

# Jiaxin Shi

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## Current Position

2022/7- Postdoctoral Scholar  
Stanford University, CA. Advisor: [Emily B. Fox](#).

## Education

2015/9-2020/6 Ph.D., Computer Science & Technology  
Tsinghua University, Beijing. Advisor: [Jun Zhu](#).

2011/8-2015/7 B.Eng., Computer Science & Technology  
Tsinghua University, Beijing.

## Professional Service

### AREA CHAIR

International Conference on Artificial Intelligence and Statistics (AISTATS) 2023

### SENIOR PROGRAM COMMITTEE

AAAI Conference on Artificial Intelligence 2022

### PROGRAM COMMITTEE / REVIEWER

Journal of Machine Learning Research (JMLR)

Transactions on Machine Learning Research (TMLR)

International Conference on Artificial Intelligence and Statistics (AISTATS) 2021, 2022

International Conference on Learning Representations (ICLR) 2020-2023

Neural Information Processing Systems (NeurIPS) 2019-2022

International Conference on Machine Learning (ICML) 2019, 2021

Asian Conference on Machine Learning (ACML) 2019, 2020

Symposium on Advances in Approximate Bayesian Inference (AABI) 2021

## Employment

2020/8-2022/6 Postdoctoral Researcher  
Microsoft Research New England, Cambridge, MA.

Oct-Dec 2019 Research Intern  
Vector Institute, Toronto, short-term visit hosted by Prof. Roger Grosse.

Jun-Sep 2019 Research Scientist Intern  
DeepMind, London, worked with Dr. Andriy Mnih and Dr. Michalis Titsias.

Jul-Sep 2018 Research Intern  
RIKEN Center for Advanced Intelligence Project, Tokyo, worked with Dr. Emtiyaz Khan.

- Nov-Jul 2015 Intern  
**Mobvoi Inc.**, Beijing, worked with Dr. Libin Shen.
- Jul-Sep 2014 Undergraduate Research Intern  
**Carnegie Mellon University**, supervised by Prof. Eric Xing on projects of distributed topic models.

## Honors & Awards

- 2022 **NeurIPS 2022 Outstanding Paper Award.**  
 Top Reviewer, NeurIPS 2022.
- 2022 **Outstanding Thesis Award**, Tsinghua University.
- 2020 **Best Student Paper Runner-Up**, 2nd Symposium on Advances in Approximate Bayesian Inference (AABI), Vancouver.
- 2019 **Microsoft Research PhD Fellowship**, Asia-Pacific Region.
- 2018 Honorable mention (ranked 1/80), Duke-Tsinghua Machine Learning Summer School.
- 2016 Excellent Graduate Award, Department of Computer Science & Technology, Tsinghua University.
- 2015 First prize (8 out of 77), Tsinghua Contribution Award of Laboratory Construction.
- 2014 Huang-Yicong Couple Scholarship, Tsinghua University.
- 2011-2013

## Publications

(\*) denotes equal contribution.

### PREPRINTS

**Jiaxin Shi** and Lester Mackey. A finite-particle convergence rate for Stein variational gradient descent. arXiv preprint arXiv:2211.09721 (2022).

Zhijie Deng\*, **Jiaxin Shi**\*, Hao Zhang, Peng Cui, Cewu Lu, and Jun Zhu. Neural eigenfunctions are structured representation learners. arXiv preprint arXiv:2210.12637 (2022).

### REFEREED CONFERENCE PUBLICATIONS

**Jiaxin Shi**, Yuhao Zhou, Jessica Hwang, Michalis K Titsias, and Lester Mackey. Gradient estimation with discrete Stein operators. *Advances in Neural Information Processing Systems (NeurIPS)*, 2022. **NeurIPS 2022 Outstanding Paper Award.**

Zhijie Deng, **Jiaxin Shi**, and Jun Zhu. NeuralEF: Deconstructing kernels by deep neural networks. *International Conference on Machine Learning (ICML)*, 2022.

Michalis K. Titsias and **Jiaxin Shi**. Double control variates for gradient estimation in discrete latent variable models. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2022.

