

EDUCATION

- June 2019 – **Massachusetts Institute of Technology**, Cambridge, MA
December 2022 – Ph.D. in Communications, Networks and Statistics
– Minor: Machine Learning
- August 2017 **Massachusetts Institute of Technology**, Cambridge, MA
– May 2019 – Master of Science in Aeronautics and Astronautics
– GPA: **5.0/5.0**
- August 2013 **Tsinghua University**, Beijing, China
– July 2017 – Bachelor of Engineering in Automation (with the highest honor)
– Bachelor of Economics in Economics (second degree)
– GPA: **93/100** Ranking: **1st/118**

WORK EXPERIENCE

- August 2023 **Meta (Facebook)**, Ads ML Ranking Services, Research Scientist
– Current – Focusing on ML inference serving systems
- December 2022 **Google**, ML HPC Networking, Software Engineer
– August 2023 – Optimized collective operations in GPU level to minimize the latency for large scale AI training tasks
– Optimized the NCCL network plugin to achieve higher traffic throughput
– Designed and implemented new algorithms to improve the performance of collective operations
- May 2022 **Meta (Facebook)**, BCR Core Ads Ranking, Intern
– August 2022 – Designed and implemented a new on-device ranking scheme to serve users' real-time interests better
– Developed a new Ads request scheme to fetch Ads faster from the backend
– Conducted global-scale online experiments in the production environment to test the new schemes
- May 2020 **Google**, Fabric Core, Intern
– August 2020 – Designed and implemented a data center routing algorithm to balance the network traffic
– Developed a new data loss rate prediction model
– Applied reinforcement learning methods to optimize data center structures

COURSES AT MIT

- Networks 6.263 Data Communication Networks, 6.829 Computer Networks, 16.363 Communication Systems Engineering, 16.393 Statistical Communication and Localization Theory
- Prob & Stat 6.436 Fundamentals of Probability, 6.434 Statistics for Engineers and Scientists, 9.S914 Mathematical Statistics: A Non-Asymptotic Approach, IDS.131 Statistics, Computation, and Applications
- Mach. Learn. 6.246 Reinforcement Learning: Foundations and Methods, 6.437 Inference and Information Optimization 6.251 Introduction to Mathematical Programming, 6.252 Nonlinear Optimization

RESEARCH INTERESTS

- Fields Learning and control methods in networked systems
Tools Stochastic optimization, reinforcement learning, statistics

SELECTED PUBLICATIONS

- August 2023 **Tracking Drift-Plus-Penalty: Utility Maximization for Partially Observable and Controllable Networks**
[Bai Liu](#), Quang Minh Nguyen, Qingkai Liang, and Eytan Modiano.
IEEE/ACM Transactions on Networking.
- December 2022 **Tracking MaxWeight*: Optimal Control for Partially Observable and Controllable Networks**
[Bai Liu](#), Qingkai Liang, and Eytan Modiano.
IEEE/ACM Transactions on Networking.
- September 2022 **Universal Policy Tracking: Scheduling for Wireless Networks with Delayed State Observation**
[Bai Liu](#), and Eytan Modiano.
58th Annual Allerton Conference on Communication, Control, and Computing.
- April 2022 **RL-QN: A Reinforcement Learning Framework for Optimal Control of Queueing Systems**
[Bai Liu](#), Qiaomin Xie, and Eytan Modiano.
ACM Transactions on Modeling and Performance Evaluation of Computing Systems. [[ArXiv](#)]
- November 2021 **Optimal Control for Networks with Unobservable Malicious Nodes**
[Bai Liu](#), and Eytan Modiano.
Performance Evaluation 151 (2021): 102230.
- September 2019 **Reinforcement Learning for Optimal Control of Queueing Systems**
[Bai Liu](#), Qiaomin Xie, and Eytan Modiano.
57th Annual Allerton Conference on Communication, Control, and Computing.
- May 2016 **Global Optimization Framework for Real-time Route Guidance via Variable Message Sign**
[Bai Liu](#), Ke Han, and Jianming Hu [[ArXiv](#)]

PATENT & SOFTWARE COPYRIGHT

- June 2016 **Global Optimization Framework for Real-time Route Guidance via Variable Message Sign**
Jianming Hu, Xin Pei, [Bai Liu](#), et al.
Chinese Invention Patent. Publication Number: CN105303856A.
- February 2016 **Intelligent Networking Transportation Guidance System Platform V1.0**
Computer Software Copyright. Registration Number: 2016SR252223.

HONORS

- July 2017 **Excellent Graduate Award**
The highest honor for undergraduate students
- June 2016 **Fellowship of Stanford Undergraduate Visiting Researcher Program**, Stanford University
Top undergraduate research program, only 18 students in China are selected annually.
- March 2016 **Qualcomm Scholarship**, Tsinghua University
Awarded to students with excellent scientific potential (top 0.3%).
- October 2012 **1st Prize in the National Mathematical Olympiad**, Chinese Mathematical Society (CMS)
- October 2012 **2nd Prize in the Chinese Physics Olympiad**, Chinese Physical Society (CPS)