# Bai Liu

✉ bailiu@mit.edu
http://bailiu.me

## EDUCATION

June 2019 – December 2022 (expected)
**Massachusetts Institute of Technology**, Cambridge, MA
- Ph.D. Candidate at Laboratory for Information and Decision Systems (LIDS)
- Major: Communications and Networks
- Minor: Machine Learning
- Also in Interdisciplinary Doctoral Program in Statistics (IDPS)

August 2017 – May 2019
**Massachusetts Institute of Technology**, Cambridge, MA
- Master of Science in Aeronautics and Astronautics
- GPA: **5.0/5.0**

August 2013 – July 2017
**Tsinghua University**, Beijing, China
- Bachelor of Engineering in Automation (with the highest honor)
- Bachelor of Economics in Economics (second degree)
- GPA: **93/100** Ranking: **1st/118**

## WORK EXPERIENCE

May 2022 – August 2022
**Meta (Facebook)**, Ads Core ML, Intern
- Designed and implemented a new on-device ranking scheme on Facebook App to promote Ads that 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 – August 2020
**Google**, Google Cloud, Intern
- 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

June 2016 – September 2016
**Stanford University**, Information Systems Laboratory, Research Assistant
- Proposed and rigorously proved original properties of layered Gaussian relay network
- Designed adaptive algorithms to accelerate locating optimal global sub-network

January 2016 – March 2016
**Imperial College London**, Centre for Transport Studies, Research Assistant
- Introduced a transportation network model with feedback scheme to mitigate traffic congestion
- Established a simulation platform and conducted simualtions using real traffic data

## 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 |

## PUBLICATIONS & MANUSCRIPTS

Under Review **Tracking MaxWeight*: Optimal Control for Partially Observable and Controllable Networks**
**Bai Liu**, 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)

## PROGRAMMING SKILLS

Proficient `Python`, `C/C++`, `MATLAB`, LaTeX

Familiar `Mathematica`, `SQL`, `Oracle`