

# Han Zhao | Curriculum Vitae

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## Research Interests

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Machine Learning and Artificial Intelligence, with particular interests in tractable probabilistic reasoning, invariant representation learning, and transfer and multitask learning.

## Education

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### Carnegie Mellon University

*PhD, Machine Learning Department, School of Computer Science*

- Advisor: Prof. Geoff Gordon

**Pittsburgh, PA, United States**

Sep. 2015 - May. 2020 (expected)

### University of Waterloo

*Master of Mathematics, Computer Science*

- Advisor: Prof. Pascal Poupart
- *Alumni Gold Medal Award, University of Waterloo*

**ON, Canada**

Sep. 2013 - May. 2015

### Tsinghua University

*Bachelor of Engineering, Department of Computer Science*

- *Distinguished Graduate of Tsinghua University*

**Beijing, China**

Aug. 2009 - July. 2013

### University of Waterloo

*Exchange Student, Computer Science*

- Advisor: Prof. Pascal Poupart

**ON, Canada**

Sep. 2012 - May. 2013

## Research and Industry Experience

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### SELECT Lab, Carnegie Mellon University

Research Assistant

- Research on efficient probabilistic inference, adversarial representational learning, and deep learning
- Advisor: Prof. Geoff Gordon

Sep. 2015 - Present

### Petuum, Inc.

Parttime Research Intern

- Worked on missing-value imputation with deep generative models

Jan. 2019 - May. 2019

### The D. E. Shaw Group

Quantitative Research Intern

- Worked on fill-rate prediction using modern machine learning approaches
- Mentor: Dr. Stephen Curran

May. 2018 - Aug. 2018

### Microsoft Research AI&R, Redmond

Research Intern

- Worked on data-driven speech enhancement with convolutional-recurrent neural networks
- Mentors: Dr. Ivan Tashev and Dr. Shuayb Zarar

May. 2017 - Aug. 2017

### Baidu USA. Silicon Valley AI Lab

Research Intern

- Worked on domain adaptation for speech recognition using adversarial neural networks
- Director: Prof. Andrew Ng. and Dr. Adam Coates

May. 2016 - Aug. 2016

### Google Inc.

Software Engineer Intern

- Worked with Jerred Costanzo on text matching for advertising

May. 2015 - Aug. 2015

### Noah's Ark Lab & The Chinese University of Hong Kong.

Sep. 2014 - Feb. 2015

Research Intern

- Deep learning on short sequence summarization for natural language processing
- Advisor: Dr. Zhengdong Lu and Dr. Hang Li

**Artificial Intelligence Group, University of Waterloo**

Jan. 2013 - May. 2015

Research Assistant

- Worked on spectral learning on probabilistic graphical models
- Advisor: Prof. Pascal Poupart

**Complex Network Lab, University of Notre Dame**

June. 2012 - Aug. 2012

Research Assistant

- Proposed and implemented a novel global network alignment between PPI networks
- Advisor: Prof. Tijana Milenković

**Natural Language Processing Group, Tsinghua University**

July. 2011 - April. 2012

Undergraduate Research Assistant

- Built a keyword extraction application on Netease Weibo for interest mining
- Advisor: Prof. Zhiyuan Liu

