

# Banghua Zhu

1# Zijing Apartment ◊ Tsinghua University ◊ Beijing 100084, P.R. China  
86-17888841922 (mobile) ◊ [13aeon.v01d@gmail.com](mailto:13aeon.v01d@gmail.com) ◊ <https://banghua.me>

## EDUCATION

---

**Tsinghua University**, Beijing, China 2014 - 2018(Expected)  
B.E.(Expected) Department of Electronic Engineering  
GPA: 95.2/100 Ranking 1<sup>st</sup>/234 in Department of Electronic Engineering  
Double Major in Mathematics

**The University of Texas at Austin**, TX, USA 2016.8 - 2016.12  
Exchange student at the Department of Electrical and Computer Engineering  
GPA: 4.0/4.0

## PUBLICATIONS AND MANUSCRIPTS

---

- [1] **Banghua Zhu**, Longzhuang He, Jintao Wang, Jian Song. Fast Sparse Bayesian Learning based Symbol Detection for Massive Spatial Modulation. *Oral Presentation on IEEE Broadcast Symposium 2016*.
- [2] Abolfazl Hashemi, **Banghua Zhu**, Haris Vikalo. Tensor Factorization Framework for Haplotype Assembly of Diploids and Polyploids. *Accepted by RECOMB-seq 2016*
- [3] **Banghua Zhu**, Jiantao Jiao, Yanjun Han, Tsachy Weissman. Boosting Decision Tree Learning by Optimal Split Scoring Function Estimation. *Currently being edited. See manuscript [here](#)*.
- [4] Yifan Chen\*, **Banghua Zhu**\*, Zuoqiang Shi. Impulsive Noise and Mixed Noise Removal via Low Dimensional Manifold Model. *Submitted to CVPR2018*.
- [5] Abolfazl Hashemi, **Banghua Zhu**, Haris Vikalo. Sparse Factorization Decomposition for Haplotype Assembly of Diploids and Polyploids. *To be published by BMC Genomics*

## RESEARCH EXPERIENCE

---

Electrical Engineering Department, Stanford University 2017.7 - present  
Advisor: **Prof. David Tse**

- Cleaned, processed and analyzed Pacbio, Illumina and Nanopore reads.
- Designed pipeline to assemble tandem repeats from hybrid reads and successfully applied that to Mucin 2 gene assembly.
- Developing integrated tools for analyzing and assembling tandem repeats.

Yau Mathematical Sciences Center, Tsinghua University 2017.1 - present  
Advisor: **Prof. Zuoqiang Shi**

- Applied point integral method to solve a Laplace-Beltrami equation for low dimensional manifold model.
- Demonstrated the superiority of low dimensional manifold model compared to low rank model in image denoising (On average  $> 3dB$  improvement in PSNR).

Department of Electrical Engineering, Stanford University 2016.11 - present  
Advisor: **Prof. Tsachy Weissman, Jiantao Jiao**

- Provided theoretical guarantee and empirical evidence to show the increase of decision tree performance when substituting maximum likelihood entropy estimator with minimax-rate optimal entropy estimator.
- Compared 13 entropy estimators to demonstrate the superiority of the JVHW estimator in decision tree learning and image registration.

Institute for Interdisciplinary Information Sciences, Tsinghua University 2016.8 - present  
Advisor: **Prof. Jianyang Zeng**

- Designed a deep neural network framework for distal interaction prediction in DNA sequence.
- Used transfer learning plus gradient boosting decision tree for extracting features of DNA sequence.
- Developing techniques for single cell DNA sequence interaction prediction.

Electrical and Computer Engineering Department, The University of Texas, Austin *2016.8 - 2016.12*  
 Advisor: **Prof. Haris Vikalo**

- Applied one hot encoding plus tensor factorization framework to polyploid haplotype assembly.
- Compared gradient descent, ISTA and FISTA in haplotype-assembly-related matrix completion problem.

Wireless Communication Group, Tsinghua University *2015.9 - 2016.8*  
 Advisor: **Prof. Jintao Wang**

- Designed fast sparse bayesian learning method for spatial modulation.
- Improved sparse bayesian learning to utilize the integer property in symbol detection.

## AWARDS

---

- 2017** Tsinghua Science and Innovation Scholarship (15 out of 3,000+ students at Tsinghua University)
- 2017** Bao Gang Excellent Student Scholarship (7 out of 3,000+ students at Tsinghua University)
- 2016** Qualcomm Scholarship (10 out of 240 students in the EE Dept.)
- 2016** National Scholarship (5 out of 240 students in the EE Dept.)
- 2015** National Scholarship (5 out of 240 students in the EE Dept.)
- 2015** Singapore Technologies Engineering China Scholarship (3 out of 240 students in EE Dept.)

## LEADERSHIP ACTIVITIES

---

Spark Program, Tsinghua University *2016.6 - present*  
**Director**

- Spark Program is a high-tech club in Tsinghua for innovative and creative students. Only around 50 students are selected into this program each year.
- Organized speaking sessions and activity rooms for interdisciplinary academic discussion.

Student Association for Science and Technology, Tsinghua University *2015.6 - present*  
**Deputy Director**

- The leader of the developers of teamstyle (An AI competition for artificial intelligence and programming in the EE Dept.) 3D game interface group.
- In charge of building the 3D interface of Team-style competition.
- Giving lectures on the usage of Github to students in EE Dept.

## TECHNICAL STRENGTHS

---

<b>Programming Languages</b>	Proficient in C/C++, Python, Matlab.
<b>Tools</b>	Familiar with C#, R, Verilog, SQL, Javascript, HTML/CSS vim, git, cmake, gcc, L <sup>A</sup> T <sub>E</sub> X, bash, Unreal Engine 4, samtools, daligner, HINGE, canu, bwa, bowtie, bowtie2 etc.

## LANGUAGE SKILLS

---

**English** Excellent listening, speaking, reading and writing abilities

- TOEFL iBT 106/120 (Reading 29, Listening 27, Speaking 23, Writing 27)
- GRE Verbal 156/170, Quantitative 170/170, Analytical Writing 4.5/6.0
- Exchange experience at UT Austin
- Internship experience at Stanford