Sulin Liu

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Research Interests

My research focuses on developing deep-learning-enabled probabilistic models, as well as probabilistic modeling for guiding exploration and discovery of knowledge in science and engineering. Previously, I have worked on federated/distributed optimization and multi-task learning.

Education

2017-pres.	Ph.D. in Machine Learning, Electrical and Computer Engineering, **Princeton University** - Advisors : Ryan P. Adams (CS), Peter J. Ramadge (ECE), GPA : 3.96/4.0
2011-2015	B.Eng. in Electrical Engineering, **National University of Singapore** - GPA : 4.84/5.0, Major GPA : 4.94/5.0, Minor in Mathematics
2014	Exchange student, **Georgia Institute of Technology** - GPA : 4.0/4.0, only 9 students selected university wide

Work Experiences

2021 May-Aug.	Research Intern, **Meta Research** Mentors : Ben Letham, Eytan Bakshy ▸ Developed sparse Bayes optimization for interpretable/simple policy search, resulted in a paper, collaborated with product team and successfully deployed the methods in products
2015-17	Research Engineer, **Nanyang Technological University, Singapore** Advisor : Sinno Jialin Pan ▸ Conducted research in distributed/federated optimization, multi-task learning

Honors and Awards

2022	Princeton ECE Travel Grant Award
2022	NeurIPS Top Reviewer Award, 8%
2020	Azure Cloud Computing Proposal Award
2019	NeurIPS Top Reviewer Award, 50%
2018	Anthony Ephremides Fellowship - awarded to the top first year Ph.D. student in the information science track
2017	Princeton University Fellowship in Natural Sciences and Engineering
2017	KDD Conference Travel Award
2014	IEEE Eta Kappa Nu Honor Society
2014	Faculty of Engineering Annual Book Prize - awarded to student with the best performance in wireless communications
2013	ST Electronics Book Prize - awarded to the top sophomore in Electrical Engineering
2011-15	Singapore Ministry of Education Undergraduate Scholarship

Publications

2022 **Sulin Liu***(equal contr.), Qing Feng*, David Eriksson*, Benjamin Letham, Eytan Bakshy
Sparse Bayesian Optimization, *under submission*, 2022. Paper.
short version at NeurIPS Workshop on Gaussian Processes, Spatiotemporal Modeling, and Decision-making Systems. (**Contributed talk, top 5 selected**)

2021 Athindran Ramesh Kumar*, **Sulin Liu***(equal contr., random order), Jaime F. Fisac, Ryan P. Adams, Peter J. Ramadge
ProBF : Probabilistic Safety Certificates with Barrier Functions, 2021. Paper. Code.
short version at NeurIPS "Safe and Robust Control of Uncertain Systems" Workshop

2020 **Sulin Liu**, Xingyuan Sun, Peter J. Ramadge, Ryan P. Adams
Task-Agnostic Amortized Inference of Gaussian Process Hyperparameters, in *Advances in Neural Information Processing Systems (NeurIPS)*, 2020. Paper. Code.
short version at 7th ICML Workshop on Automated Machine Learning. (**Spotlight talk**)

2020 Hossein Valavi, **Sulin Liu**, Peter J. Ramadge
Revisiting the Landscape of Matrix Factorization, in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2020. **Oral presentation**. Paper.

2018 Mengchen Zhao, Bo An, Yaodong Yu, **Sulin Liu**, Sinno Jialin Pan
Data Poisoning Attacks on Multi-Task Relationship Learning, in *AAAI Conference on Artificial Intelligence (AAAI)*, 2018. Paper.

2017 **Sulin Liu**, Sinno Jialin Pan, Qirong Ho
Distributed Multi-task Relationship Learning, in *Conference on Knowledge Discovery and Data Mining (KDD)*, 2017. Paper.

2017 Yaodong Yu*, **Sulin Liu***(equal contr.), Sinno Jialin Pan
Communication-Efficient Distributed Primal-Dual Algorithm for Saddle Point Problems, in *Uncertainty in Artificial Intelligence (UAI)*, 2017. Paper.