**Jiaxin Shi**, Chang Liu, and Lester Mackey. Sampling with mirrored Stein operators. *International Conference on Learning Representations (ICLR)*, 2022. **Spotlight Presentation (top 5.2%).**

Shengyang Sun, **Jiaxin Shi**, Andrew Gordon Wilson, and Roger B Grosse. Scalable variational Gaussian processes via harmonic kernel decomposition. In *International Conference on Machine Learning (ICML)*, pages 9955–9965, 2021.

Yuhao Zhou, **Jiaxin Shi**, and Jun Zhu. Nonparametric score estimators. In *International Conference on Machine Learning (ICML)*, pages 11513–11522, 2020.

**Jiaxin Shi**, Michalis K. Titsias, and Andriy Mnih. Sparse orthogonal variational inference for Gaussian processes. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2020. **Best Student Paper Runner-Up at AABI 2019**.

Yang Song\*, Sahaj Garg\*, **Jiaxin Shi**, and Stefano Ermon. Sliced score matching: A scalable approach to density and score estimation. *The 35th Conference on Uncertainty in Artificial Intelligence (UAI)*, 2019. **Oral Presentation (top 8.7%)**.

**Jiaxin Shi**, Mohammad Emtiyaz Khan, and Jun Zhu. Scalable training of inference networks for Gaussian-process models. In *International Conference on Machine Learning (ICML)*, pages 5758–5768, 2019.

Shengyang Sun\*, Guodong Zhang\*, **Jiaxin Shi\***, and Roger Grosse. Functional variational Bayesian neural networks. In *International Conference on Learning Representations (ICLR)*, 2019.

Yucen Luo, Tian Tian, **Jiaxin Shi**, Jun Zhu, and Bo Zhang. Semi-crowdsourced clustering with deep generative models. In *Advances in Neural Information Processing Systems (NeurIPS)*, pages 3216–3226, 2018.

**Jiaxin Shi**, Shengyang Sun, and Jun Zhu. A spectral approach to gradient estimation for implicit distributions. *International Conference on Machine Learning (ICML)*, pages 4644–4653, 2018.

Jingwei Zhuo, Chang Liu, **Jiaxin Shi**, Jun Zhu, Ning Chen, and Bo Zhang. Message passing Stein variational gradient descent. In *International Conference on Machine Learning (ICML)*, pages 6013–6022, 2018.

**Jiaxin Shi\***, Shengyang Sun\*, and Jun Zhu. Kernel implicit variational inference. *International Conference on Learning Representations (ICLR)*, 2018.

#### WORKSHOP PAPERS

**Jiaxin Shi** and Lester Mackey. A finite-particle convergence rate for Stein variational gradient descent. In *OPT 2022: Optimization for Machine Learning (NeurIPS 2022 Workshop)*, 2022.

Alex Wang, Matthew E. Levine, **Jiaxin Shi**, and Emily Fox. Learning absorption rates in glucose-insulin dynamics from meal covariates. In *NeurIPS 2022 Workshop on Learning from Time Series for Health*, 2022.

Michalis K. Titsias and **Jiaxin Shi**. Double control variates for gradient estimation in discrete latent variable models. *4th Symposium on Advances in Approximate Bayesian Inference*, 2022.

**Jiaxin Shi**, Chang Liu, and Lester Mackey. Sampling with mirrored Stein operators. *4th Symposium on Advances in Approximate Bayesian Inference*, 2022.

Shengyang Sun\*, **Jiaxin Shi\***, and Roger Grosse. Neural networks as inter-domain inducing points. *3rd Symposium on Advances in Approximate Bayesian Inference*, 2020.

**Jiaxin Shi**, Michalis Titsias, and Andriy Mnih. Sparse orthogonal variational inference for Gaussian processes. *2nd Symposium on Advances in Approximate Bayesian Inference*, Vancouver, 2019.

Yuhao Zhou, **Jiaxin Shi**, and Jun Zhu. Spectral estimators for gradient fields of log-densities. *ICML Workshop on Stein’s Method*, Long Beach, CA, 2019.

Shengyang Sun\*, Guodong Zhang\*, **Jiaxin Shi\***, and Roger Grosse. Functional variational Bayesian neural networks. *NeurIPS Bayesian Deep Learning Workshop*, Montréal, 2018.

