Mingyang Xie

✉ mingyang@umd.edu
🌐 mingyangx.github.io
in mingyangx

Research Interests

I am broadly interested in computer vision (CV), with a focus on computational photography, computational imaging, and low-level to mid-level vision. I am actively looking for research internships.

Education

2021–2026   **University of Maryland**, *College Park, MD, USA*
Ph.D. in Computer Science. GPA: *3.81/4.0.*
Expected to graduate in May 2026.
Advisor: Christopher Metzler

2017–2021   **Washington University in St. Louis**, *St. Louis, MO, USA*
B.S. in Computer Science. GPA: *3.99/4.0.*
Summa Cum Laude (Graduated with highest honors).
Advisors: Ulugbek Kamilov, Brendt Wohlberg

Publications & Preprints

* denotes equal contribution.

Preprint   **Flash-Splat: 3D Reflection Removal with Flash Cues and Gaussian Splats**
M. Xie*, H. Cai*, S. Shah, Y. Xu, B. Feng, J. Huang, C. Metzler.
Under Review at ECCV 2024.

CVPR 2024   **WaveMo: Learning Wavefront Modulations to See Through Scattering**
M. Xie*, H. Guo*, B. Feng, L. Jin, A. Veeraraghavan, C. Metzler.
Conference on Computer Vision and Pattern Recognition (CVPR), 2024

Preprint   **Snapshot High-Dynamic-Range Imaging with a Polarization Camera**
M. Xie*, M. Chan*, C. Metzler.
Arxiv. [Paper Link]

Science Advances   **NeuWS: Neural Wavefront Shaping for Guidestar-Free Imaging Through Static and Dynamic Scattering Media**
B. Feng*, H. Guo*, M. Xie, V. Boominathan, M. Sharma, A. Veeraraghavan, C. Metzler.
Science Advances, 2023. [Science.org Frontpage Cover] [Paper Link]

IEEE JSAIT   **TurbuGAN: An Adversarial Learning Approach to Spatially-varying Multiframe Blind Deconvolution with Applications to Imaging Through Turbulence.**
B. Feng*, M. Xie*, C. Metzler.
IEEE Journal on Selected Areas in Information Theory, 2022. [Paper Link]

WACV 2022   **PROVES: Establishing Image Provenance using Semantic Signatures**
M. Xie, M. Kulshrestha, S. Wang, J. Yang, A. Chakrabarti, N. Zhang, Y. Vorobeychik.
Winter Conference on Applications of Computer Vision (WACV), 2022. [Paper Link]

IEEE TCI   **CoIL: Coordinate-Based Internal Learning for Tomographic Imaging**
Y. Sun, J. Liu, M. Xie, B. Wohlberg, U. S. Kamilov.
IEEE Transactions on Computational Imaging (TCI), 2021. [Paper Link]

ICCVW 2021   **Joint Reconstruction and Calibration Using Regularization by Denoising with Application to Computed Tomography**

M. Xie*, J. Liu*, Y. Sun, B. Wohlberg, U. S. Kamilov.

International Conference on Computer Vision Workshops (ICCVW), 2021. [Paper Link]

Research Experiences

Spring 2024   **3D Transmission / Reflection Separation using Flash Cues and Gaussian Splats**

University of Maryland. Advised by Christopher Metzler.

- Developed a novel approach for separating transmitted and reflected 3D scenes by using Gaussian Splatting and unpaired flash and no-flash multi-view images.

2023   **Learning Wavefront Modulations for Imaging Through Scattering**

University of Maryland. Advised by Christopher Metzler & Ashok Veeraraghavan.

- Developed the 1st guidestar-free approach for wide-field-of-view & high-resolution imaging through non-sparse dynamic scattering media via neural representation.
- Further developed a real-time ($1000\times$ faster) approach by optimizing a sequence of phase patterns displayed on a spatial light modulator (SLM) via end-to-end learning.

Spring 2023   **Single-shot High Dynamic Range Imaging Using Polarization Camera**

University of Maryland. Advised by Christopher Metzler.

- Developed a novel single-shot HDR imaging methodology with a polarization camera.
- Demonstrated 4dB improvement over software-only single-shot HDR baselines.

2022   **Generative Adversarial Learning for Spatially Varying Blind Deconvolution**

University of Maryland. Advised by Christopher Metzler.

- Developed a self-supervised image restoration GAN based on distribution matching.
- Achieved SOTA performance on imaging through air turbulence.

2021   **Tomographic Reconstruction Using Continuous Neural Representation.**

Washington University in St. Louis. Advised by Ulugbek Kamilov & Brendt Wohlberg.

- Developed a CT image reconstruction approach using implicit neural representation.
- Demonstrated 1 dB improvement over baselines.

Awards

March 2024   Qualcomm Innovation Fellowship Finalist

August 2023   International Conference on Computational Photography 2023 Best Poster Award

June 2022   Runner-Up Award for CVPR 2022 5th UG2+ Atmospheric Turbulence Mitigation

2021 - 2022   Dean's Fellowship – University of Maryland

2018 - 2019   Dean's List – Washington University in St. Louis

Technical Skills

Languages   Python, Matlab, C++

Optical Lab   Spatial Light Modulator (SLM), Holographic Capture, 4F System, Interferometer

Other Tools   Arduino, 3D Printing, Laser Cutting, AutoCAD, Fusion 360