2017 **Sulin Liu**, Sinno Jialin Pan
Adaptive Group Sparse Multi-task Learning via Trace Lasso, in *International Joint Conference on Artificial Intelligence (IJCAI)*, 2017. **Oral presentation**. Paper.

Presentations

Invited and Contributed Oral Presentations

2022 Sparse Bayesian Optimization
Contributed Talk at NeurIPS Workshop onGaussian Processes, Spatiotemporal Modeling, and Decision-making Systems, 2022.

2020 Task-Agnostic Amortized Inference of Gaussian Process Hyperparameters
Spotlight Talk at 7th ICML Workshop on Automated Machine Learning, 2020.

2017 Adaptive Group Sparse Multi-task Learning via Trace Lasso
International Joint Conference on Artificial Intelligence (IJCAI), 2017.

Selected Poster Presentations

2020	Task-Agnostic Amortized Inference of Gaussian Process Hyperparameters *Conference on Neural Information Processing Systems (NeurIPS), 2020.*
2017	Distributed Multi-task Relationship Learning *Conference on Knowledge Discovery and Data Mining (KDD), 2017.*
2017	Adaptive Group Sparse Multi-task Learning via Trace Lasso *International Joint Conference on Artificial Intelligence (IJCAI), 2017.*

Professional Services

Conference Reviewing

2018-	Conference on Neural Information Processing Systems (NeurIPS)
2019-	International Conference on Machine Learning (ICML)
2020-	Asian Conference on Machine Learning (ACML)
2019-2022	International Conference on Learning Representations (ICLR)
2021	ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)
2021	SIAM International Conference on Data Mining (SDM)
2020-2021	AAAI Conference on Artificial Intelligence (AAAI)

Journal Reviewing

2021-	IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
2020	Journal of Machine Learning Research (JMLR)

Workshop Reviewing

2022	AI for Accelerated Materials Design Workshop, NeurIPS 2022
2022	AI for Science : Progress and Promises Workshop, NeurIPS 2022

Graduate Coursework

- **ML** : Machine Learning and Pattern Recognition, Theoretical Machine Learning, Theoretical Deep Learning

- **Stats** : Statistical Theory and Methods, High-Dimensional Probability, Statistical Optimization and Reinforcement Learning

- **Optimization** : Linear and Nonlinear Optimization, Optimization for Machine Learning, Large-Scale Optimization

- **Control** : Safety-Critical Robotic Systems

Teaching Experiences

2021-2022	Co-instructor for SML 310 Research Projects in Data Science, in Fall 2021 & Spring 2022.
2020	Teaching assistant for COS 424 Fundamentals of Machine Learning, in Fall 2020
2020	Teaching assistant for COS 302 Mathematics for Machine Learning, in Spring 2020
2019	Teaching assistant for SML 201 Introduction to Data Science, in Spring 2019.

2018-2019	Teaching assistant for ELE 535 Machine Learning and Pattern Recognition, in Fall 2018 & Fall 2019 (head TA).

Programming Skills

- **Proficient** : Python (PyTorch, Numpy, Pandas), MATLAB, LaTeX, Git, Slurm, Bash/Zsh
- **Familiar** : TensorFlow, C/C++, Java, Parameter Server, HTML/CSS, VHDL

Open Source Projects

Creator and Co-creator :

- AHGP : https://github.com/PrincetonLIPS/AHGP
- ProBF : https://github.com/athindran/ProBF

Developer and Contributor :

- BoTorch : https://github.com/pytorch/botorch
- Ax : https://github.com/facebook/Ax

References

Ryan P. Adams
Professor of Computer Science
Princeton University
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Peter J. Ramadge
Professor of Electrical and Computer Engineering
Princeton University
Princeton, NJ, USA
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Eytan Bakshy
Research Director of Adaptive Experimentation Team
Meta Research
Menlo Park, CA, USA
ebakshy@meta.com

Sinno Jialin Pan
Professor of Computer Science and Engineering
Nanyang Technological University
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