

# BAI LIU

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## EDUCATION

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**Tsinghua University**, Beijing, China

2013.08 - 2017.07 (*expected*)

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

**Stanford University**, Stanford, CA, USA

2016.06 - 2016.09

- The Chinese Undergraduate Visiting Research (UGVR) Program, in which only 18 students were selected from China
- Undergraduate Visiting Research Assistant in the Department of Electrical Engineering

**Imperial College London**, London, UK

2016.01 - 2016.02

- Undergraduate Visiting Research Assistant in the Centre for Transport Studies

## Related Courses

- **Research:** Student Research Training (99/100), Literature Searching and Utilization (98/100)
- **Mathematics:** Introduction to Complex Analysis (99/100), Probability and Statistics (94/100), Linear Algebra (93/100), Numerical Analysis and Algorithms (93/100), Applied Stochastic Processes (92/100)
- **Programming:** Introduction to Systems Engineering (99/100), Multimedia Technology and Its Applications (99/100), C++ Programme Design and Training (94/100), Fundamental Pattern Recognition (94/100)

## PUBLICATIONS AND MANUSCRIPTS

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- [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. *14<sup>th</sup> 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*. Currently under review.
- [3] **Bai Liu**, Xiugang Wu, and Ayfer Özgür. Efficiently Reaching the Largest Wireless Capacity with the Fewest Relays. *In preparation for submission*.
- [4] 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.
- [5] Intelligent Networking Transportation Guidance System Platform [INGSP] V1.0. *Computer Software Copyright*. Registration Number: 2016SR252223. Date: 2016.06.01.

## RESEARCH EXPERIENCES

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**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

- Accomplished all work independently

**Tsinghua University**, Beijing, China

2015.08 - Present

*Institute for Interdisciplinary Information Sciences (IIIS)*

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

**Project 1: Management Scheme of Auto-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
- Extended the model to stochastic cases
- Successfully established a model simulation platform

**Ongoing project : Auto-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

**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 (> 3,000 lines of codes)
- Conducted a simulation case study on a real-life test network in China

**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 thorough simulation
- Designed and built a comprehensive traffic management system web client (> 9,000 lines of codes)

## HONORS AND AWARDS

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

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

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

**2016** Cai Xiong Scholarship (Awarded to students with excellent scientific potential, 0.5%)

**2015** Tsinghua Spark Talents Program (Undergraduate High-tech Club) Membership

**2014** China National Scholarship (Highest level of scholarship set by the government of China, 2%)

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

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

## TECHNICAL STRENGTHS

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|--------------------|--|
| <b>Programming</b> | Proficient in C/C++, MATLAB, Wolfram, C#, Javascript, HTML/CSS |
| <b>Tools</b>       | L <sup>A</sup> T <sub>E</sub> X, git, SQL, Oracle              |

## LANGUAGE SKILLS

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**TOEFL iBT** 107/120 (Reading 30, Listening 28, Speaking 23, Writing 26)

**GRE** 324/340+3.5/6.0 (Verbal 154/170, Quantitative 170/170, Analytical Writing 3.5/6.0)