**
Department of Statistics, University of Oxford
Masters/ 4th year undergraduate Advanced Simulation Methods

Teaching Assistant **2019 - 2020**
Balliol College, University of Oxford
Calculus, Probability, Statistics and Data Analysis

Class Tutor **2015 - 2016**
Warwick University
Introduction to Analysis and Algebra, 1st year undergraduates