Haiyun He

Curriculum Vitae

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Cornell University, Ithaca, NY 14853
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https://haiyun-he.github.io

Research Interests

Information theory (hypothesis testing, inference and estimation), statistical learning, machine learning, wireless communications

Education

2018-2022 **National University of Singapore**,
Ph.D. in Electrical and Computer Engineering,
Thesis topic: "Fundamental Performance Limits of Statistical Problems: From Detection Theory to Semi-Supervised Learning".
Advisor: Prof. Vincent Y. F. Tan

2016-2017 **National University of Singapore**,
M.Sc. in Electrical Engineering,
Project topic: "Joint Altitude and Beamwidth Optimization for UAV-Enabled Wireless Communications".
Advisor: Prof. Rui Zhang

2012-2016 **Beihang University (BUAA/Beijing University of Aeronautics and Astronautics), Beijing, China**,
B.Eng. in Electrical and Information Engineering.

Professional Experience

Jan 2023– **Postdoctoral Associate**, Cornell University, USA.
Hosted by Prof. Ziv Goldfeld and Prof. Christina Lee Yu

Jun 2022-Dec 2022 **Postdoctoral Fellow**, National University of Singapore, Singapore.
Hosted by Prof. Vincent Y. F. Tan

Jan 2020-Apr 2020 **Visiting Student**, University of Toronto, Toronto, Canada.
Hosted by Prof. Ashish Khisti

Feb 2018-Jul 2018 **Research Engineer**, National University of Singapore, Singapore.
Hosted by Prof. Vincent Y. F. Tan

Feb 2016-Jun 2016 **CSC Exchange Undergraduate Student**, Polytechnic University of Turin, Turin, Italy.
Department of Electronics and Telecommunications

Publications

Preprints

[1] **Haiyun He**, Christina Lee Yu, Ziv Goldfeld, "Information-Theoretic Generalization Bounds for Deep Neural Networks", Submitted to journal in Apr. 2024 [arXiv].

Journal Papers

[4] **Haiyun He**, Hanshu Yan and Vincent Y. F. Tan, "Information-Theoretic Characterization of the Generalization Error for Iterative Semi-Supervised Learning", Journal of Machine Learning Research, Vol.23, No. 287, Pages 1–52, Aug. 2022 [arXiv].

[3] **Haiyun He**, Qiaosheng (Eric) Zhang and Vincent Y. F. Tan, "Optimal Change-Point Detection with Training Sequences in the Large and Moderate Deviations Regimes", IEEE Transactions on Information Theory, Vol. 67, No. 10, Pages 6758–6784, Oct. 2021 [arXiv].

[2] **Haiyun He**, Lin Zhou and Vincent Y. F. Tan, "Distributed Detection with Empirically Observed Statistics", IEEE Transactions on Information Theory, Vol. 66, Pages 4349–4367, Jul. 2020 [arXiv].

[1] **Haiyun He**, Shuowen Zhang, Yong Zeng and Rui Zhang, "Joint Altitude and Beamwidth Optimization for UAV-Enabled Multiuser Communications", IEEE Communications Letters, Vol. 22, No. 2, Pages 344–347, Feb. 2018 [arXiv].

Conference Papers

[5] **Haiyun He**, Christina Lee Yu, Ziv Goldfeld, "Hierarchical Generalization Bounds for Deep Neural Networks", ISIT 2024, Athens, Greece.

[4] **Haiyun He**, Christina Lee Yu, Ziv Goldfeld, "Information-Theoretic Generalization Bounds for Deep Neural Networks", NeurIPS InfoCog Workshop 2023 **(Contributed Talk)** [link].

[3] **Haiyun He**, Gholamali Aminian, Yuheng Bu, Miguel Rodrigues, Vincent Y. F. Tan, "How Does Pseudo-Labeling Affect the Generalization Error of the Semi-Supervised Gibbs Algorithm?", Proc. of 26th International Conference on Artificial Intelligence and Statistics (AISTATS), Valencia, Spain, Apr. 2023 (AR $\approx$ 29%) [arXiv].

[2] **Haiyun He**, Qiaosheng (Eric) Zhang and Vincent Y. F. Tan, "Optimal Resolution of Change-Point Detection with Empirically Observed Statistics and Erasures", ISITA 2020, Virtual Conference.

