# Mingyang Xie

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## Research Interests

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

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## 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

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## Publications & Preprints

\* denotes equal contribution.

**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 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, 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

**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 $1^{st}$ 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