

EDUCATION

June 2019 **Massachusetts Institute of Technology**, Cambridge, MA

- Current
 - Ph.D. Candidate
 - Laboratory for Information and Decision Systems (LIDS)
 - Major Field of Study: Communication Networks
 - Minor: Machine Learning and Statistics
 - Advisor: Eytan Modiano

August 2017 **Massachusetts Institute of Technology**, Cambridge, MA

- May 2019
 - Master of Science in Aeronautics and Astronautics
 - Laboratory for Information and Decision Systems (LIDS)
 - GPA: **5.0/5.0**

August 2013 **Tsinghua University**, Beijing, China

- July 2017
 - Bachelor of Engineering in Automation
 - Bachelor of Economics in Economics (Second Degree)
 - GPA: **93/100** Ranking: **1st/118**
 - Graduated with Outstanding Honor (Top 1%)

RESEARCH INTERESTS

Fields Learning and control problems in networked systems (data networks, logistic networks etc.)

Tools Reinforcement learning, stochastic optimization, inference methods

PUBLICATIONS & MANUSCRIPTS

September 2019 **Reinforcement Learning for Optimal Control of Queueing Systems**

[Bai Liu](#), Qiaomin Xie, and Eytan Modiano.

To appear at *IEEE Allerton Conference*.

August 2016 **Efficiently Reaching the Largest Wireless Capacity with the Fewest Relays**

[Bai Liu](#), Xiugang Wu, and Ayfer Özgür

Presented at *Stanford UGVR Program Workshop*. [[Poster](#)]

May 2016 **Global Optimization Framework for Real-time Route Guidance via Variable Message Sign**

[Bai Liu](#), Ke Han, and Jianming Hu [[ArXiv](#)]

RESEARCH EXPERIENCE

October 2017 **Laboratory for Information and Decision Systems**, Massachusetts Institute of Technology, Ad-

– Current visor: Prof. Eytan Modiano

- Applied model-based reinforcement learning and Lyapunov analysis
- Designed algorithm for queueing networks with unbounded state spaces
- Proved that the average queue back- log can get arbitrarily close to the optimal result

June 2016 – **Information Systems Laboratory**, Stanford University, Advisor: Prof. Ayfer Özgür

- September 2016
 - Proposed and rigorously proved six original properties of layered Gaussian relay network
 - Designed adaptive algorithms based on a dynamic programming method that can locate optimal global sub-network exponentially faster

- January 2016 **Centre for Transport Studies**, Imperial College London, Advisor: Prof. Ke Han
- March 2016
- Introduced feedback scheme into a transportation network model and applied the linear decision rule and heuristic optimization approach to design optimization algorithm
 - Established a simulation platform (based on MATLAB, >3,000 lines of codes) and conducted a simulation case study on a real-life test network in China
- August 2015 **Institute for Interdisciplinary Information Sciences**, Tsinghua University, Advisor: Prof. Longbo Huang
- July 2016
- Applied both discrete model and fluid model to vehicle scheduling problem
 - Utilized dynamic programming and stochastic networks methods and proved the upper bound of the total number of vehicles required for balancing
 - Proposed a polynomial-time algorithm to obtain the optimal scheduling policy

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(s)**
Won Excellent Graduate Award for three times (Beijing City, Tsinghua University and Department of Automation respectively).
- 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 2014 **China National Scholarship**, the Ministry of Education, China
Highest level of scholarship set by the government of China (< top 0.1%).
- 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, Keras, MATLAB, C/C++, C#, \LaTeX
- Familiar Mathematica, SQL, Oracle, Git, Javascript, HTML/CSS