Hao He

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA — 2017 - present
Ph.D. student in Computer Science
M.S. in Computer Science — 2017 - Feb 2020
• Advisor: Prof. Dina Katabi GPA: 5.0/5.0

Peking University, China — 2013 - 2017
B.S. in Computer Science
• Major GPA: 3.93/4.00 (top 1%)

EXPERIENCE

Research Assistant, MIT — Sep 2017 to Present
Advisor: Prof. Dina Katabi

Health-care Solutions with Wireless Sensing and Machine Learning

• The first model to predict oxygenation from breathing signals. Enable the WiFi-based remote sensing of blood oxygen level.
• Propose a new concept of *continousuly indexed domain adaptation*. The method brings significant improvement for health care applications like sleep stage classification.
• Propose the first convolutional neural network for WiFi-based fall detection.
• Propose the first WiFi-based respiration monitoring system that can recover the breathing signals of multiple individuals even when they are separated by zero distance.

Deep Learning for System Design

• Propose the first graph neural network that optimizes high-frequency (THz) circuits.

Research Intern, Microsoft Research — Sep 2016 to Aug 2017
Mentor: David Wipf

Neural Sparse Bayesian Learning Algorithm

• Propose a novel RNN that solves hard sparse matrix inverse problem with a theory of translating the Sparse Bayesian Learning algorithm to recurrent neural network cell.

Mentor: Stephen Lin

White Box Photo Post-Processing Framework

• Propose the first reinforcement learning augmented GANs framework for photo retouching under arbitary resolutions.

PUBLICATIONS

Google Scholar Profile

* indicates co-primary authors.

MANUSCRIPTS

Controlling Directions Orthogonal to a Classifier
Yilun Xu, **Hao He**, Tianxiao Shen, Tommi S. Jaakkola. *in Submission.*

Graph-Relational Domain Adaptation
Zihao Xu, **Hao He**, Guang-He Lee, Bernie Wang, Hao Wang. *in Submission.*

Contactless Oxygen Monitoring with Gated Neural Predictor
Hao He*, Yingcong Chen*, Yuan Yuan*, Dina Katabi. *in Submission.*

Making Contrastive Learning Robust to Shortcuts
Tianhong Li*, Lijie Fan*, Yuan Yuan, **Hao He**, Yonglong Tian, Dina Katabi. *in Submission.*

Making Indoor RF-Based Localization Work Around Corners
Shichao Yue*, **Hao He***, Peng Cao*, Masayuki Koizumi, Dina Katabi. *in Submission.*

CONFERENCE PAPERS

Continuously Indexed Domain Adaptation.

Hao Wang*, **Hao He***, Dina Katabi.
International Conference on Machine Learning (ICML), 2020.

Learning Compositional Koopman Operators for Model-Based Control
Yunzhu Li*, **Hao He***, Jiajun Wu, Dina Katabi, Antonio Torralba
International Conference on Learning Representations (ICLR), 2020, **(Spotlight)**.

Circuit-GNN: Graph Neural Networks for Distributed Circuit Design
Hao He*, Guo Zhang*, Dina Katabi.
International Conference on Machine Learning (ICML), 2019.

ProbGAN: Towards Probabilistic GAN with Theoretical Guarantees
Hao He, Hao Wang, Guang-He Lee, Yonglong Tian.
International Conference on Learning Representations (ICLR), 2019.

Hierarchical Bidirectional Inference Networks for Health Profiling
Hao Wang, Chengzhi Mao, **Hao He**, Mingmin Zhao, Tommi S Jaakkola, Dina Katabi.
The Thirty-Third AAAI Conference on Artificial Intelligence (AAAI), 2019.

RF-Based Fall Monitoring Using Convolutional Neural Networks
Yonglong Tian*, Guang-He Lee*, **Hao He***, Chen-Yu Hsu, Dina Katabi.
ACM International Joint Conference on Pervasive and Ubiquitous Computing, 2018.

Extracting Multi-Person Respiration from Entangled RF Signals
Shichao Yue, **Hao He**, Hao Wang, Hariharan Rahul, Dina Katabi.
ACM International Joint Conference on Pervasive and Ubiquitous Computing, 2018.

Exposure: A White-Box Photo Post-Processing Framework
Yuanming Hu, **Hao He**, Chenxi Xu, Baoyuan Wang, Stephen Lin.
ACM Transactions on Graphics (TOG), 2018.

From Bayesian Sparsity to Gated Recurrent Nets
Hao He, Bo Xin, Satoshi Ikehata, David Wipf.
Conference on Neural Information Processing Systems (NeurIPS), 2017, **(Oral Presentation)**.

WORKSHOP PAPERS

Domain Adaptation with Factorizable Joint Shift
Hao He, Yuzhe Yang, Hao Wang.
Uncertainty & Robustness in Deep Learning Workshop, ICML, 2021.

Training-Free Uncertainty Estimation for Dense Regression
Lu Mi, Hao Wang, Yonglong Tian, **Hao He**, Nir Shavit.
Uncertainty & Robustness in Deep Learning Workshop, ICML, 2021.

Learning Caching Policies with Subsampling
Haonan Wang, **Hao He**, Mohammad Alizadeh, Hongzi Mao.
Machine Learning for Systems Workshop, NeurIPS, 2019.

Towards Safe Online Reinforcement Learning in Computer Systems
Hongzi Mao, Malte Schwarzkopf, **Hao He**, Mohammad Alizadeh.
Machine Learning for Systems Workshop, NeurIPS, 2019.

SERVICES

Program Committee for AAAI	2022
Reviewer for ICLR, CVPR	2022
Program Committee for AAAI, UAI	2021
Reviewer for ICLR, CVPR, ICML (top 10%), ICCV	2021
Program Committee for AAAI, IJCAI, UAI	2020
Reviewer for ICML (top 33%), NeurIPS	2020
Program Committee for UAI, GraphReason@ICML, GraphLearning@NeurIPS	2019
Reviewer for ICML, NeurIPS	2019
Program Committee for TADGM@ICML	2018

COURSES

System: Computer Network (6.892) (A+)
AI: Algorithm for Inference (6.438) (A), Information and Inference (6.437) (A), Fundamentals of Probability(6.436) (A), Bayesian Modelling and Inference (6.882) (A), Non-Asymptotic Statistics (9.521) (PE)
Theory: Learning-Augmented Algorithms (6.890) (A), An Algorithmist's Toolkit (18.408) (A+)

AWARDS

- National Scholarship for Excellent Academic Performance, China (highest, twice)
- Arawana Scholarship for Excellent Academic Performance, Peking University
- ACM-ICPC 2015 Asia Regional Shenyang Site, Gold Medal
- ACM-ICPC 2014 Asia Regional Anshan Site, Gold Medal