

Alan Q. Wang

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Education

- 2019 – 2024 📖 **Ph.D., Cornell University** in Electrical and Computer Engineering.
Thesis: "Interpretability, Robustness, and Controllability in 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

Preprints

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," 2023.

Journal Articles

1. M. Aghasizade, A. Kiyoumarsioskouei, S. Hashemi, M. Torabinia, A. Caprio, M. Rashid, Y. Xiang, H. Rangwala, T. Ma, B. Lee, A. 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.
2. 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.
3. A. Q. Wang and M. R. Sabuncu, "A Flexible Nadaraya-Watson Head Can Offer Explainable and Calibrated Classification," *Transactions on Machine Learning Research*, 2023.
4. 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.
5. G. Zhou, Y. Chen, C. Chien, L. Revatta, J. Ferdous, M. Chen, S. Deb, S. D. L. Cruz, A. 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.
6. A. Q. Wang, A. V. Dalca, and M. R. Sabuncu, "Computing Multiple Image Reconstructions with a Single Hypernetwork," *Machine Learning for Biomedical Imaging*, 2022.
7. 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. 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. 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

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| 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

- 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