

**EDUCATION**

Master/PhD candidate in Electrical Engineering since Aug. 2012  
University of Washington, Seattle, WA  
Expected to graduate: June 2017  
GPA: 3.82/4.0

- Master concurrent program in Statistics
- Conference Travel Award: Interspeech 2012, NIPS 2015, ACL 2016
- Graduate School Fund for Excellence and Innovation, at University of Washington, 2016

Bachelor of Engineering in Electrical Engineering Sep. 2008 ~ Jun. 2012  
Tsinghua University, Beijing, China  
GPA: 92.2/100 (top 5%)

- Tsinghua Scholarship for Outstanding Academic Performance
- Singapore Technologies Engineering Ltd Scholarship
- Undergraduate exchange program to Washington University in St. Louis, MO

High School Affiliated to Nanjing Normal University, China Sep. 2005 ~ Jun. 2008

- Gold Medal (Total Best Score) of the 2008 Asian Physics Olympiad
- Graduation with Distinction

**PROFESSIONAL EXPERIENCE**

**Internship at Deep Learning Team, Microsoft Research** Mar. 2016 ~ Sep. 2016  
Project “Reinforcement Learning for Language Understanding”, mentor: Xiaodong He

- Formulate a language task involving reinforcement learning by predicting and tracking popular discussion threads
- Propose to use a bidirectional LSTM architecture for modeling Q-value in a combinatorial action space
- Investigate policy-based response generation in dialogue setting

**Internship at Deep Learning Team, Microsoft Research** Mar. 2015 ~ Sep. 2015  
Project “Customer Relation Management” (CRM), mentor: Li Deng

- Explore temporal deep neural network models and reinforcement learning in opportunity scoring
- Improve topic model training using back propagation algorithm, and verify large performance and runtime gain on large-scale text classification tasks
- Apply deep generative model on CRM data and show salient interpretable features

**Research Assistant at Signal, Speech and Language Interpretation Lab, University of Washington** Jul. 2012 ~ Mar. 2015  
Project “Broad Operational Language Technology” (BOLT), supervisor: Mari Ostendorf

- Improve Arabic name error and out-of-vocabulary (OOV) detection using maximum entropy classifier leveraging confusion network structural features, error prediction probability and lexical features
- A data-driven approach to learning sentence-level lexical features by training a predictor of whether a sentence has a name in it. Use of word n-gram vs. word class features is also explored.

**Internship at Alexa Team, Amazon.com, Inc.** Jun. 2014 ~ Sep. 2014

- Investigated utterance selection methods for in-domain language model training, in the application scenario of Amazon Echo and Fire TV voice search.

- Combined semi-supervised training approach with in-domain data and achieved significant reduction in perplexity. However ASR word error rate degraded. Used language model interpolation and optimized towards lattice-rescoring expected WER to avoid different behaviors in perplexity and WER. The results showed unsupervised transcription might be of little use.

**Research Assistant at Speech Technology and Research Laboratory (STAR Lab), SRI International** Jun. 2013 ~ Aug. 2013

Project “Broad Operational Language Technology” (BOLT), supervisor: Arindam Mandal

- Software engineering experience, including data preparation, feature extraction, classification and post-processing, in both batch and live system
- Explore new models: sequence models for error, out-of-vocabulary (OOV) and name error detection in speech recognition using conditional random fields, slight gain evaluated with receiver operating characteristic curve
- Improved Arabic OOV detection by incorporating new features including new recognizer confidence score, and automatically learned word classes

**Internship at Speech Group, Microsoft Research Asia** Jul. 2011 ~ Jun. 2012

Project “Turning a monolingual speaker into multi-lingual”, mentor Yao Qian

- Project webpage <http://research.microsoft.com/en-us/projects/mixedlangtts/>
- Used speaker adaptation techniques for mix-language speech synthesis with consistent voice, taking cross-lingual F0 variations and equalizing speaking rate into account, and improved both objective and subjective evaluations

