Juan Kuntz Nussio

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https://juankuntz.github.io/

Profile

Versatile **Research Scientist** with

- a knack for working across disciplines and a **broad background** in mathematics, computer science, and engineering;
- ample experience in **computational statistics**, **machine learning**, **Monte Carlo**, **optimization**, & **control theory**;
- proficiency in **Python** and keen interest in software development;
- and **ten years** of experience in academic **research**.

Scientific Skills

Computational statistics: Frequentist inference, Bayesian inference, (marginal) maximum likelihood/a posterior estimation, bias-variance trade-offs, statistical efficiency, variational inference, expectation-maximization, empirical Bayes, hidden Markov models, filtering/smoothing, hierarchical models, and gradient-flow methods (e.g. SVGD).

Machine learning: Un/self-/supervised learning, neural networks, autoencoders, probabilistic and energy-based models (VAEs, GANs, and diffusion models, etc.), contrastive and score-matching training techniques, and a working knowledge of reinforcement learning (bandits, dynamic programming, TD learning, actor-critic methods, etc.).

Monte Carlo: Rejection sampling, importance sampling, Markov chain Monte Carlo, annealed importance sampling, sequential Monte Carlo, pseudo-marginal methods, mutilevel Monte Carlo, likelihood-free methods, debiasing techniques, and variance reduction techniques (control variates, antithetic variates, Rao-Blackwellization, etc.).

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.).

Control theory: Stability and Lyapunov theory, linear systems theory, linearization techniques, optimal control, robust control, system identification techniques, and model predictive control.

Broader mathematics: Numerical analysis, probability theory, optimal transport, differential geometry, dynamical systems, stochastic processes, Markov processes, and measure theory.

Languages

Bilingual in **Spanish** and **English**, proficient in **French**.

'Languages'

Python (numpy, JAX, PyTorch, pandas, scipy, cvxopt, etc.), Git, Linux (bash), SQL, MATLAB, and LaTeX.

Publications

13 academic publications including **9 first-author journal articles** and **a book**; see my website for a searchable list with subject tags. ***h*-index** of **8** and **151 total citations**, as indicated by Google Scholar in Oct. 2022. Latest publications:

- **J. Kuntz**, J. N. Lim and A. M. Johansen. "Scalable particle-based alternatives to EM". *AISTATS* (under review, 2022).
- **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).

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

Education

Ph.D. in Bioengineering and Mathematics. Oct 2012 – Oct 2017
Imperial College London, UK., Funded by a BBSRC Studentship.
Thesis: "Deterministic approximation schemes with computable errors for the distributions of Markov chains".

M.Eng. in Biomedical Engineering. Oct 2008 – Jul 2012
Imperial College London, UK., Graduated with First-Class Honours (ranked second in year group).

- Integrated Masters degree (Bachelors + Masters) with a one-year specialization in Control Engineering.