

Yuyuan Han

Computational imaging & robust image-free sensing

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I design optical measurements for single-pixel imaging and train networks that operate directly on the measurements, without reconstructing an image.

Education & Research Appointments

Xi'an Jiaotong University · PhD student

2022–present

Electronic Science and Technology · Master's-to-PhD track · Advisor: Huaibin Zheng

Politecnico di Milano · Visiting PhD student

Oct 2026–present

Department of Physics · Supervisor: Antonio Pifferi

Northwest University · B.Eng.

2018–2022

Electronic Information Science and Technology

Selected Research

The Lift Spectrum · Robust image-free sensing

Preprint

[arXiv](#) · 2026 · [Paper](#) · [Code](#)

- Showed that, without reconstruction, the 1D-to-2D lift is the design problem; mapped the lift spectrum.
- Proposed STSF + TPLS: +3.2–9.9 mIoU over the prior image-free method (SPIFS); near-constant accuracy down to 0.78% sampling; up to +21.7 mIoU over clean-trained reconstruct-then-segment at 20 dB noise.

Sparse Hadamard single-pixel imaging

[Optics Express](#) · 2025 · [Paper](#) · [Code](#)

- Introduced tunable sparsity into orthogonal Hadamard patterns: noise-robust imaging through scattering, low-order matrices that save memory, no training or post-processing.

LDGI · Optical phased-array imaging

[Optics Communications](#) · 2025 · [Paper](#) · [Code](#)

- Showed that line patterns from one-dimensional optical phased arrays break the noise symmetry of ghost-imaging denoising; proposed LDGI (orders-of-magnitude gains), validated optically.

Current Research

Acquisition-aware single-pixel sensing with optical-bench tests (manuscript in preparation); question answering on single-pixel measurements (exploratory). Planned at Politecnico di Milano: time-domain diffuse optical tomography.

Additional Experience

Photonic device modeling · Modeled and optimized electro-optic phased-array geometries for beam steering.

Optical system integration · Led mechanical design, optical alignment and system integration; participated in underwater field tests.

Award & Service

2024 · Second Prize, National Post-Graduate Mathematical Contest in Modeling · [Code](#)

Reviewer · IEEE Transactions on Image Processing, IEEE Transactions on Computational Imaging, Optics Express, Optics Letters (13 verified reviews, 2025–2026)

Publications

Peer-reviewed journal articles

- 01 Chong Wang, Hao Lu, **Yuyuan Han**, Huaibin Zheng, Yuchen He. [Graph-Regularized Estimation for Inverse Problems in Computational Optical Imaging](#). *IEEE Transactions on Image Processing* 35, 9314–9326 (2026). doi:10.1109/TIP.2026.3726365
- 02 Jingwei Li, **Yuyuan Han**, Aoxiang Chen, Pengpeng Li, Xinglin Zhu, Guanbao Zhao, Luohan Peng, Huaibin Zheng. [Optical Phased Arrays on Photonic Integrated Circuit Platforms: Challenges, Opportunities, and Future Applications](#). *Nanophotonics* 15(14), e70182 (2026). doi:10.1002/nap2.70182
- 03 **Yuyuan Han**, Peng Wu, Hanxiong Xu, Bin Li, Yuchen He, Jianbin Liu, Hui Chen, Huaibin Zheng. [Generalized sparse Hadamard single-pixel Imaging](#). *Optics Express* 33(20), 43324–43341 (2025). doi:10.1364/OE.576533
- 04 **Yuyuan Han**, Huaibin Zheng, Bin Li, Jingwei Li, Long Qiu, Wenxuan Hao, Zheng Dang, Hui Chen, Jianbin Liu, Yuchen He, Yanyan Liu, Zhuo Xu. [Loop differential ghost imaging based on line pattern](#). *Optics Communications* 580, 131589 (2025). doi:10.1016/j.optcom.2025.131589
- 05 Jingwei Li, Huaibin Zheng, **Yuyuan Han**, Bin Li, Wenxuan Hao, Long Qiu, Yanyan Liu, Yuchen He, Xiaoyong Wei, Zhuo Xu. [Design and analysis of single-electrode integrated lithium niobate optical phased array for two-dimensional beam steering](#). *Optics and Lasers in Engineering* 184, 108617 (2025). doi:10.1016/j.optlaseng.2024.108617
- 06 Long Qiu, Huaibin Zheng, **Yuyuan Han**, Bin Li, Wenxuan Hao, Zheng Dang, Yuanlin Yu, Jiawei Li, Hanxiong Xu, Hui Chen, Jianbin Liu, Yuchen He, Yanyan Liu, Zhuo Xu. [Fusion of near-infrared single-photon LiDAR with visible light camera](#). *Measurement Science and Technology* 36(6), 065409 (2025). doi:10.1088/1361-6501/addddf
- 07 Huaibin Zheng, **Yuyuan Han**, Long Qiu, Yanfeng Zong, Jingwei Li, Yu Zhou, Yuchen He, Jianbin Liu, Gao Wang, Hui Chen, Zhuo Xu. [Long-Range Imaging LiDAR with Multiple Denoising Technologies](#). *Applied Sciences* 14(8), 3414 (2024). doi:10.3390/app14083414
- 08 Yanfeng Zong, Huaibin Zheng, Xinwei Wu, Jingwei Li, Long Qiu, **Yuyuan Han**. [Sequence-Controlled Pseudothermal Optical Ghost Imaging System](#). *Acta Optica Sinica* 43(7), 0711001 (2023). doi:10.3788/AOS221781

Preprints

- 09 **Yuyuan Han**, Jingwei Li, Xiaoxia Zhang, Long Qiu, Chong Wang, Wenxuan Hao, Jiangyu Han, Xinyu Yao, Yuchen He, Hui Chen, Jianbin Liu, Huaibin Zheng. [The Lift Spectrum: How Measurement-to-Space Adaptivity Shapes Robustness in Image-Free Single-Pixel Sensing](#). *arXiv* (2026). doi:10.48550/arXiv.2607.22077

Research Code

STSF-TPLS · Image-free segmentation from single-pixel measurements with a content-adaptive lift and task-prioritized loss scheduling; code and pretrained weights (PyTorch).

Comparison-of-SPI-DLs · Eight deep architectures and a classical inverse, benchmarked on one shared Hadamard acquisition (PyTorch).

SHSI · Sparse Hadamard single-pixel imaging: pattern generation and reconstruction (MATLAB).

LDGI · Loop differential ghost imaging for line patterns from optical phased arrays (MATLAB).

TGIs-Entry · Reference implementations of traditional, differential and normalized ghost imaging (MATLAB).

remote-gpu-trainer · Open-source agent skill for Claude Code and Codex that runs, verifies and delivers GPU experiments (60+ stars).