# Zi **Wang**

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## Research Interest

Machine learning theory, algorithms and applications in related areas such as robotics, computer vision, data mining, speech, and visualization.

## Education

Sep. 2014 – now

Ph.D. Student in Electrical Engineering and Computer Science, ***Massachusetts Institute of Technology*** Cambridge, MA

- **GPA**: 5.0/5.0
- Courses: 6.856 Randomized Algorithms A+, 6.437 Inference and Information A, 6.832 Underactuated Robotics A, 6.830 Database Systems A.
- Master thesis (in progress): Optimization as Estimation with Gaussian Process Bandits
- Advisors: Prof. Stefanie Jegelka, Prof. Leslie Kaelbling, and Prof. Tomás Lozano-Pérez

2010 – 2014

B.Eng. in Computer Science and Technology, ***Tsinghua University*** Beijing, China

- **GPA**: 92/100, **Rank**: 2/129
- Relevant courses: Stochastic Mathematical Methods (Probability Theory and Random Process) 97, Introduction to Machine Learning 100, Introduction to Artificial Intelligence 99, Introduction to Complex Analysis 100, Numerical Analysis 94, Calculus 96, Discrete Mathematics 96, Physics for Scientists and Engineers 99, The Principles of Signal Processing 100.
- Undergraduate thesis: Fast Dropout Training for Deep Neural Networks (in Chinese)
- Thesis advisors: Prof. Fei Sha and Prof. Jun Zhu

## Honors & Awards

Aug. 2014 — Greater China Computer Science Fellowship, *MIT.* Cambridge, MA

Jul. 2014 — Outstanding Graduates Award, *Tsinghua.* Beijing, China

Nov. 2013 — Science and Innovation Scholarship, *awarded to 3% students.* Beijing, China

Sep. 2013 — Anita Borg Scholarship, *Google China.* Beijing, China

Oct. 2012 — Friendship of Tsinghua - ESS Scholarship, *awarded to 2% students.* Beijing, China

Oct. 2011 — Friendship of Tsinghua - Tung OOCL Scholarship, *awarded to 3% students.* Beijing, China

May 2010 — Tomorrow's Star of Shanghai's Science and Technology, *top 0.02%.* Shanghai, China

Feb. 2009 — Mathematical Contest in Modeling (MCM), *Honorable Mention.* Bedford, MA

## Research Experience

Sep. 2014 – now

**Research Assistant**, *Learning and Intelligent Systems Group.* Cambridge, MA

- Studied Gaussian process optimization, contextual and continuous bandit problems, etc.
- Proposed and implemented a MAP algorithm for GP optimization with applications to robotics/vision.
- Derived the theoretical bounds for the new method, and analyzed relations to other methods.

Feb. – May. 2014

**Research Assistant**, *Theoretical and Empirical Data Sciences Group.* Los Angeles, CA

- Researched auto-encoders, deep neural networks and dropout training.
- Derived and implemented fast training algorithm with regularizer via noise marginalization.
- Analyzed and compared performance of training with regularizer and training with dropout noise for deep neural networks both on CPU and GPU.

Mar. 2013 – Jul. 2014

**Research Assistant**, *State Key Lab of Intelligent Tech. & Systems.* Beijing, China

- Studied topic modeling, variational inference, Gibbs sampling and data augmentation.
- Implemented the prototype for scalable inference algorithm for correlated and dynamic topic models.
- Researched different evaluation methods, and compared perplexity results for variational LDA, Gibbs LDA, variational CTM, and our partially collapsed Gibbs sampling algorithm for CTM.
- Created hierarchical visualizations for 1000 topics learned from New York Times with graphviz, C#, D3.js.

Jul. – Aug. 2013

**Undergraduate Researcher**, *Theoretical and Empirical Data Sciences Group.* Los Angeles, CA

- Researched non-negative matrix factorization (NMF) with sparse coding for speech separation.
- Derived the algorithm and implemented the prototype for Discriminative NMF.
- Our method yields a 11.5% improvement on signal-to-noise ratio over traditional sparse NMF.

Dec. 2012 – May 2013

**Research Assistant**, *Future Internet Technology Sub-interest Group.* Beijing, China

- Competed in Baidu's Movie Recommendation Algorithm Contest representing the group.
- Implemented the recommendation algorithm based on Matrix Factorization and Random Forest.
- Analyzed the usefulness of data from previous ratings, social network, item tags and history viewing records.
- "The Most Innovative Design" at Baidu Workshop on Movie Recommendation Systems.

## Teaching Experience

Fall 2015

**Teaching Assistant**, *6.883 Learning with Discrete and Combinatorial Structure*, MIT

## Professional Service

2016

**Reviewer**, *AISTATS 2016.*

2013

**Volunteer**, *NIPS 2013.*

## Publication

**Z. Wang**, B. Zhou, S. Jegelka. **Optimization as Estimation with Gaussian Processes in Bandit Settings**. *International Conference on Artificial Intelligence and Statistics (AISTATS), 2016. Full oral presentation (6% acceptance rate).*

Z. Lu*, **Z. Wang***, F. Sha. **Fast Learning with Noise in Deep Neural Nets**. *NIPS 2014 Workshop: Perturbations, Optimization, and Statistics, Quebec, Canada, 2014.*

**Z. Wang**, F. Sha. **Discriminative Non-Negative Matrix Factorization for Single-Channel Speech Separation**. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Florence, Italy, 2014.*

J. Chen, J. Zhu, **Z. Wang**, X. Zheng, B. Zhang. **Scalable Inference for Logistic-Normal Topic Models**. *Neural Information Processing Systems (NIPS), Lake Tahoe, CA, 2013.*

## Skills

### Computer

C/C++, Java, C#, JavaScript, Matlab, Python, HTML, CSS, XML, LaTeX, Bash, VHDL, Verilog HDL, Assembly.

### Language

English, Chinese.