## Peer-Reviewed Conference Publications

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- [C1] **H. Zhao**, A. Coston, T. Adel and G. Gordon, "Conditional Learning of Fair Representations". In *Proceedings of the 8th International Conference on Learning Representations (ICLR 2020)*.
- [C2] T. Adel, **H. Zhao** and R. E. Turner, "Continual Learning with Adaptive Weights (CLAW)". In *Proceedings of the 8th International Conference on Learning Representations (ICLR 2020)*.
- [C3] **H. Zhao** and G. Gordon, "Inherent Tradeoffs in Learning Fair Representations". In *Proceedings of the 33rd Advances in Neural Information Processing Systems (NeurIPS 2019)*.
- [C4] **H. Zhao**<sup>\*</sup>, Y. H. Tsai<sup>\*</sup>, R. Salakhutdinov and G. Gordon, "Learning Neural Networks with Adaptive Regularization". In *Proceedings of the 33rd Advances in Neural Information Processing Systems (NeurIPS 2019)*.
- [C5] **H. Zhao**, O. Stretcu, A. Smola and G. Gordon, "Efficient Multi-task Feature and Relationship Learning". In *Proceedings of the 35th conference on Uncertainty in Artificial Intelligence (UAI 2019)*.
- [C6] **H. Zhao**<sup>\*</sup>, Y. Xu<sup>\*</sup>, X. Shi and N. B. Shah, "On Strategyproof Conference Peer Review". In *Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI 2019)*.
- [C7] **H. Zhao**, R. Tachet, K. Zhang and G. Gordon, "On Learning Invariant Representation for Domain Adaptation". In *Proceedings of the 36th International Conference on Machine Learning (ICML 2019)*.
- [C8] **H. Zhao**, J. Hu, Z. Zhu, A. Coates and G. Gordon, "Deep Generative and Discriminative Domain Adaptation". In *Proceedings of the 18th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2019)*.
- [C9] C. Liang, J. Ye, **H. Zhao**, B. Pursel and C. Lee Giles, "Active Learning of Strict Partial Orders: A Case Study on Concept Prerequisite Relations". In *Proceedings of the 12th International Conference on Educational Data Mining (EDM 2019)*.
- [C10] **H. Zhao**<sup>\*</sup>, S. Zhang<sup>\*</sup>, G. Wu, J. Costeira, J. Moura and G. Gordon, "Adversarial Multiple Source Domain Adaptation". In *Proceedings of the 32nd Advances in Neural Information Processing Systems (NeurIPS 2018)*.
- [C11] **H. Zhao** and G. Gordon, "Frank-Wolfe Optimization for Symmetric-NMF under Simplicial Constraint", In *Proceedings of the 34th conference on Uncertainty in Artificial Intelligence (UAI 2018)*.
- [C12] **H. Zhao**, S. Zarar, I. Tashev and C.-H. Lee, "Convolutional-Recurrent Neural Networks for Speech Enhancement". In *Proceedings of 2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2018)*.
- [C13] **H. Zhao** and G. Gordon, "Linear Time Computation of Moments in Sum-Product Networks". In *Proceedings of the 31st Advances in Neural Information Processing Systems (NIPS 2017)*.

- [C14] T. Adel, **H. Zhao** and A. Wong, “Unsupervised Domain Adaptation with a Relaxed Covariate Shift Assumption”. In *Proceedings of the 31st AAAI Conference on Artificial Intelligence (AAAI 2017)*.
- [C15] **H. Zhao**, P. Poupart and G. Gordon, “A Unified Approach for Learning the Parameters of Sum-Product Networks”. In *Proceedings of the 30th Advances in Neural Information Processing Systems (NIPS 2016)*.
- [C16] P. Jaini, A. Rashwan, **H. Zhao**, Y. Liu, E. Banijamali, Z. Chen and P. Poupart, “Online Algorithms for Sum-Product Networks with Continuous Variables”. In *Proceedings of the 8th International Conference on Probabilistic Graphical Models (PGM 2016)*.
- [C17] **H. Zhao**, T. Adel, G. Gordon and B. Amos, “Collapsed Variational Inference for Sum-Product Networks”. In *Proceedings of the 33rd International Conference on Machine Learning (ICML 2016)*.
- [C18] A. Rashwan, **H. Zhao** and P. Poupart, “Online and Distributed Bayesian Moment Matching for SPNs”. In *Proceedings of the 19th International Conference on Artificial Intelligence and Statistics (AISTATS 2016)*.
- [C19] **H. Zhao**, M. Melibari and P. Poupart, “On the Relationship between Sum-Product Networks and Bayesian Networks”. In *Proceedings of the 32nd International Conference on Machine Learning (ICML 2015)*.
- [C20] **H. Zhao**, Z. Lu and P. Poupart, “Self-Adaptive Hierarchical Sentence Model”. In *Proceedings of the 24th International Joint Conference on Artificial Intelligence (IJCAI 2015)*.
- [C21] **H. Zhao**, P. Poupart, Y. Zhang and M. Lysy, “SoF: Soft-Cluster Matrix Factorization for Probabilistic Clustering”. In *Proceedings of the 29th AAAI Conference on Artificial Intelligence (AAAI 2015)*.
- [C22] T. Milenković, **H. Zhao** and F. Faisal, “Global Network Alignment in the Context of Aging”. In *Proceedings of the 4th ACM International Conference on Bioinformatics, Computational Biology and Biomedicine (ACM-BCB 2013)*.

