Cheng Zhang

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Research Interests

- Statistics: Scalable Bayesian Inference (e.g., Markov Chain Monte Carlo, Variational Inference), Bayesian Nonparametric Models (e.g., Gaussian Processes), Sparse Modelling
- Machine Learning: Probabilistic Graphical Models, Deep Bayesian Learning
- Computational Biology: Bayesian Phylogenetic Inference

Education

University of California, Irvine, Irvine, CA

Ph.D., Computational Mathematics, 2011–2016

- Dissertation: *Scalable Hamiltonian Monte Carlo via Surrogate Methods*
- Advisors:
  - Hongkai Zhao (Computational Mathematics)
  - Babak Shahbaba (Statistics/Machine Learning)

Peking University, Beijing, China

M.S., Computational Mathematics, 2008–2011
B.S., Mathematics and Applied Mathematics, 2004–2008

Professional Positions

Assistant Professor Aug 2019 to present
Department of Probability and Statistics,
School of Mathematical Sciences,
Peking University

Postdoctoral Research Fellow Jan 2017 to July 2019
Computational Biology Program,
Fred Hutchinson Cancer Research Center,
Advisor: Frederick A. Matsen IV

Publications

1. Variational Bayesian Phylogenetic Inference.
   Zhang, C. and Matsen F. A.
   In *Proceedings of the 7th International Conference on Learning Representations*, 2019.

2. Generalizing Tree Probability Estimation via Bayesian Networks.
   Zhang, C. and Matsen F. A.
   In *Advances in Neural Information Processing Systems*, **spotlight**(3.5%), 2018.

3. Non-bifurcating Phylogenetic Tree Inference via The Adaptive LASSO.
   Zhang, C.*, Dinh, V.* and Matsen F. A.
   Journal of the American Statistical Association (accepted), 2018

4. Variational Hamiltonian Monte Carlo via Score Matching.
   Zhang, C., Shahbaba, B., and Zhao, H.
   Bayesian Analysis, **13**(2), pages 486–506, 2018.

5. Probabilistic Path Hamiltonian Monte Carlo.
   Dinh, V.*, Bilge, A.*, **Zhang, C.***, and Matsen F. A.
   In *Proceedings of the 34th International Conference on Machine Learning*, pp. 1009–1018, 2017

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

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

Awards

Travel Awards

- NeurIPS Travel Award 2018

Selected Talks

- **Invited** The 17th Annual Meeting of the Chinese Society for Industrial and Applied Mathematics (CSIAM 2019), Foshan, China. *Modern Bayesian Approaches and Applications in Deep Learning.* Sep, 2019
- **Invited** The Annual Meeting of the Canadian Society of Applied and Industrial Mathematics (CAIMS 2019), Whistler, BC. *Variational Bayesian Phylogenetic Inference.* Jun, 2019
- **Invited** SIAM Conference on Computational Science and Engineering (CSE19), Spokane, USA. *Scalable Bayesian Inference for Inverse Problems.* Feb, 2019
- **Invited** The 32nd Conference on Neural Information Processing Systems, Montreal, Canada. *Generalizing Tree Probability Estimation via Bayesian Networks.* Dec, 2018
- **Invited** Joint Statistical Meeting 2018, Vancouver, BC. *Variational Hamiltonian Monte Carlo via Score Matching.* Aug, 2018
- **Invited** The 34th International Conference on Machine Learning, Sydney, Australia. *Probabilistic Path Hamiltonian Monte Carlo.* Aug, 2017
- **Seminar Talk** AI/ML Seminar, Department of Computer Science, UC Irvine. *Variational Hamiltonian Monte Carlo via Score Matching.* Nov, 2016

Teaching Experience

Teaching Assistant at University of California, Irvine

- Math 2D - Multivariable Calculus Spring 2016
- 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

Reviewer

- *Journal of Machine Learning Research*

- *Statistics and Computing*
- *Bayesian Analysis*
- *Inverse Problems in Science and Engineering*
- *International Conference on Machine Learning (ICML) 2020*

Skills

Statistical and Mathematical Skills

- Statistics: Bayesian Inference, Generalized Linear Models, Longitudinal Data Analysis, Multivariate Statistical Methods, Probabilistic Graphical Models.
- Mathematics: Numerical Analysis, Numerical Optimization, Numerical Linear Algebra, Numerical Partial Differential Equation, Stochastic Processes, Stochastic Differential Equation.

Computation Skills

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

Professional Memberships

- Member, American Mathematical Society 2012–present