Laura Battaglia

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Statistics and machine learning PhD researcher working on scalable probabilistic machine learning, with a focus on approximate Bayesian inference, uncertainty quantification, and generative modelling. Prior industry experience in financial risk, financial modelling, and banking supervision.

Education

2022 – Now — **Ph.D., University of Oxford,** Statistics and Machine Learning
Research interests: *scalable approximate Bayesian inference; variational and predictive posterior methods; model misspecification and robust/generalised Bayes; probabilistic generative modelling; applications to causal inference and finance.*
Supervisor: *Geoff Nicholls*. Collaborations with: *Robin Evans, Chris Holmes*.

Feb-Mar 2026 — **Visiting researcher, Monash University,** under the supervision of *Jack Jewson*.

2019 – 2020 — **MSc, Barcelona School of Economics (Pompeu Fabra),** Data Science (Grade: 9.25/10)
Main courses: *statistical learning, machine learning theory, optimisation, reinforcement learning, natural language processing, data warehousing, network analysis.*
Thesis: *Tracking the Economy Using FOMC Speech Transcripts* under supervision of *Omiros Papaspiliopoulos*.

2013 – 2016 — **MSc, Bocconi University,** Economics (Grade: 107/110)
Main courses: *statistics, mathematics, econometrics, microeconometrics, development economics, political economics, monetary policy.*
Thesis: *Evaluating the accuracy of Regression Discontinuity design: an empirical example using experimental data* under supervision of *Selim Guleshi*.

2013 — **Exchange Program, Cornell University,** Finance (GPA: 4.05/4.0)

2010 – 2013 — **BSc, Bocconi University,** Finance (Grade: 110/110 cum laude)
Thesis: *The endowment effect as an expectations-based effect: an empirical analysis.*

Employment History

2023 – Now — **ML Consultant, Italian Association for Financial Analysis (AIAF)**
Focus: *Advisor on machine learning applications in finance; lead of the monthly Finance & AI Monitor.*

2020 – 2022 — **Data Science and ML research assistant, Barcelona School of Economics**
Key areas: *natural language processing, MCMC and variational methods for high-dimensional inference.*
Lecturer in computational ML and programming.
Supervised by Prof. Stephen Hansen (University College London) via ERC Grant.

2016 – 2019 — **Supervision Analyst, European Central Bank - Single Supervisory Mechanism**
Expertise: *business model risk, governance, liquidity risk, cooperative banks, crisis management & failing procedures.*
Selected in the first SSM Traineeship Programme, then awarded a fixed position in the official analyst recruitment campaign.

2014 — **Consulting Intern, Promontory Financial Group**
Focus: *contributing to a Section 166 Skilled Person Review of customers in financial difficulty of a large UK bank.*

Technical Skills

- **Programming languages:** Python, R, SQL, Bash
- **Frameworks and libraries:** JAX, PyTorch, TensorFlow, Numpyro, Pandas
- **Cloud platforms and tools:** Google Cloud Platform (GCP), Amazon Web Services (AWS), Tableau, LaTeX

Research Articles

1. **L. Battaglia***, S. Cortinovis*, C. Holmes, D. T. Frazier, and J. Jewson, "Variational predictive resampling," *arXiv preprint arXiv:2605.11168*, 2026.
2. **L. Battaglia**, T. Farghly, S. Cortinovis, D. de Vassimon Manela, A. Shidani, and C. Williams, "Copula diffusion modelling under marginal constraints," in *Eighth Workshop on Tractable Probabilistic Modeling (UAI)*, 2025.
3. **L. Battaglia**, C. U. Carmona, R. A. Haines, M. A. Loake, M. Benskin, and G. K. Nicholls, "Amortising over hyperparameters in generalised bayesian inference," *arXiv preprint arXiv:2412.16419*, 2025.
4. D. d. V. Manela*, **L. Battaglia* (co-first author)**, and R. J. Evans, "Marginal causal flows for validation and inference," *Advances in Neural Information Processing Systems*, 2024.
5. **L. Battaglia**, T. Christensen, S. Hansen, and S. Sacher, "Inference for regression with variables generated from unstructured data," *arXiv preprint arXiv:2402.15585*, 2024.
6. J. Jewson, L. Li, **L. Battaglia**, S. Hansen, D. Rossell, and P. Zwiernik, "Graphical model inference with external network data," *Biometrics*, 2024.

Presentations

- **Variational predictive resampling**
  May 2026, Statalk 2026 conference @ Young Italian Statistics Society, Turin, Italy — *Invited Talk*
  June 2025, Workshop on Statistics and experimental Design with ML @ INI, Cambridge, UK — *Poster*
  May 2025, Post-Bayes workshop @ UCL, London, UK — *Poster*
- **Martingale posteriors: history, hopes and headaches**
  May 2026, Oxford Young Statisticians Seminar (sponsored by: Quadrature), Oxford, UK — *Invited Talk*
- **Inference for regression with variables generated by AI or ML**
  July 2025, Seminars of the Economics Department @ University of Pisa, Pisa, Italy — *Invited Talk*
- **Marginal causal flows for validation and inference**
  December 2024, Conference on Neural Information Processing Systems, Vancouver, Canada — *Poster*
  December 2024, NeurIPS @ Cambridge, Cambridge, UK — *Poster*
- **The Variational Meta-Posterior for the learning rate and prior hyperparameters**
  July 2024, ISBA, Venice, Italy — *Poster*
  March 2023, BayesComp, Levi, Finland — *Poster*
- **Network-adjusted graphical modelling**
  June 2022, CESifo Venice Summer Institute, Venice, Italy — *Poster*

Scholarships & Awards

- 2022 – 2026 — **Clarendon Scholarship** (merit scholarship fully funding Oxford PhD program)
- Winter 2024 — **Keble Association Study Award** (merit award)

Teaching and grading

- **SB2b Statistical Machine Learning** , University of Oxford
  Hilary (Winter) 2024
- **SB3.1 Applied Probability**, University of Oxford
  Hilary (Winter) 2023
- **SC4 Advanced Topics in Statistical Machine Learning**, University of Oxford
  Hilary (Winter) 2022
- **Summer School in Foundations of Data Science**, Barcelona School of Economics
  Spring 2021
- **21DM005 Computational Machine Learning II**, Barcelona School of Economics
  Spring 2021

Professional service

2024 – Now
- **Equality, Diversity, and Inclusion Committee Member**, Dept. of Statistics, Oxford
- **Senior Advisor of the Young Statisticians Seminar**, Dept. of Statistics, Oxford