## Journal Publications

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- [J1] F. Faisal, **H. Zhao** and T. Milenković, “Global Network Alignment in the Context Of Aging”. In *IEEE/ACM Transactions on Computational Biology and Bioinformatics (IEEE/ACM TCBB 2014)*.

## Peer-Reviewed Workshop Publications

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- [W1] **H. Zhao**, A. Coston, T. Adel and G. Gordon, “Conditional Learning of Fair Representations”. In *Workshop on Machine Learning with Guarantees (NeurIPS 2019)*.
- [W2] **H. Zhao\***, J. Chi\*, Y. Tian and G. Gordon, “Adversarial Privacy Preservation under Attribute Inference Attack”. In *Workshop on Machine Learning with Guarantees (NeurIPS 2019)*.
- [W3] **H. Zhao\***, Y. H. Tsai\*, R. Salakhutdinov and G. Gordon, “Approximate Empirical Bayes for Deep Neural Networks”. In *Uncertainty in Deep Learning workshop (UAI 2018)*.
- [W4] **H. Zhao\***, S. Zhang\*, G. Wu, J. Costeira, J. Moura and G. Gordon, “Multiple Source Domain Adaptation with Adversarial Learning”. In *Proceedings of the 6th International Conference on Learning Representations (ICLR 2018, workshop track)*.
- [W5] Y. H. Tsai, **H. Zhao**, R. Salakhutdinov and N. Jojic, “Discovering Order in Unordered Datasets: Generative Markov Networks”. In *Time Series workshop (NIPS 2017, arXiv:1711.03167)*.
- [W6] **H. Zhao**, O. Stretcu, R. Negrinho, A. Smola and G. Gordon, “Efficient Multi-task Feature and Relationship Learning”. In *Learning with Limited Labeled Data: Weak Supervision and Beyond workshop (NIPS 2017, arXiv:1702.04423)*.
- [W7] **H. Zhao** and P. Poupart, “A Sober Look at Spectral Learning”. In *Method of Moments and Spectral Learning workshop (ICML 2014, arXiv:1406.4631)*.

## Pre-print and Technical Reports

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[T1] **H. Zhao**, Z. Zhu, J. Hu, A. Coates and G. Gordon, "Principled Hybrids of Generative and Discriminative Domain Adaptation" (arXiv:1705.09011)

## Patents

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[P1] I. Tashev, S. Zarar, C-H. Lee, Y-H. Tu and **H. Zhao**, "Systems, methods, and computer-readable media for improved real-time audio processing". US Patent. US 15/952,353.

## Conference and Invited Talks

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### Inherent Tradeoffs in Learning Invariant Representations

- o Massachusetts Institute of Technology Oct. 2019
- o Brandeis University Nov. 2019

### Learning Neural Networks with Adaptive Regularization

- o ShanghaiTech University Aug. 2019
- o New York University, Shanghai Aug. 2019
- o Tencent AI Lab Aug. 2019
- o Noah's Ark Lab, Huawei Aug. 2019
- o Toutiao AI Lab, ByteDance Aug. 2019
- o Amazon AWS AI Lab, Shanghai Sep. 2019
- o Borealis AI Lab, Waterloo Sep. 2019
- o University of Waterloo, Waterloo Sep. 2019

### On Strategyproof Conference Peer Review

- o International Joint Conference on Artificial Intelligence Aug. 2019

### On Learning Invariant Representations for Domain Adaptation

- o Microsoft Research Seminar series, Microsoft Research Montreal Lab May. 2019
- o International Conference on Machine Learning June 2019

### Multiple Source Domain Adaptation with Adversarial Learning

- o AI seminar, Carnegie Mellon University Apr. 2018
- o Microsoft Research Seminar series, Microsoft Research Montreal Lab Sep. 2018
- o Technical seminar, Petuum Inc. Oct. 2018
- o Technical seminar, Pony. AI Nov. 2018

### High-Accuracy Neural-Network Models for Speech Enhancement

- o Microsoft Research Seminar series, Microsoft Research Redmond Lab Aug. 2017
- o IEEE International Conference on Acoustics, Speech and Signal Processing Apr. 2018

### Sum-Product Networks: A New Probabilistic Inference Machine

- o AI seminar, Carnegie Mellon University Mar. 2017

### Collapsed Variational Inference for Sum-Product Networks

- o International Conference on Machine Learning June 2016

### On the Relationship between Sum-Product Networks and Bayesian Networks

- o AI seminar, University of Waterloo Mar. 2015
- o International Conference on Machine Learning July 2015

