Bai Liu

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http://bailiu.me

EDUCATION

June 2019 – Current
Massachusetts Institute of Technology, Cambridge, MA
- 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 – May 2019
Massachusetts Institute of Technology, Cambridge, MA
- Master of Science in Aeronautics and Astronautics
- Laboratory for Information and Decision Systems (LIDS)
- GPA: **5.0/5.0**

August 2013 – July 2017
Tsinghua University, Beijing, China
- 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

In Submission
Global Optimization Framework for Real-time Route Guidance via Variable Message Sign
Bai Liu, Ke Han, and Jianming Hu
Submitted to *Transportmetrica A*. Revceived positive feedback. [ArXiv]

In Submission
Efficiently Reaching the Largest Wireless Capacity with the Fewest Relays
Bai Liu, Xiugang Wu, and Ayfer Özgür [Poster]

RESEARCH EXPERIENCE

October 2017 – Current
Laboratory for Information and Decision Systems, Massachusetts Institute of Technology, Advisor: 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 – September 2016
Information Systems Laboratory, Stanford University, Advisor: Prof. Ayfer Özgür
- 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 – March 2016 **Centre for Transport Studies**, Imperial College London, Advisor: Prof. Ke Han
- 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 – July 2016 **Institute for Interdisciplinary Information Sciences**, Tsinghua University, Advisor: Prof. Longbo Huang
- 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`