

# Kaiwen Wu

📍 Philadelphia, PA, USA

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## Research

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I am interested in both theory and applications of machine learning. I have been working on various areas in probabilistic machine learning including Gaussian processes, variational inference, Bayesian optimization, and active learning. Before starting my PhD, I used to work on generative modeling, convex optimization, and adversarial robustness of deep learning models.

## Education

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**University of Pennsylvania** Philadelphia, PA  
Ph.D. in Computer and Information Science 2021 - Present  
Advisor: Jacob R. Gardner

**University of Waterloo** Waterloo, ON  
M.Math. in Computer Science (Thesis Option) 2018 - 2020  
Advisor: Yaoliang Yu

**Nanjing University** Nanjing, China  
B.Sc. in Computer Science 2014 - 2018

## Work Experience

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**Meta Reality Labs** Redmond, WA  
Research Scientist Intern Aug 2024 - Dec 2024

- Worked on experimental designs for VR/AR hardware using active learning.

**Borealis AI** Waterloo, ON  
Research Intern Jan 2019 - May 2019

- Worked on robust mean estimation on noisy data using generative adversarial networks.
- Published a paper at AISTATS 2020.

## Open Source Contributions

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**BoTorch** (<https://github.com/pytorch/botorch>)  
A Python package for Bayesian optimization in PyTorch

- Implemented an improved elliptical slice sampling method for truncated normal distributions.

## Publications

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### Refereed Conference Proceedings

- [C1] **Kaiwen Wu** and Jacob R. Gardner  
Understanding Stochastic Natural Gradient Variational Inference  
Proceedings of the 41st International Conference on Machine Learning (ICML). 2024.
- [C2] **Kaiwen Wu**, Jonathan Wenger, Haydn T Jones, Geoff Pleiss, and Jacob Gardner  
Large-Scale Gaussian Processes via Alternating Projection  
Proceedings of the 27th International Conference on Artificial Intelligence and Statistics (AISTATS). 2024.
- [C3] Kyurae Kim, Jisu Oh, **Kaiwen Wu**, Yian Ma, and Jacob R. Gardner  
On the Convergence of Black-Box Variational Inference  
Advances in Neural Information Processing Systems (NeurIPS). 2023.

- [C4] Natalie Maus, **Kaiwen Wu**, David Eriksson, and Jacob Gardner  
Discovering Many Diverse Solutions with Bayesian Optimization  
Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS). 2023.
- [C5] **Kaiwen Wu**, Kyurae Kim, Roman Garnett, and Jacob R. Gardner  
The Behavior and Convergence of Local Bayesian Optimization  
Advances in Neural Information Processing Systems (NeurIPS). 2023.
- [C6] Quan Nguyen, **Kaiwen Wu**, Jacob Gardner, and Roman Garnett  
Local Bayesian optimization via maximizing probability of descent  
Advances in Neural Information Processing Systems (NeurIPS). 2022.
- [C7] **Kaiwen Wu**, Gavin Weiguang Ding, Ruitong Huang, and Yaoliang Yu  
On Minimax Optimality of GANs for Robust Mean Estimation  
Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics (AISTATS). 2020.
- [C8] **Kaiwen Wu**, Allen Wang, and Yaoliang Yu  
Stronger and Faster Wasserstein Adversarial Attacks  
Proceedings of the 37th International Conference on Machine Learning (ICML). 2020.

## Workshop Papers

- [W1] **Kaiwen Wu** and Jacob R. Gardner  
A Fast, Robust Elliptical Slice Sampling Method for Linearly Truncated Multivariate Normal Distributions  
NeurIPS Workshop on Bayesian Decision-making and Uncertainty. 2024.
- [W2] Guojun Zhang, **Kaiwen Wu**, Pascal Poupart, and Yaoliang Yu  
Newton-type Methods for Minimax Optimization  
ICML Workshop on Beyond First-order Methods in Machine Learning Systems. 2021.

## Teaching Experience

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### University of Pennsylvania

- Teaching Assistant, CIS 520 Machine Learning FA 2023
- Teaching Assistant, ESE 204 Decision Models FA 2022

### University of Waterloo

- Teaching Assistant, CS 370 Numerical Computation SP 2020
- Teaching Assistant, CS 486/686 Introduction to Artificial Intelligence SP 2019
- Teaching Assistant, CS 480/680 Introduction to Machine Learning FA 2018

## Honors & Awards

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- NeurIPS Top Reviewer 2024
- Vector Scholarship in Artificial Intelligence, Vector Institute 2018
- Entrance Scholarship, University of Waterloo 2018
- Jimin Liu Scholarship, Nanjing University 2017

## Academic Service

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### Conference Reviews

- Program Committee Member, AAAI Conference on Artificial Intelligence (2021)
- Reviewer, Conference on Neural Information Processing Systems (2023 – 2025)
- Reviewer, International Conference on Artificial Intelligence and Statistics (2021, 2024)
- Reviewer, International Conference on Learning Representations (2024 – 2025)
- Reviewer, International Conference on Machine Learning (2023 – 2025)

### Journal Reviews

- Reviewer, Transactions on Machine Learning Research (2025)