

Au Khai Xiang

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About

I employ mathematical tools from probability, statistics, geometry, and physics for data-driven statistical inference.

I am also passionate about science education and communication.

Stats & ML

Bayesian data analysis
Markov chain Monte Carlo
Variational inference
Bayesian neural nets
Numerical integration

Programming

Python (JAX, Pytorch)
MATLAB/Octave
Java
C

Languages

English
Mandarin Chinese
Malay

Referee

Dr. Alexandre Thiery
Associate Professor
PhD supervisor
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Education

- 2018–2022 **PhD in Integrative Sciences (Statistics)** National University of Singapore
Thesis: *Hamiltonian Monte Carlo variants* (awaiting defense)
Recipient of NUS Graduate School Scholarship
- 2014–2017 **B.Eng. (Hons) in Engineering Science** National University of Singapore
Specialisation in Computational Science (GPA 4.6/5)
Semester abroad at the University of California San Diego (GPA 4/4)
Recipient of ASEAN Undergraduate Scholarship

Research

Papers

- 2022 **Manifold Lifting: Scaling MCMC to the vanishing noise regime** [link](#)
Joint work with M. M. Graham, and A. H. Thiery
Accepted into the Journal of Royal Statistical Society Series B
- 2021 **Reflected Hamiltonian Monte Carlo** [link](#)
Joint work with A. H. Thiery
Accepted into NeurIPS Bayesian Deep Learning (BDL) Workshop

Conferences and Workshops

- 2021 Talk: *Reflected Hamiltonian Monte Carlo* Monte Carlo Methods
- 2021 Poster: *Reflected Hamiltonian Monte Carlo* NeurIPS BDL workshop
- 2020 Workshop: *Introduction to Markov chain Monte Carlo* NUS Hackerschool
- 2020 Talk: *On Bayesian inference and uncertainty quantification* NTU ML Society
- 2019 Talk: *Manifold Lifting* INFORMS-APS, Brisbane
- 2019 Talk: *Manifold Lifting* Monte Carlo Methods, Sydney

Experience

- 2018-2021 **Graduate Fellow** Tembusu College, NUS
Head of recruitment and training of residential assistants
Attend to student cases primarily regarding mental health
Aid in college event planning and administrative work
- 2018-2021 **Graduate Teaching Assistant** National University of Singapore
Python, MATLAB, business statistics, engineering lab, and classical logic
- 2017-2018 **Freelance Tutor**
Undergraduate statistics, secondary school mathematics
- 2015 **Summer research intern** A*STAR (Materials Research)
Designed and built optical setup for LED Visible Light Communication

Awards and Certificates

2017	JN Reddy Book Prize	National University of Singapore
	Best academic performance for the final-year undergraduate cohort	
2017	Best Final Year Project for Undergraduates	National University of Singapore
	Project: <i>Simulation and Modelling of Polycrystalline Microstructures</i>	
	Optimized lab workflow for model design using Java and Fortran scripts	
	Finite element analysis of weld microstructures under stress	
2017-2018	Coursera online courses on Deep Learning	Coursera
	Neural Networks and Deep Learning, Hyperparameter Tuning, Structuring Machine Learning Projects, Sequence Models	
2016	IES Young Creator's Award	Institution of Engineers Singapore (IES)
	Team lead for the <i>Smart walking cane for the visually-impaired with obstacle and wet-surface detection</i>	
	Designed sensor circuitry and implemented signal processing algorithms	
2011–2014	Diploma in Engineering Science	Ngee Ann Polytechnic
	Silver Medalist Graduate (GPA 4/4)	
	Recipient of Liu Yin Soon Scholarship	

Others interests

2022	Chess: 3rd place (individual) at the NUS Mind Sport Championships
2015 & 17	Chess: 1st place (team) at the NUS Inter-college Games
2008	Piano: ABRSM Grade 8 with Distinction
2007–now	Card magic: Performer at various public/charity/private events