Alan Q. Wang

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Education

2019 – 2024 **Ph.D., Cornell University** in Electrical and Computer Engineering, minor in Biomedical Engineering.
Thesis: "Interpretable, Robust, and Controllable Machine Learning Methods for Medical Imaging"
Committee: Mert Sabuncu (advisor), Chris Xu, Jayadev Acharya

2015 – 2019 **B.Sc., University of Illinois at Urbana-Champaign** in Computer Engineering.
Thesis: "Structural Consistency for Diverse Video Colorization with Deep Learning"

Research Experience

2019 – 2024 **Graduate Researcher.** Cornell University
Advisor: Mert Sabuncu

2022 **Research Intern.** Google

2021 **Research Intern.** Google

2019 **Research Intern.** MIT Lincoln Laboratory

Research Publications

Journal Articles

1. A. Q. Wang, B. K. Karaman, H. Kim, J. Rosenthal, R. Saluja, S. I. Young, and M. R. Sabuncu, "A Framework for Interpretability in Machine learning For Medical Imaging," *IEEE Access*, 2024.
2. M. Aghasizade, A. Kiyoumarsioskouei, S. Hashemi, M. Torabinia, A. Caprio, M. Rashid, Y. Xiang, H. Rangwala, T. Ma, B. Lee, A. Q. Wang, M. Sabuncu, S. C. Wong, and B. Mosadegh, "A Coordinate-Regression-Based Deep-Learning Model for Catheter Detection During Structural Heart Interventions," *Applied Sciences*, 2023.
3. T. Ma, A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "Hyper-Convolutions Via Implicit Kernels for Medical Image Analysis," *Medical Image Analysis*, 2023.
4. A. Q. Wang and M. R. Sabuncu, "A Flexible Nadaraya-Watson Head Can Offer Explainable and Calibrated Classification," *Transactions on Machine Learning Research*, 2023.
5. A. Q. Wang, E. M. Yu, A. V. Dalca, and M. R. Sabuncu, "A Robust and Interpretable Deep Learning Framework for Multi-Modal Registration Via Keypoints," *Medical Image Analysis*, 2023.
6. G. Zhou, Y. Chen, C. Chien, L. Revatta, J. Ferdous, M. Chen, S. Deb, S. D. L. Cruz, A. Q. Wang, B. Lee, M. Sabuncu, W. Browne, H. Wun, and B. Mosadegh, "Deep Learning Analysis of Blood Flow Sounds to Detect Arteriovenous Fistula Stenosis," *NPJ Digital Medicine*, 2023.
7. A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "Computing Multiple Image Reconstructions with a Single Hypernetwork," *Machine Learning for Biomedical Imaging*, 2022.
8. C. D. Bahadir, A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "Deep-Learning-Based Optimization of the Under-Sampling Pattern in MRI," *IEEE Transactions on Computational Imaging*, 2020.

Conference Papers

1. X. He, A. Q. Wang, and M. R. Sabuncu, "Neural Pre-Processing: A Learning Framework for End-to-End Brain MRI Pre-processing," in *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2023.
2. M. Nguyen, A. Q. Wang, H. Kim, and M. R. Sabuncu, "Robust learning via conditional prevalence adjustment," in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2023.
3. A. Q. Wang, M. Nguyen, and M. R. Sabuncu, "Learning Invariant Representations with a Nonparametric Nadaraya-Watson Head," in *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
4. E. M. Yu, A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "KeyMorph: Robust Multi-modal Affine Registration via Unsupervised Keypoint Detection," in *Medical Imaging with Deep Learning (MIDL)*, 2022.
5. A. Q. Wang, A. K. LaViolette, L. Moon, C. Xu, and M. R. Sabuncu, "Joint Optimization of Hadamard Sensing and Reconstruction in Compressed Sensing Fluorescence Microscopy," in *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2021.

Workshop Papers

1. A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "HyperRecon: Regularization-Agnostic CS-MRI Reconstruction with Hypernetworks," in *Machine Learning for Medical Image Reconstruction at MICCAI*, 2021.
2. A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "Neural Network-Based Reconstruction in Compressed Sensing MRI Without Fully-Sampled Training Data," in *Machine Learning for Medical Image Reconstruction at MICCAI*, 2020.
3. J. Zhang, H. Zhang, A. Q. Wang, Q. Zhang, M. Sabuncu, P. Spincemaille, T. D. Nguyen, and Y. Wang, "Extending LOUPE for k-Space Under-Sampling Pattern Optimization in Multi-coil MRI," in *Machine Learning for Medical Image Reconstruction at MICCAI*, 2020.

Teaching

Fall 2022 — **Teaching Assistant.** Applied Digital Signal Processing and Communications (ECE 5415).
Graduate-level course at Cornell Tech
Held office hours, answered online forum questions, and conducted recitations/lectures

Spring 2020 — **Teaching Assistant.** Digital Signal and Image Processing (ECE 4250).
Upper and graduate-level course at Cornell University
Held office hours, answered online forum questions, and conducted recitations/lectures

Fall 2019 — **Teaching Assistant.** Machine Learning (CS 446).
Upper-level course at University of Illinois
Responsible for grading assignments and holding office hours

Service

- **Reviewer.** IEEE Transactions on Image Processing, Medical Image Analysis, Neurocomputing, WACV, MELBA
- **Organizer.** Machine Learning in Medicine (MLIM) Seminar Series

Invited Talks

Apr 2024
- **Vector Institute**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"
- **CNS Lab at Stanford University**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"

Feb 2024
- **NYU Langone Division of Precision Medicine**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"

Jan 2024
- **MLxMed Seminar at University of Pittsburgh**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"
- **Northern Illinois University**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"
- **MIT CSAIL**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"
- **A.A. Martinos Center for Biomedical Imaging**. "Towards Reliable and Trustworthy Machine Learning Methods in Medical Imaging"

Nov 2023
- **BioMedIA Seminar at UCL**. "Robust and Interpretable Multi-modal Image Registration with KeyMorph"
- **Causal Reading Group**. "A Nonparametric Approach to Learning Causal Representations"

Jun 2023
- **Cornell University Summer Research Seminar**. "A Nonparametric Approach to Classification Based on the Nadaraya-Watson Estimator"

Awards

2023
- **DAAD AInet Fellow**. "Awarded twice a year to a group of outstanding international early career researchers in the field of artificial intelligence."

2021
- **MICCAI Student Travel Award**

2019
- **Cornell Fellowship Award**

Mentoring

2022
- Aanika Jain, high school student

2020
- Leo Moon, Cornell undergraduate student
- Mayur Bhandary, Cornell Tech Master's student