

BAI LIU

2# Zijing Student Apartment ◊ Tsinghua University ◊ Beijing, 100084, P.R.China
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EDUCATION

Tsinghua University, Beijing, China *2013.08 - 2017.07 (expected)*

- Bachelor of Engineering in Automation (expected)
- GPA: **93/100** Ranking: **1st/118**

Stanford University, Stanford, CA, USA *2016.06 - 2016.09*

- Research Assistant in the Information Systems Laboratory, Department of Electrical Engineering
- The Undergraduate Visiting Research (UGVR) Program (18 students selected from China)

Imperial College London, London, UK *2016.01 - 2016.02*

- Research Assistant in the Centre for Transport Studies

Core Courses

- **Mathematics:** Probability and Statistics (94/100), Linear Algebra (93/100), Calculus (91/100), Signals and System Analysis (95/100), Numerical Analysis and Algorithms (93/100), Applied Stochastic Processes (92/100), Introduction to Complex Analysis (99/100)
- **Programming:** C++ Programme Design and Training (94/100), Introduction to Systems Engineering (99/100), Multimedia Technology and Its Applications (99/100), Fundamental Pattern Recognition (94/100), Computer Principles and Applications (93/100)

SCHOLARSHIPS & AWARDS

2016 & 2015 Fang Chongzhi Scholarship (Highest honor in the Dept. of Automation, 1 out of 560)

2014 China National Scholarship (Highest scholarship given by the government of China, < 0.1%)

2016 Qualcomm Scholarship (Awarded to students with excellent scientific potential, 0.3%)

2016 Cai Xiong Scholarship (Awarded to students with excellent scientific potential, 0.1%)

2016 Tang Lixin Scholarship (Awarded to students with outstanding academic performance, 0.2%)

2012 **1st Prize in the National Mathematical Olympiad (< 0.01%)**

2012 **2nd Prize in the National Physics Olympiad (< 0.05%)**

PUBLICATIONS & MANUSCRIPTS

- [1] **Bai Liu**, Jianming Hu, Pan Gao, and Xudong Xie. Dynamic Traffic Guidance Generating Method on Variable Message Sign in Small and Medium-Sized Cities. *14th ITS Asia Pacific Forum*. Full version accepted. Invited to deliver oral presentation.
- [2] **Bai Liu**, Ke Han, and Jianming Hu. Global Optimization Framework for Real-time Route Guidance via Variable Message Sign. *Submitted to Transportmetrica A*. Under review. [[arXiv](#)]
- [3] **Bai Liu**, Xiugang Wu, and Ayfer Özgür. Efficiently Reaching the Largest Wireless Capacity with the Fewest Relays. *In preparation for submission*. [[Poster](#)]

RESEARCH EXPERIENCES

Stanford University, Stanford, CA, USA *2016.06 - Present*

Information Systems Laboratory, Department of Electrical Engineering

Research Assistant, Advisor: **Prof. Ayfer Özgür**

Project: Sub-network Selection of Gaussian Relay Network

- 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
- Designed efficient algorithms for the cases with dynamic parameters
- Established a simulation platform (based on MATLAB, > 2,000 lines of codes)
- Accomplished all work independently

Imperial College London, London, UK

2016.01 - 2016.02

Centre for Transport Studies

Research Assistant, Advisor: **Prof. Ke Han**

Project: Dynamic Transportation Network Modeling

- Introduced feedback scheme into a transportation network model
- 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)
- Conducted a simulation case study on a real-life test network in China

Tsinghua University, Beijing, China

2015.08 - Present

Institute for Interdisciplinary Information Sciences (IIIS)

Research Assistant, Advisor: **Prof. Longbo Huang**

Project 1: Management Scheme of Self-Driving Vehicles

- Utilized dynamic programming and stochastic networks methods
- Proved the upper bound of the total number of vehicles required for balancing
- Proposed a polynomial-time algorithm to obtain the optimal scheduling policy
- Successfully established a model simulation platform (based on Mathematica)

Ongoing project : Self-Driving Management with Queueing

- Co-advisor: **Dongning Guo**, Professor in the Department of Electrical Engineering & Computer Science, Northwestern University
- Applied fluid model and introduced queueing theory
- Proposed and proved several properties

Tsinghua University, Beijing, China

2015.01 - 2015.07

Institute of System Engineering, Department of Automation

Research Assistant, Advisor: **Prof. Jianming Hu**

Project: Dynamic Traffic Guidance Scheme Design

- Successfully designed a guidance scheme based on regional road networks and implemented simulation
- Designed and built a comprehensive traffic management system web client (> 9,000 lines of codes)

PATENTS & SOFTWARE COPYRIGHTS

- [1] Jianming Hu, Xin Pei, **Bai Liu**, *et al.* Variable Message Sign Information Release Method of Prediction Model. *Chinese Invention Patent*. Publication Number: CN105303856A. Publication Date: 2016.02.03.
- [2] Intelligent Networking Transportation Guidance System Platform [INGSP] V1.0. *Computer Software Copyright*. Registration Number: 2016SR252223. Date: 2016.06.01.

PROGRAMMING SKILLS

Proficient MATLAB (>20k lines), C/C++ (>20k lines), C# (>10k lines), \LaTeX
Familiar Wolfram, SQL, Oracle, Git, Javascript, HTML/CSS

LANGUAGE SKILLS

TOEFL iBT 107/120 (Reading 30, Listening 28, Speaking 23, Writing 26)
GRE 324/340+3.5/6.0 (Verbal 154, Quantitative 170, Analytical Writing 3.5)