**Research Assistant at Research Institute of Network and Human-Machine Speech Communication, Tsinghua University** Jul. 2010 ~ Jun. 2011

- Implemented pitch estimation algorithm and tested its sensitivity to additive noise
- Investigated both rule-based and statistical approaches in simultaneous speech detection
- Investigated statistical and computational auditory scene analysis approaches towards accompaniment/unvoice/voice classification, and studied their application on monaural audio separation

## SKILLS

### Programming Languages and Toolkits

- Work experience with C++, Matlab, Python; familiar with Bash, Java
- Familiar with sklearn, kaldi, RNNLM, hadoop

### Relevant Graduate-level Coursework

- Digital Signal Processing
- Computer Speech Processing
- Nonparametric Regression and Classification
- Machine Learning in Big Data

### Teaching Assistantship

- Discrete-Time Linear Systems: lead discussion sessions and a few lectures Spring 2014 & Winter 2016
- Probability and Random Process: Fall 2015

## PUBLICATIONS

**Ji He**, Mari Ostendorf, Xiaodong He, “Reinforcement Learning with External Knowledge and Two-Stage Q-functions for Predicting Popular Reddit Threads”, arXiv:1704.06217, 2017

**Ji He**, Mari Ostendorf, Xiaodong He, Jianshu Chen, Jianfeng Gao, Lihong Li, Li Deng, “Deep Reinforcement Learning with a Combinatorial Action Space for Predicting and Tracking Popular Discussion Threads”, EMNLP 2016

**Ji He**, Jianshu Chen, Xiaodong He, Jianfeng Gao, Lihong Li, Li Deng, Mari Ostendorf, “Deep Reinforcement Learning with a Natural Language Action Space”, ACL 2016

Xiujun Li, Lihong Li, Jianfeng Gao, Xiaodong He, Jianshu Chen, Li Deng, **Ji He**, “Recurrent Reinforcement Learning: A Hybrid Approach”, arxiv:1509.03044, 2015

Jianshu Chen, **Ji He**, Xiaodong He, Lin Xiao, Jianfeng Gao, and Li Deng, “Interpreting the Prediction Process of a Deep Network Constructed from Supervised Topic Models”, ICASSP 2016

Jianshu Chen, **Ji He**, Yelong Shen, Lin Xiao, Xiaodong He, Jianfeng Gao, Xinying Song, Li Deng, “End-to-end Learning of LDA by Mirror-Descent Back Propagation over a Deep Architecture”, NIPS 2015

Alex Marin, Mari Ostendorf, **Ji He**, “Learning Phrase Patterns for ASR Name Error Detection Using Semantic Similarity”, Interspeech 2015

**Ji He**, Alex Marin, Mari Ostendorf, “Effective Data-driven Feature Learning for Detecting Name Errors in Automatic Speech Recognition”, SLT Workshop 2014

**Ji He**, Yao Qian, Frank K. Soong, Sheng Zhao, “Turning a Monolingual Speaker into Multilingual for a Mixed-language TTS”, Interspeech 2012

## PATENTS

- Multiple-action computational model training and operation, 2016
- Training and operating multi-layer computational models, 2015
- Multi-model controller, 2015

## SPECIAL INTERESTS

- Chinese Students & Scholars Association, at University of Washington**      2012 ~ 2015
- Vice President of Event Planning; Board Advisor
  - Taking online Coursera courses, gym exercising, reading

## REFERENCES

Mari Ostendorf <ostendor@u.washington.edu>

- Professor at Department of Electrical Engineering, University of Washington

Xiaodong He <xiaohe@microsoft.com>

- Principal Researcher in the Deep Learning Technology Center of Microsoft

Li Deng <deng@microsoft.com>

- Partner Research Manager, Chief Scientist for AI at Microsoft Research

Stan Salvador <stansalvador@hotmail.com>

- Senior Research Scientist at Amazon

Frank K. Soong <frankkps@microsoft.com>

- Principal Researcher and Manager of the Speech Group, Microsoft Research Asia