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 looking for research internships for 2024.

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.

Under Review **Snapshot High-Dynamic-Range Imaging with a Polarization Camera**
M. Xie*, M. Chan*, C. Metzler.
Under Review, 2023. [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

Fall 2023 **Neural Radiance Fields with Severe Reflection/Transmission Superposition**

University of Maryland. Advised by Christopher Metzler.

- Developed a novel reflection/transmission separation methodology for NeRF.
- Enabled robust novel view synthesis under highly specular reflections.

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 - 2023 **Imaging Through Scattering Media by Wavefront Shaping**

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 the set of phase patterns displayed on a spatial light modulator (SLM) via end-to-end learning.

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

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++

Libraries PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, Pandas

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

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