Yucen Luo, Tian Tian, **Jiaxin Shi**, Jun Zhu, and Bo Zhang. Semi-crowdsourced clustering with deep generative models. *ICML Workshop on Theoretical Foundations and Applications of Deep Generative Models*, Stockholm, 2018.

**Jiaxin Shi\***, Shengyang Sun\*, and Jun Zhu. Implicit variational inference with kernel density ratio fitting. *ICML Workshop on Implicit Models*, Sydney, 2017.

#### VISUALIZATION & GRAPHICS

Mengchen Liu, **Jiaxin Shi**, Kelei Cao, Jun Zhu, and Shixia Liu. Analyzing the training processes of deep generative models. *IEEE Transactions on Visualization and Computer Graphics*, 24(1):77–87, 2018.

Mengchen Liu, **Jiaxin Shi**, Zhen Li, Chongxuan Li, Jun Zhu, and Shixia Liu. Towards better analysis of deep convolutional neural networks. *IEEE Transactions on Visualization and Computer Graphics*, 23(1):91–100, 2017. **Most cited paper of TVCG 2017.**

Fanglue Zhang, Jue Wang, Eli Shechtman, Ziyue Zhou, **Jiaxin Shi**, and Shimin Hu. Plenopatch: Patch-based plenoptic image manipulation. *IEEE Transactions on Visualization and Computer Graphics*, 23(5):1561–1573, 2017.

## Software

I created and lead the development of **ZhuSuan** ([GitHub](#), [Documentation](#)), an open-source differentiable probabilistic programming library based on Tensorflow. The project had **2K stars** on GitHub by Aug 2021.

**Jiaxin Shi**, Jianfei Chen, Jun Zhu, Shengyang Sun, Yucen Luo, Yihong Gu, and Yuhao Zhou. ZhuSuan: A library for Bayesian deep learning. *arXiv preprint arXiv:1709.05870*, 2017.

## Selected Talks

- Sep 2022 **SIAM Conference on Mathematics of Data Science**, San Diego, CA.
- Apr 2022 **Banff International Research Station**, Advances in Stein’s method and its applications in Machine Learning and Optimization, Banff, Alberta.
- Feb 2022 **Imperial College London & Oxford**, Centre for Doctoral Training in Statistics and Machine Learning.
- Feb 2022 **4th Symposium on Advances in Approximate Bayesian Inference**.
- Jan 2022 **Max Planck Institute for Intelligent Systems & Cyber Valley**, Scientific Symposium.
- Oct 2021 **University of Edinburgh**, School of Informatics.
- Aug 2021 **RIKEN Center for Advanced Intelligence Project (RIKEN-AIP)**, Tokyo.
- Jan 2020 **Microsoft Research New England**, Cambridge, MA.
- Dec 2019 **Vector Institute**, Toronto.
- Sep 2019 **DeepMind**, Deep Learning Group Meeting, London.
- Sep 2019 **University of Bristol**, School of Mathematics.
- Jun 2019 **International Conference on Machine Learning (ICML)**, Long Beach, CA.
- May 2019 **PaperWeekly local meetup**, Beijing.
- Apr 2019 **RealAI Inc.**, Beijing.
- Nov 2018 **Nanjing University**, Symposium on Machine Learning and Applications (MLA).

Jul 2018 **International Conference on Machine Learning (ICML)**, Stockholm.  
Jul 2018 **Renmin University**, International Forum on Statistics, Beijing.  
Mar 2018 **GPU Technology Conference**, San Jose, CA.  
Jun 2017 **Jiangmen Community**, Beijing.

## Teaching

2019-2020 **Instructor of the lectures on probabilistic programming**  
70240413: Statistical Machine Learning, Tsinghua University.

Spring 2018 **Invited Lecture**  
70240033: Artificial Intelligence, Tsinghua University.

Spring 2018 **Teaching Assistant**  
70240413: Statistical Machine Learning, Tsinghua University.

Jul-Aug 2017 **Teaching Assistant**  
Duke-Tsinghua Machine Learning Summer School 2017.

Spring 2017 **Teaching Assistant**  
70240413: Statistical Machine Learning, Tsinghua University.