JUN CHENG

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SUMMARY

PhD candidate in computational statistics with interests in developing advanced Monte Carlo methods, including sequential Monte Carlo (SMC) and Markov chain Monte Carlo (MCMC), for Bayesian inverse problems, surrogate modelling, and rare event estimation.

EDUCATION

University College London *Sep 2022 – Present*
PhD in Mathematics; Supervisors: Dr Alex Diaz and Dr Luca Grieco London, UK
Courses: Measure-theoretic probability, kernel methods in machine learning and statistics, asymptotic methods and statistical applications

Imperial College London *Oct 2020 – Oct 2021*
Master of Science - Statistics; Distinction; Supervisor: Dr James S Martin London, UK
Courses: Computational statistics, Machine Learning, Advanced Simulation Methods, Bayesian Methods, Statistical Genetics and Bioinformatics

Sichuan University *Sep 2016 – June 2020*
Bachelor of Science - Statistics; First-Class Honours Chengdu, China
Courses: Analysis, Advanced Algebra, Probability Theory, Mathematical Modelling, Mathematical Statistics, Statistical Computational Methods

Peking University *Sep 2018 – Jan 2019*
Exchange student; GPA: 3.81/4.00 Beijing, China
Courses: Applied Stochastic Processes, Financial Time Series Analysis, Applied Multivariate Statistical Analysis, Advanced Functional Analysis

PUBLICATIONS

"Dynamic Model Updating through Reliability-based Sequential History Matching" (with F.A. DiazDelaO & P.O. Hristov). *Mechanical Systems and Signal Processing*, 2025, Vol. 232, Article 112689. PDF.

- Combined SMC methods with history matching (HM) to achieve full Bayesian posterior distributions for dynamic model updating.
- Demonstrated this approach using an engineering example and a cardio-respiratory case study with sequential data.

RESEARCH PROJECTS

Adaptive Emulators for Rare Event Estimation under a Sequential Monte Carlo Framework
PhD Project, UCL *June 2024 – present*

- Developed an SMC-based framework to construct adaptive Gaussian process emulators for rare event estimation.
- Demonstrated robustness to multimodal structures arising from either the underlying simulator or the active learning process.
- Accepted for oral presentation at ENUMATH 2025..

Sequential Monte Carlo with Partial Resampling
Summer Research Project, Imperial *May 2021 – Sep 2021*

- Investigated the impact of different resampling techniques on the accuracy of smoothing.
- Incorporated partial resampling with partial rejection control strategy or Riemann manifold Hamilton Monte Carlo moves to improve the performance of smoothing.
- Designed advanced SMC algorithms and implemented simulation study on stochastic volatility model.

Markov Chain Monte Carlo Methods Based on Riemann Manifold and Their Applications
Undergraduate Project, SCU *Oct 2019 – June 2020*

- Compared the difference between HMC and Metropolis-adjusted Langevin algorithm (MALA).
- Verified the high efficiency of Riemann Manifold MCMC methods on different cases.

National University of Singapore Data Science
Summer Research Project, NUS *Aug 2019*

- Analyzed ARMA model's applications on aquiculture and weather forecast.
- Served as a team leader and organized team meetings.

TEACHING AND RESEARCHING EXPERIENCE

Teaching Assistant, UCL *Sep 2022 - present*

- Conducted tutorials, including problem-solving and presentation sessions, for the Analysis - 1 module.
- Collaborated with lecturers to support learning for students from diverse academic backgrounds for multiple modules.
- Supervised undergraduate mathematics students for their summer projects.
- Provided statistical support for non-mathematics master's students in UCL EGA Institute for Women's Health.

Research Associate, SCU *Feb 2022 - Aug 2022*

- Investigated the delay reporting problem in the dynamics of the disease spread.
- Incorporated latent Gaussian process with dynamic contact networks underlying the epidemic for time delay cases.

HONORS & AWARDS

Associate Fellow of the Higher Education Academy (AFHEA)

4-year PhD TA studentship, Department of Mathematics, UCL (2022–)

Comprehensive Second-Class Scholarship (Top 5%) – Sichuan University (2016–2017; 2018–2019)

Scholarship for Student Leaders with Outstanding Academic Performance – Sichuan University (2017–2018)

Second Prize, 9th National College Students Mathematics Competition, Sichuan Area (2016–2017)

SKILLS

Programming: Python, R, Matlab, LaTeX
Languages: English (Professional), Chinese (Native)