Au **Khai Xiang**

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About

I employ mathematical tools from probability, statistics, geometry, and physics for machine learning (ML) and data-driven statistical inference.

I am deeply passionate about science education and communication.

Stats & ML

Bayesian data analysis
Statistical sampling
Variational inference
Geometric integration
Numerical optimization
Bayesian neural nets

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–now	**PhD in Integrative Sciences (Statistics)**	National University of Singapore

Thesis: *Hamiltonian Monte Carlo variants for efficient Bayesian inference*
Expected graduation period: 2022
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 University 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 2021
Full paper in preparation

Conferences and Workshops

Year	Item	Venue
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: *Simulation and Modelling of Polycrystalline Microstructures*
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 *Smart walking cane for the visually-impaired with obstacle and wet-surface detection*
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