

Heming Wang

474 Dreese Laboratories
2015 Neil Avenue
The Ohio State University
Columbus, OH 43202, USA

Phone: 614-286-7961
wang.11401@osu.edu
Homepage: whmrtm.github.io

- EDUCATION** **The Ohio State University**, Columbus, OH, USA August 2018 - Present
Advisor: Prof. DeLiang Wang
Ph.D. student, Computer Science and Engineering
- University of Waterloo**, Waterloo, ON, Canada August 2016 - May 2018
Advisor: Prof. Richard Mann & Prof. Edward Vrscay
Master of Mathematics, Applied Mathematics
- University of Waterloo**, Waterloo, ON, Canada August 2014 - May 2016
Bachelor of Science, Physics
- Harbin Institute of Technology**, Harbin, HL, China August 2012 - May 2014
Electric Science and Technology
- PROFESSIONAL SUMMARY** My name is Heming Wang, and I am currently a fifth-year Ph.D. student in Computer Science and Engineering at the Ohio State University, advised by Prof. DeLiang Wang. My research interests focus on speech enhancement, self-supervised learning and generative AI.
- PUBLICATIONS** **H. Wang**, E. W. Healy and D. L. Wang, “Combined Generative and Predictive Modeling for Speech Super-resolution,” *arXiv preprint arXiv:2401.14269*, 2024.
- M. Yang, C. Zhang, Y. Xu, Z. Xu, **H. Wang**, B. Raj and D. Yu. “uSee: Unified Speech Enhancement and Editing with Conditional Diffusion Models.” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
- L. Zhang, Y. Qian, L. Yu, **H. Wang**, X. Wang, H. Yang, L. Zhou, S. Liu, Y. Qian and M. Zeng, “Diffusion Conditional Expectation Model for Efficient and Robust Target Speech Extraction,” *arXiv preprint arXiv:2309.13874*, 2023.
- H. Wang**, M. Yu, H. Zhang, C. Zhang, Z. Xu, M. Yang, Y. Zhang and D. Yu, “Unifying Robustness and Fidelity: A Comprehensive Study of Pretrained Generative Methods for Speech Enhancement in Adverse Conditions,” *arXiv preprint arXiv:2309.09028*, 2023.
- Z. Xu, Y. Xu, V. Kothapally, **H. Wang**, M. Yang and D. Yu, “SpatialCodec: Neural Spatial Speech Coding,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
- H. Wang** and D. L. Wang, “Cross-Domain Diffusion Based Speech Enhancement for Very Noisy Speech,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.

H. Wang, Yao. Q, H. Yang, N. Kanda, P. Wang, T. Yoshioka, X. Wang, Y. Wang, S. Liu, Z. Chen and others, “DATA2VEC-SG: Improving Self-Supervised Learning Representations for Speech Generation Tasks,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.

H. Wang, X. Zhang, and D. L. Wang, “Fusing Bone-conduction and Air-conduction Sensors for Complex-Domain Speech Enhancement,” *IEEE/ACM Transactions on Audio, Speech, and Language Processing (IEEE/ACM TASLP)*, Vol. 30, pp. 3134-3143. 2022.

Y. Zhang, **H. Wang**, and D. L. Wang, “Densely-connected Convolutional Recurrent Network for Fundamental Frequency Estimation in Noisy Speech,” in the 23th Annual Conference of the International Speech Communication Association (**INTERSPEECH**), pp. 401-405, 2022.

H. Wang, Y. Qian, X. Wang, Y. Wang, C. Wang, S. Liu, T. Yoshioka, J. Li and D. L. Wang, “Improving Noise Robustness of Contrastive Speech Representation Learning with Speech Reconstruction,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 6062-6066, 2021.

Y. Wang, J. Li, **H. Wang**, Y. Qian, C. Wang and Y. Wu, “Wav2vec-Switch: Contrastive Learning from Original-noisy Speech Pairs for Robust Speech Recognition,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 7097-7101, 2021.

H. Wang, X. Zhang and D. L. Wang, “Attention-based Fusion for Bone-conducted and Air-conducted Speech Enhancement in the Complex Domain,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 7757-7761, 2021.

H. Wang and D. L. Wang, “Cross-domain Speech Enhancement With A Neural Cascade Architecture,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 7862-7866, 2021.

H. Wang and D. L. Wang, “Neural Cascade Architecture with Triple-domain Loss for Speech Enhancement,” in *IEEE/ACM Transactions on Audio, Speech, and Language Processing (IEEE/ACM TASLP)*, vol. 30, pp. 734-743, 2021.

H. Wang and D. L. Wang, “Towards Robust Speech Super-resolution,” in *IEEE/ACM Transactions on Audio, Speech, and Language Processing (IEEE/ACM TASLP)*, vol. 29, pp. 2058-2066, 2021.

H. Wang and D. L. Wang, “Time-Frequency Loss for CNN Based Speech Super-Resolution,” in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 861-865, 2020.

H. Wang, R. Mann, and E. R. Vrscaj, “A Diffusion-Based Two-Dimensional Empirical Mode Decomposition Algorithm for Image Analysis,” in *International Conference*

Image Analysis and Recognition (ICAR), pp. 293-305, 2018.

RESEARCH EXPERIENCES

Research Intern
May-August 2023

Tencent AI Lab
Seattle, Washington, United States

- Nearfield sound resynthesis with vocoder / codec / self-supervised learning models

Research Intern
May-August 2022

Microsoft Inc.
Seattle, Washington, United States

- Use self-supervised learning to improve generative performance of speech representations

Research Intern
May-August 2021

Microsoft Inc.
Seattle, Washington, United States

- Use self-supervised learning to improve robust automatic speech recognition

Graduate Research Assistant
August 2018 - Present

The Ohio State University
Columbus, Ohio, USA

- Speech enhancement
- Self-supervised learning
- Generative AI

Graduate Research Assistant
August 2016 - May 2018

University of Waterloo
Waterloo, Ontario, Canada

- Real-time signal processing for ultrasound
- Empirical mode decomposition for signal analysis
- Bayesian methods for blind source separation

Undergraduate Research Assistant
May-August 2015

University of Waterloo
Waterloo, Ontario Canada

- Formant synthesis for English vowels
- Real-time spectrum analysis using MyDAQ

COMPUTER SKILLS

Python, C++, Bash, MATLAB, Pytorch, Tensorflow, Keras.

AWARDS

University Fellowship
The Ohio State University

2018

Entrance Scholarship
Department of Physics & Astronomy, University of Waterloo

2014

ACADEMIC SERVICES

Reviewer: IEEE/ACM Transactions on Audio, Speech, and Language Processing, IEEE Internet of Things Journal, Cybernetics and Systems, IEEE International Conference on Acoustics, Speech, and Signal Processing