Cheng Zhang

Contact Information

Program in Computational Biology
Fred Hutchinson Cancer Research Center
Seattle, WA 98109

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Research Interests

Scalable Bayesian Inference, Markov Chain Monte Carlo, Variational Inference, Probabilistic Learning, Gaussian Processes, Bayesian Phylogenetic Inference, Sparse Modeling.

Education

University of California, Irvine, Irvine, CA

Ph.D., Computational Mathematics, 2011–2016

- Dissertation: *Scalable Hamiltonian Monte Carlo via Surrogate Methods*
- Advisors: Hongkai Zhao and Babak Shahbaba

Peking University, Beijing, China

M.S., Computational Mathematics, 2008–2011

B.S., Mathematics and Applied Mathematics, 2004–2008

Research Experience

Postdoctoral Research Fellow — Jan 2017 to present
Computational Biology Program,
Fred Hutchinson Cancer Research Center,
Advisor: Frederick A. Matsen IV

Research Assistant — May 2014 to Dec 2016
Department of Mathematics,
University of California, Irvine
Advisors: Hongkai Zhao and Babak Shahbaba

Research Assistant — Sep 2011 to May 2014
Department of Mathematics,
University of California, Irvine
Advisor: Hongkai Zhao

Publications

1. **Zhang, C.** and Matsen F. A. "Variational Bayesian Phylogenetic Inference" (2018). In preparation.
2. **Zhang, C.** and Matsen F. A. "Generalizing Tree Probability Estimation via Bayesian Networks" (2018). Submitted.
3. **Zhang, C.***, Dinh, V.* and Matsen F. A. "Non-bifurcating Phylogenetic Tree Inference via The Adaptive LASSO" (2018). Submitted.
4. **Zhang, C.**, Shahbaba, B., and Zhao, H. "Variational Hamiltonian Monte Carlo via Score Matching" (2018). *Bayesian Analysis*, **13**(2), pages 486–506
5. Dinh, V.*, Bilge, A.*, **Zhang, C.***, and Matsen F. A. "Probabilistic Path Hamiltonian Monte Carlo" (2017). In *Proceedings of the 34th International Conference on Machine Learning (ICML)*.

6. **Zhang, C.**, Shahbaba, B., and Zhao, H. "Hamiltonian Monte Carlo Acceleration Using Surrogate Functions with Random Bases" (2017). *Statistics and Computing*, **27**(6), pages 1473–1490

7. **Zhang, C.**, Shahbaba, B., and Zhao, H. "Precomputing Strategy for Hamiltonian Monte Carlo Method Based on Regularity in Parameter Space" (2017). *Computational Statistics*, **32**(1), pages 253–279

Skills

Statistical and Mathematical Skills

- Statistics: Markov chain Monte Carlo, Variational Inference, Generalized Linear Models, Longitudinal Data Analysis, Multivariate Statistical Methods.
- Mathematics: Stochastic Process, Stochastic Differential Equation, Numerical Analysis, Numerical Optimization, Numerical Partial Differential Equation, Computational Linear Algebra.

Computation Skills

- Proficient programming in Python, Matlab, R, C/C++.

Awards

Peking University

- Outstanding graduates, School of Mathematical Sciences — July 2011

High School

- National mathematics contest of senior high school in China, first class award (provincial division) — 2003

Presentations

Fred Hutchinson Cancer Research Center

- Probabilistic Path Hamiltonian Monte Carlo — ICML, Aug 2017

University of California, Irvine

- Variational Hamiltonian Monte Carlo via Score Matching — AI/ML, Nov 2016
- Variational Bayesian Inference and Markov chain Monte Carlo — GAMS, Nov 2015
- Precomputing Strategy for Hamiltonian Monte Carlo Methods Based on Regularity in Parameter Space — GAMS, Oct 2014

Reviewer

- *Inverse Problems in Science and Engineering*
- *Bayesian Analysis*

Teaching Experience

Teaching Assistant at University of Carlifornia, Irvine

- Math 130B - Probability and Stochastic Process — Winter 2016
- Math 105B - Numerical Analysis — Winter 2016
- Math 2E - Multivariable Calculus — Spring 2015
- Math 6G - Linear Algebra — Spring 2015
- Math 2B - Single Variable Calculus — Fall 2013 – Spring 2014