

Mingyang Xie

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Research Interests

I am broadly interested in computer vision and machine learning, with a focus on computational photography and generative AI. I am actively looking for research internships for 2025.

The majority of my research projects involve dealing with degraded or unsatisfactory images/videos, including 3D reflection removal with Gaussian Splatting, 2D reflection removal with diffusion model, blind deconvolution with GAN, descattering, and HDR imaging with polarization camera, medical imaging, etc.

Education

- 2021–2026 **University of Maryland, College Park, MD, USA**
Ph.D. in Computer Science. GPA: 3.81/4.0.
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.

- In Submission to CVPR **Flash-Split: Single-view Reflection Removal with Flash Cues and Latent Diffusion**
T. Fu*, [M. Xie*](#), H. Cai, C. Metzler.
- ECCV 2024 **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.
European Conference on Computer Vision, 2024. [[Project Page](#)]
- 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, 2024. [[Project Page](#)] [[Paper Link](#)]
- 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 JSAT **TurboGAN: 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, 2022. [[Paper Link](#)]

IEEE TCI **CoLL: 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

Fall 2024 **2D Transmission / Reflection Separation using Diffusion Model**

University of Maryland. Advised by [Christopher Metzler](#).

- Developed a novel diffusion-model-based approach using flash cues and latent space separation.
- Achieved significantly better performance than previous state-of-the-art methods.

Fall 2024 **Masked Language Modeling for Video-Language Models**

University of Maryland. Advised by [Paola Cascante-Bonilla](#).

- Analyzed how masked language modeling affects the temporal reasoning ability of various video-language models.

Summer 2024 **Languaged-guided Video Color Tonemapping**

Research Internship at *Dolby Laboratories*. Advised by Vijay Kamarshi.

- Developed a diffusion-model-based approach for language-guided video color tone-mapping.

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× 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.

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.

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