[1] **Haiyun He**, Lin Zhou, and Vincent Y. F. Tan, "Distributed Detection with Empirically Observed Statistics", ITW 2019, Visby, Gotland, Sweden.

Teaching Experience

Instructor
- AY 22/23/24 Cornell ORIE 4741/5741 Learning with Big Messy Data

Teaching Assistant
- AY 18/19 NUS EE4603 Biomedical Imaging Systems
- AY 19–22 NUS EE5139 Information Theory and its Applications
- AY 20/21 NUS CG2023 Signals and Systems
- AY 20/21 NUS EE5137 Stochastic Processes

Honors and Awards

2023 Cornell CAM Postdoctoral Fellowship

2022 EECS Rising Stars

2021 EASIT 2021 Best Poster Award

2018 NUS Research Scholarship, 2018-2022

2016 Outstanding Graduate of Beihang University

2015 "Internet+" Innovation and Entrepreneurship Competition top 10 in Beijing, top 50 in China (*Project of Smart Band*)

2015 Honorable Mention of COMAP's Mathematical Contest in Modeling (MCM)

2013,2014 First-class Scholarship of Beihang University

Presentations and Academic Activities

2024 ITA 2024, San Diego, USA
Talk: *"Information-Theoretic Generalization Bounds for Deep Neural Networks"*

2023 NeurIPS InfoCog Workshop 2023, New Orleans, USA
Contributed Talk: *"Information-Theoretic Generalization Bounds for Deep Neural Networks"*

2023 ICLR 2023, Kigali, Rwanda
Poster: *"Information-Theoretic Characterization of the Generalization Error for Iterative Semi-Supervised Learning"*

2023 AISTATS 2023, Valencia, Spain
Poster: *"How Does Pseudo-Labeling Affect the Generalization Error of the Semi-Supervised Gibbs Algorithm?"*

2023 ITA 2023, San Diego, USA
Talk: *"Information-Theoretic Characterization of the Generalization Error for Iterative Semi-Supervised Learning"*

2022 EASIT 2022, Virtual Conference
Poster: *"Information-Theoretic Characterization of the Generalization Error for Iterative Semi-Supervised Learning"*

2021 BIID'9, Virtual Conference
Main program talk: *"Optimal Change-Point Detection with Training Sequences in the Large and Moderate Deviations Regimes"*

2021 EASIT 2021, Virtual Conference
Poster: *"Optimal Change-Point Detection with Training Sequences in the Large and Moderate Deviations Regimes"*

2021 CSCIT 2021, Virtual Conference

2020 ISITA 2020, Virtual Conference
Oral presentation: "Optimal Resolution of Change-Point Detection with Empirically Observed Statistics and Erasures"

2019 ITW 2019, Visby, Gotland, Sweden
Oral presentation: "Distributed Detection with Empirically Observed Statistics"

2019 CSCIT 2019, CUHK, Hong Kong, China
Poster: "Distributed Detection with Empirically Observed Statistics"

2018 ISIT 2018, Vail, Colorado, USA

2017 GlobeComm 2017, Singapore (Volunteer)

Academic Service

Conference Reviewer
- Annual AAAI Conference on Artificial Intelligence (2024)
- Internation Conference on Machine Learning (ICML) (2022, 2023)
- International Symposium on Information Theory (ISIT) (2020–2024)
- Conference on Neural Information Processing Systems (NeruIPS) workshops (2023)
- China Communications, 2018
- IEEE International Conference on Communications Workshops (ICC Workshops), 2018

Journal Reviewer
- Journal of Machine Learning Research
- IEEE Transactions on Information Theory
- IEEE Communications Letters
- IEEE Transactions on Signal Processing
- IEEE Transactions on Signal and Information Processing over Networks
- IEEE Internet of Things Journal
- IEEE Transactions on Neural Networks and Learning Systems
- Neurocomputing
- Journal of Intelligent & Fuzzy Systems

Skills

Programming Languages: Matlab , Python , C/C++

Languages: Chinese (Native), Cantonese (Native), English (Fluent)

Interests

- Music, Movie, Swimming, Japanese