### Self-Adaptive Hierarchical Sentence Model

- o AI seminar, University of Waterloo Mar. 2015
- o Technical seminar, Google Apr. 2015
- o International Joint Conference on Artificial Intelligence July 2015
- o AI lunch, Jump Trading Nov. 2017

### SoF: Soft-Cluster Matrix Factorization for Probabilistic Clustering'

- o Association for the Advancement of Artificial Intelligence Jan. 2015

## Honors and Awards

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### Scholarships

- Tsinghua University Scholarship for Academic Excellence 2010-2012
- Google Excellence Scholarship 2012
- Liu Jimin Scholarship, Tsinghua University 2012
- Mathematics Graduate Experience Award, University of Waterloo 2013
- David R. Cheriton Graduate Scholarship, University of Waterloo 2013-2015
- International Masters Student Award, University of Waterloo 2013-2015
- Graduate Research Scholarship, University of Waterloo 2013-2015

### Awards

- Alumni Gold Medal Award, University of Waterloo 2015
- Distinguished Graduate of Tsinghua University 2013
- Second Prize in Contributions for Laboratory Construction, Tsinghua University 2011
- Most Popular Application in the Design of Social Oriented System in Microblogs 2011
- Third Place in the poster competition of the 2012 REU Program, University of Notre Dame. Sponsored by the National Science Foundation 2012
- ICML Travel Award 2015-2016, 2019
- NIPS/NeurIPS Travel Award 2016-2019
- ICLR Travel Award 2018

## Professional Activities

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### Conference Reviewer/Program Committee Member

- Reviewer, Advances in Neural Information Processing Systems (NIPS/NeurIPS) 2016, 2018-2019
- Reviewer, International Conference on Machine Learning (ICML) 2017-2020
- Reviewer, International Conference on Artificial Intelligence and Statistics (AISTATS) 2017-2020
- Reviewer, International Conference on Learning Representations (ICLR) 2019-2020
- Reviewer, International Conference on Computer Vision (ICCV) 2019
- Reviewer, Conference on Computer Vision and Pattern Recognition (CVPR) 2020
- Reviewer, European Conference on Computer Vision (ECCV) 2020
- Reviewer, IEEE Workshop on Statistical Signal Processing (SSP) 2016
- Reviewer, Workshop on Adaptive & Multitask Learning: Algorithms & Systems (ICML) 2019
- Reviewer, Workshop on Statistical Deep Learning in Computer Vision (ICCV) 2019
- PC member, AAAI Conference on Artificial Intelligence (AAAI) 2019-2020
- PC member, International Joint Conference on Artificial Intelligence (IJCAI) 2020
- PC member, Asian Conference on Machine Learning (ACML) 2019
- PC member, Deep Generative Models Workshop, ICML 2018
- PC member, Workshop on Tractable Probabilistic Models, ICML 2018
- PC member, Workshop on Principled Approaches to Deep Learning, ICML 2017
- PC member, Workshop on Learning with Rich Experience: Integration of Learning Paradigms, NeurIPS 2019

### Journal Reviewer

- IEEE Computational Intelligence Magazine 2019
- Neural Computing 2019
- Transactions on Audio, Speech and Language Processing (TASLP) 2019
- Pattern Analysis and Applications 2019
- PLoS One 2016-2018
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2016, 2017
- Machine Learning Journal (MLJ) 2017, 2019
- IEEE Access 2017, 2019
- Journal of Machine Learning (JMLR) 2016

## Teaching Experience

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Instructor, TechX Academy

- Advanced Introduction to Deep Learning Aug. 2019
- Teaching Assistant, Tsinghua University**
- Introduction to Information Retrieval Sep. 2011 - May. 2012
- Teaching Assistant, University of Waterloo**
- Designing Functional Programs Sep. 2013 - Jan. 2014
- Teaching Assistant, Carnegie Mellon University**
- Introduction to Machine Learning Jan. 2016 - May. 2016
- Convex Optimization Sep. 2016 - Jan. 2017
- Undergraduate Computational Complexity Theory Jan. 2018 - May. 2018

## University Service

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### Carnegie Mellon University

- Machine Learning Department, PhD admission committee 2017
- Machine Learning Department, PhD speaking skills committee 2018 - Present
- School of Computer Science, coordinator of AI Seminar 2018 - Present