Au Khai Xiang

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About

I develop probabilistic inference methods used in computational statistics and machine learning (ML).

I am invested in scientific education and communication.

Stats & ML

Bayesian data analysis
Monte Carlo methods
Matrix computations
Numerical ODE/PDE

Programming

Python
MATLAB/Octave
C
Hive
PySpark

Languages

English
Mandarin Chinese
Malay

Referee

Dr. Alexandre Thiery
PhD supervisor
a.h.thiery@nus.edu.sg
+65 6516-2761

Dr. Matthew Graham
PhD co-supervisor
m.graham@ucl.ac.uk

Work

2023–now	**Manager - Data Science**	American Express, Singapore
	Developed ML methods for the purpose of fraud risk identification.	

Education

2018–2023	**PhD in Statistics**	National University of Singapore (NUS)
	Thesis: *Hamiltonian Monte Carlo variants*	
	Recipient of NUS ISEP Scholarship, GPA: 4.63/5	
2014–2017	**B.Eng. (Hons) in Engineering Science**	National University of Singapore
	Specialisation in Computational Science	
	Recipient of ASEAN Undergraduate Scholarship, GPA: 4.63/5	
	Semester abroad at the University of California San Diego, GPA: 4/4	

Research

Publication

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

Conference and Workshop

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 teaching assistant**	National University of Singapore
	Python, MATLAB, statistics, engineering lab, and classical logic	
2018-2021	**Graduate residential assistant**	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	

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   Close-up card magic: performer at various events