

Profile

Versatile **Research Scientist** with

- a knack for working across disciplines and a **broad background** in mathematics, computer science, and engineering;
- proficiency in **machine learning**, **statistics**, **optimization**, and **Monte Carlo**;
- **5 years** of experience in **Python**;
- and **10 years** in academic **research**.

Scientific Skills

Statistics: Frequentist and Bayesian inference, point estimation, hypothesis testing, asymptotics, bootstrapping, interval estimation, linear regression and GLMs, ensemble methods (bagging, Bayesian averaging, boosting), experimental design, variational inference, expectation-maximization, empirical Bayes, hidden Markov models, and filtering/smoothing.

Machine learning:

- supervised learning (nearest neighbours, L/QDA, SVMs, decision trees, random forests, etc.),
- unsupervised learning (PCA, k -means, factor analysis, sparse coding, etc.),
- deep learning (RNNs, LSTMs, CNNs, autoencoders, transformers),
- statistical learning theory (risk minimization, cross-validation, bias-variance tradeoff, double descent),
- regularization (early stopping, Tikhonov, L_1 , dropout, data augmentation),
- reinforcement learning (bandits, dynamic programming, TD learning, actor-critic methods),
- generative models (diffusion models, VAEs, GANs) with applications to computer vision,
- NLP (word embeddings, language models, sentiment analysis, seq2seq models).

Monte Carlo: Rejection sampling, importance sampling, Markov chain Monte Carlo, annealed importance sampling, sequential Monte Carlo, pseudo-marginal methods, variance reduction techniques, and likelihood-free methods.

Optimization: Standard convex programs (LPs, SDPs, etc.), primal-dual formulations, first-order methods, stochastic optimization, proximal algorithms, higher-order methods, algorithms for constrained optimization (IPMs, ADMM, etc.), and derivative-free methods (coordinate descent, Bayesian optimization, simulated annealing, genetic algorithms, etc.).

Engineering Skills

Proficient in Python (numpy, pandas, TensorFlow, PyTorch, JAX, scikit-learn, matplotlib, statsmodels, Pyro, SciPy).

Versed in coding best practices (Git, unit testing, documenting with Sphinx, review, CI/CD with Github actions, etc.).

Experienced in MATLAB, SQL, Bash, R, and \LaTeX .

Familiar with the AWS ecosystem incl. the SageMaker platform.

Work Experience

Postdoctoral Research Fellow. *Department of Statistics, University of Warwick, UK.* Apr 2020 – today

Postdoctoral Research Associate. *Department of Bioengineering, Imperial College London, UK.* Nov 2017 – Jun 2019

Research Assistant. Mar 2017 – Aug 2017,
Departments of Bioengineering, Chemistry, and Mathematics, Oct 2016 – Feb 2017,
Imperial College London, UK. Jan 2015 – Jun 2015

Education

Ph.D. in Bioengineering and Mathematics. *Imperial College London, UK., BBSRC funded.* Oct 2012 – Oct 2017
Thesis: “Deterministic approximation schemes with computable errors for the distributions of Markov chains”.

M.Eng. in Biomedical Engineering. *Imperial College London, UK.* Oct 2008 – Jul 2012

- Integrated Masters degree (Bachelors + Masters) with a one-year specialization in Control Engineering. Graduated with First-Class Honours (ranked second in year group).

Publications

13 academic publications including **10 first-author articles** and a **book**; see [my website](#) for a searchable list with subject tags. **h -index** of **9** and **179 total citations**, as indicated by [Google Scholar](#) in April 2023. Latest publications:

- **J. Kuntz**, J. N. Lim, and A. M. Johansen. “Particle algorithms for maximum likelihood training of latent variable models”. *AISTATS* 206:5134–5180 (2023, **oral presentation**).
- **J. Kuntz**, F. R. Crucinio, and A. M. Johansen. “Product-form estimators: exploiting independence to scale up Monte Carlo”. *Statistics and Computing* 32.12 (2022).