

# Cheng Zhang

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CONTACT INFORMATION	Department of Probability and Statistics Peking University Beijing, 100871, China	Tel: (+86) 13621390837 Email: chengzhang@math.pku.edu.cn Webpage: zcrabbit.github.io
RESEARCH INTERESTS	<ul style="list-style-type: none"><li>• Statistics: Scalable Bayesian Inference (e.g., Markov Chain Monte Carlo, Variational Inference), Bayesian Nonparametric Models (e.g., Gaussian Processes), Sparse Modelling</li><li>• Machine Learning: Probabilistic Graphical Models, Deep Bayesian Learning</li><li>• Computational Biology: Bayesian Phylogenetic Inference</li></ul>	
EDUCATION	<b>University of California, Irvine, Irvine, CA</b>  Ph.D., Computational Mathematics, 2011–2016 <ul style="list-style-type: none"><li>• Dissertation: <i>Scalable Hamiltonian Monte Carlo via Surrogate Methods</i></li><li>• Advisors:<ul style="list-style-type: none"><li>* Hongkai Zhao (Computational Mathematics)</li><li>* Babak Shahbaba (Statistics/Machine Learning)</li></ul></li></ul> <b>Peking University, Beijing, China</b>  M.S., Computational Mathematics, 2008–2011 B.S., Mathematics and Applied Mathematics, 2004–2008	
PROFESSIONAL POSITIONS	<b>Assistant Professor</b> Department of Probability and Statistics, School of Mathematical Sciences, Peking University	Aug 2019 to present
	<b>Postdoctoral Research Fellow</b> Computational Biology Program, Fred Hutchinson Cancer Research Center, Advisor: Frederick A. Matsen IV	Jan 2017 to July 2019
PUBLICATIONS	<ol style="list-style-type: none"><li>1. ARTree: A Deep Autoregressive Model for Phylogenetic Inference. Xie, T. and <b>Zhang, C.</b> In <i>Advances in Neural Information Processing Systems</i>, <b>spotlight</b>, 2023, to appear</li><li>2. Hierarchical Semi-Implicit Variational Inference with Application to Diffusion Model Acceleration. Yu, L.*, Xie, T.*, Zhu, Y.*, Yang, T., Zhang, X. and <b>Zhang, C.</b> In <i>Advances in Neural Information Processing Systems</i>, 2023, to appear</li><li>3. Particle-based Variational Inference with Generalized Wasserstein Gradient Flow. Cheng, Z.*, Zhang, S.*, Yu, L. and <b>Zhang, C.</b> In <i>Advances in Neural Information Processing Systems</i>, 2023, to appear</li><li>4. A Topology-marginal Composite Likelihood via a Generalized Phylogenetic Pruning Algorithm. Jun, S. H., Nasif, H., Jennings-Shaffer, C., Rich, D. H., Kooperberg, A., Fourment, M., <b>Zhang, C.</b>, Suchard, M. A., and Matsen, F. A. <i>Algorithms for Molecular Biology</i>, <b>18</b>(10), 2023.</li></ol>	

5. A Data-driven and Model-based Accelerated Hamiltonian Monte Carlo method for Bayesian elliptic inverse problems.  
Li, S., **Zhang, C.**, Zhang, Z. and Zhao, H.  
*Statistics and Computing*, **33**(90), 2023.
6. Learnable Topological Features for Phylogenetic Inference via Graph Neural Networks.  
**Zhang, C.**  
In *Proceedings of the 11th International Conference on Learning Representations*, 2023
7. Semi-Implicit Variational Inference via Score Matching.  
Yu, L. and **Zhang, C.**  
In *Proceedings of the 11th International Conference on Learning Representations*, **notable top 25% (spotlight)**, 2023
8. Non-bifurcating Phylogenetic Tree Inference via The Adaptive LASSO.  
**Zhang, C.\***, Dinh, V.\* and Matsen F. A.  
*Journal of the American Statistical Association*, **116**(534), pages 858-873, 2021.
9. Improved Variational Bayesian Phylogenetic Inference with Normalizing Flows  
**Zhang, C.**  
In *Advances in Neural Information Processing Systems*, **oral**(1.1%), 2020.
10. Learning, Using, and Extending Variational Distributions of Phylogenetic Trees.  
Matsen F. A., Fourment, M., Karcher M., Magee A., Swanepoel, C. and **Zhang, C.**  
In *Proceedings of the 14th Machine Learning in Computational Biology*, 2019.
11. Variational Bayesian Phylogenetic Inference.  
**Zhang, C.** and Matsen F. A.  
In *Proceedings of the 7th International Conference on Learning Representations*, 2019.
12. Generalizing Tree Probability Estimation via Bayesian Networks.  
**Zhang, C.** and Matsen F. A.  
In *Advances in Neural Information Processing Systems*, **spotlight**(3.5%), 2018.
13. Variational Hamiltonian Monte Carlo via Score Matching.  
**Zhang, C.**, Shahbaba, B., and Zhao, H.  
*Bayesian Analysis*, **13**(2), pages 486–506, 2018.
14. 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
15. 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
16. 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 International Chinese Statistical Association (ICSA) 2023 China Conference, Chengdu, China. *Learnable Topological Features for Phylogenetic Inference*. July, 2023
  - **Invited** The 34th Conference on Neural Information Processing Systems, Vancouver, Canada. *Improved Variational Bayesian Phylogenetic Inference with Normalizing Flows*. Dec, 2020
  - **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

Instructor at Peking University

- Statistical Models and Computing Methods Fall 2020, 2021, 2022, 2023
- Bayesian Theory and Computation Spring 2021, 2022
- Modern Computational Statistics Fall 2019

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

Journals

- *Journal of Machine Learning Research*
- *Statistics and Computing*
- *Bayesian Analysis*

Conferences

- *ICML 2020, 2021, 2022, 2023*
- *ICLR 2021, 2022, 2023*
- *NeurIPS 2022, 2023*