Conor Hassan

conorhassan.ai@gmail.com

EXPERIENCE

Postdoctoral Researcher Dec. 2024 – Present
Aalto University *Helsinki, Finland*

- Designing efficient inference methods for *transformer-based* probabilistic models and training models to in-context learn sequential decision-making tasks.
- Ongoing projects include online RL post-training of transformer probabilistic models, extending inference via test-time compute, and training models to condition on hierarchies of different data sources.

Applied Scientist Intern May 2024 – Nov. 2024
Amazon *Melbourne, Australia*

- Engineered and delivered an end-to-end recommendation system for an Amazon product serving millions of customers. Designed data pipelines with SQL and Spark, trained models on EC2 GPU clusters, helped architect real-time storage using vector databases, and created deployment documentation.
- Applied *Transformer* architectures and graph learning concepts to build a model using embeddings from CLIP-based models, then applied a Set Transformer to learn customer history, increasing the average click-through rate by 15-25% over the incumbent system.

Doctoral Researcher Apr. 2021 – Apr. 2024
Queensland University of Technology *Brisbane, Australia*

- Developed variational inference algorithms for federated learning of hierarchical Bayesian models, enabling distributed training across data silos without sharing raw data.
- Led applied research collaborations with international cancer registries, modeling diagnosis and survival rates from distributed tabular health records.

Machine Learning Engineer (part-time) Oct. 2022 – Jun. 2023
WearOptimo *Brisbane, Australia*

- Developed and implemented probabilistic machine learning models to analyze complex biophysical signals from microwearable devices for real-time hydration monitoring, using *Pyro* and *NumPyro*.
- Work spanned the full project lifecycle: model development, inference algorithms, model selection tools, data cleaning, and communicating results to engineering and scientific teams.

Teaching and Research Assistant Roles 2018 – 2022
Queensland University of Technology, University of Otago *New Zealand & Australia*

- Tutored seven undergraduate and master's level courses in mathematics and statistics.
- Developed software for generating synthetic health-related tabular data using deep generative models (*Normalizing Flows*, *GANs*, *VAEs*) and differential privacy techniques.

Internship Roles 2018 – 2022
PyMC, AgResearch, IMC, Ernst & Young *New Zealand & Australia*

- *GSoC Contributor, PyMC*: Contribution of multivariate distributions for conditional autoregressive priors.
- *Statistical Scientist, AgResearch*: Constructed and implemented novel hierarchical Bayesian models in *Stan* to analyze parasite resistance, leveraging complex random effects and repeated measures data.
- *Quantitative Trader, IMC*: Developed and evaluated trading strategies by conducting post-trade analysis using market book information; created predictive models for missing counterparties.
- *Risk Advisory Consultant, Ernst & Young*: Analyzed payroll data to build financial and risk assessments.

EDUCATION

Doctor of Philosophy (PhD), Queensland University of Technology (QUT) 2021 – 2024

- Title: "Structured Models and Algorithms for Sensitive Data".
- Supervised by Distinguished Professor Kerrie Mengersen. Recipient of *QUT Outstanding Thesis Award* (approximately top 5% of all awarded theses, 2024). Visiting researcher at Università della Svizzera Italiana (USI) for four months.

Bachelor of Science with Honours, First Class in Statistics, University of Otago 2020
Bachelor of Science in Statistics, minor in Mathematics, University of Otago 2017 – 2019

- Awarded the *top graduating Honours* student across the Faculty of Science. Recipient of the *Prime Minister's Scholarship for Asia*; fully funded academic exchange at National University of Singapore (NUS).

SELECTED WORK

Conor Hassan, Nasrulloh Loka, Cen-You Li, Daolang Huang, Paul E. Chang, Yang Yang, Francesco Silvestrin, Samuel Kaski, and Luigi Acerbi. "Efficient Autoregressive Inference for Transformer Probabilistic Models." arXiv preprint arXiv:2510.09477 (2025).

- Shortened version appeared as "Efficient Autoregressive Inference for Tabular Foundation Models" at EurIPS 2025 AI for Tabular Data Workshop.
- Improves sampling, density evaluation, and memory efficiency by up to 10-20× when autoregressively sampling from tabular foundation models, with minimal reduction in performance or training overhead.

Xinyu Zhang, **Conor Hassan**, Julien Martinelli, Daolang Huang, and Samuel Kaski. "In-Context Multi-Objective Optimization." To appear on arXiv, December 2025.

- Previously presented at ELLIS UnConference 2025 Amortized ProbML Workshop.

Conor Hassan, Robert Salomone, and Kerrie Mengersen."Federated Variational Inference Methods for Structured Latent Variable Models." arXiv preprint arXiv:2302.03314 (2024).

Conor Hassan, Robert Salomone, and Kerrie Mengersen. "Deep Generative Models, Synthetic Tabular Data, and Differential Privacy: An Overview and Synthesis." arXiv preprint arXiv:2307.15424 (2024).

Conor Hassan, Matthew Sutton, Antonietta Mira, and Kerrie Mengersen. "Scalable Vertical Federated Learning via Data Augmentation and Amortized Inference." arXiv preprint arXiv:2405.04043 (2024).

For the full list of my publications, see my Google Scholar page.

AWARDS

- *QUT Outstanding Doctoral Thesis Award*, awarded to approximately top 5% of all theses (**2024**).
- *Australian Research Council Linkage Scholarship*, valued at $36,000 per annum for 3.5 years (**2021**).
- *Otago Institute Prize*, top graduating Honours student across the Faculty of Science (**2021**).
- *University of Otago Gopi Jain Memorial Prize*, highest achieving Statistics Honours student (**2020**).
- *University of Otago Beverly Bursary*, highest achieving student in examinations (**2019**, **2020**).
- *Prime Minister's Scholarship for Asia*, academic exchange at NUS funded by the NZ Government (**2019**).
- *University of Otago Staff Prize in Mathematics & Statistics*, excellent examination results (**2017**, **2018**).
- Recipient of six scholarships, covering university fees and living costs for four years (**2017–2020**).

TECHNICAL SKILLS

Languages: Python, SQL, R, Julia, Bash, C++ (basic)

ML & Deep Learning Software: PyTorch, JAX, Scikit-learn, Pyro, NumPyro, PyMC, Stan

Infrastructure: AWS (EC2, S3, SageMaker), Docker, Spark, MLflow, Weights & Biases, Git