Cheng Zhang

Contact Information	Program in Computational Biology Fred Hutchinson Cancer Research Center Seattle, WA 98109	Tel: (+1) 949-378-4472 Email: czhang23@fredhutch.org Webpage: zcrabbit.github.io

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

Research Experience

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

Research Assistant Sep 2011 to Dec 2016
Department of Mathematics,
University of California, Irvine
Advisors: Hongkai Zhao and Babak Shahbaba

Publications

1. Variational Bayesian Phylogenetic Inference.
   Zhang, C. and Matsen F. A.
   To appear in *Proceedings of the 6th 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 (in revision), 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

Peking University

- Outstanding Graduates, School of Mathematical Sciences 2011
- Orient Golden Finger Scholarship, School of Mathematical Sciences 2010
- Department Scholarship 2008–2011

Selected Talks

- **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
- **Seminar Talk** GAMS Seminar, Department of Statistics, UC Irvine. *Variational Bayesian Inference and Markov chain Monte Carlo.* Nov, 2015
- **Seminar Talk** GAMS Seminar, Department of Statistics, UC Irvine. *Precomputing Strategy for Hamiltonian Monte Carlo Methods Based on Regularity in Parameter Space.* Oct, 2014

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

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

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

References

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