Hao Liang

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Research Focus

Generative models for 3D avatars and human-centered computer vision. Additional interests include model robustness, explainability, and fairness in face analysis, as well as distributed learning frameworks such as federated learning.

Education

Rice University, Ph.D. in Electrical and Computer Engineering	2021 – 2026
Carnegie Mellon University, M.S. in Electrical and Computer Engineering	2018 – 2020
University of Electronic Science and Technology of China, B.E. in Electrical Engineering	2014 – 2018

Experience

Research Assistant, Rice University/Samsung Research America, Supervisor: Prof. Guha Balakrishnan — 2021 – Present

- FastAvatar: Designed a feed-forward conditional Gaussian Splatting model that reconstructs realistic 3D human avatars from a single unconstrained image in real-time, bridging the gap toward "instant 3D" avatars.
- Causal Benchmarking: Developed a synthetic dataset of human faces with attributes changing using GANs and Human annotations as labels, used it to analyze existing Face Recognition Algorithms to identify a causal relationship between attributes and the bias of models.
- Bias and Kernel Size: Proposed a framework to understand to linking between the model bias and the model architectural design choice.

Research Associate, Carnegie Mellon University, Supervisor: Prof. Giulia Fanti — 2020 - 2021

- RareGAN: Designed an algorithm to efficiently generate samples from rare classes in GANs.

Research Assistant, Carnegie Mellon University, Supervisor: Prof. Gauri Joshi — 2018 - 2020

- FedNOVA: Designed algorithms on computational and communicational efficient Federated Learning (FL), solved the problem of heterogeneous goals in FL.

Selected Publications

FastAvatar: Instant 3D Gaussian Splatting for Faces from Single Unconstrained Poses
Hao Liang, Guha Balakrishnan, Submitted to 3DV 2026

Linking convolutional kernel size to generalization bias in face analysis CNNs
Hao Liang, Josue Ortega Caro Vikram Maheshri, Ankit B Patel, Guha Balakrishnan, WACV 2024

Benchmarking Algorithmic Bias in Face Recognition: An Experimental Approach Using Synthetic Faces and Human Evaluation
Hao Liang, Pietro Perona Guha Balakrishnan, ICCV 2023

Visualizing chest X-ray dataset biases using GANs
Hao Liang, Kevin Ni Guha Balakrishnan, MIDL 2023

Tackling the objective inconsistency problem in heterogeneous federated optimization
Jianyu Wang, Qinghua Liu, *Hao Liang*, Gauri Joshi Vincent Poor, NeurIPS 2020

Services

Reviewer: NeurIPS, ICCV, ECCV, CVPR, ICML, ICLR, ICASSP, AISTATS, AAAI, IEEE Transactions on Signal Processing

Workshop co-organizer: First Workshop on Experimental Model Auditing via Controllable Synthesis (EMACS) at CVPR 2025