

Shenghao Zheng

zhengshenghao666@gmail.com — +86 13298119850 — Research Gate — Google Scholar
Personal Academic Website: Zheng Shenghao

RESEARCH INTERESTS

Computational imaging, Miniaturized device design, Computer Vision
Deep learning methods and its applications in solving inverse imaging problems.

EDUCATION

Harbin Institute of Technology, Harbin, China

Master of Engineering in School of Instrumentation of Science and Engineering

Sept. 2022 — Jun. 2024

Cumulative GPA: 85.8/100

Harbin Institute of Technology, Harbin, China

Bachelor of Engineering in School of Instrumentation of Science and Engineering

Aug. 2018 — Jun. 2022

Cumulative GPA: 88.95/100

Ranking: 4/53 Percentage: 7.55%

RESEARCH EXPERIENCE

Lensless imaging method based on mask modulation

June 2022 – June 2024

- Designed and set up the lensless masked imaging (LMI) system for data collection.
- Proposed a self-calibrated phase retrieval (SCPR) method that can jointly retrieve the binary amplitude mask and the complex wave field of a sample.
- Introduced the idea of wavefront decoupling into LMI systems, which was commonly used in ptychographic iterative engine (PIE) imaging systems.
- Proposed an enhanced self-calibrated phase retrieval (eSCPR) method that can realize single-shot, dynamic LMI.

Dual-constrained physics-enhanced untrained neural network for lensless imaging

June 2022 - October 2023

- Constructed the basic workflow of the self-supervised untrained DPENet with Mr. Zehua Wang.
- Set up the lensless imaging system and assisted in completing the data collection work.
- Assisted in replying to reviews' comments.

Lensfree auto-focusing imaging with coarse-to-fine tuning method

June 2022 – June 2024

- Constructed the basic backbone of the sFocusNet with Mr. Zhihui Ding.
- Set up the experimental system and assisted in completing the data collection work.
- Assisted in replying to reviews' comments.

Lensfree brick-assembled microscopy based on prior-guided phase retrieval (on preparing)

March 2024–Present

- Designed a brick-assembled lensfree microscopy, providing a toy-based microscopic platform for preschool education.
- Proposed a prior-guided phase retrieval algorithm that can reconstruct the complex wavefield of samples with high quality and low running time.

PUBLICATIONS

Journal paper

- **Shenghao Zheng**, Fannuo Xu, and Cheng Guo, "Single-shot lensless masked imaging with enhanced self-calibrated phase retrieval," *Optics Letters* 49, 3934-3937 (2024)
- **Shenghao Zheng**, Zhihui Ding, Rui Jiang, and Cheng Guo, "Lensless masked imaging with self-calibrated phase retrieval," *Optics Letters* 48, 3279-3282 (2023)
- Zehua Wang, **Shenghao Zheng**, Zhihui Ding, and Cheng Guo, "Dual-constrained physics-enhanced untrained neural network for lensless imaging," *Journal of the Optical Society of America A* 41, 165-173 (2024)
- Zhihui Ding, **Shenghao Zheng**, Feilong Zhang, Qiang Li, Cheng Guo. "Lensfree auto-focusing imaging with coarse-to-fine tuning method." *Optics and Lasers in Engineering* 181, 108366 (2024)
- Cheng Guo, Xianming Liu, Feilong Zhang, Yongbin Du, **Shenghao Zheng**, Zehua Wang, Xiaoqing Zhang, Xingchi Kan, Zhengjun Liu, and Weibo Wang, "Lensfree on-chip microscopy based on single-plane phase retrieval," *Optics Express* 30, 19855-19870 (2022)

- Cheng Guo, Feilong Zhang, Xianming Liu, Qiang Li, **Shenghao Zheng**, Jiubin Tan, Zhengjun Liu, Weibo Wang.
"Lensfree auto-focusing imaging using nuclear norm of gradient." Optics and Lasers in Engineering 156, 107076 (2022)

SELECTED COURSES

Master's Courses

- Nonlinear optics Grade: 90/100
- Numerical Analysis B Grade: 93/100

Bachelor's Courses

- Linear Algebra and Analytic Geometry B Grade: 98/100
- Calculus B(1) Grade: 95/100
- Calculus B(2) Grade: 95/100
- Complex Function and Integral Transformation Grade: 94/100
- Engineering Optics (1) Grade: 91.3/100
- Engineering Optics (2) Grade: 93.5/100
- Electromagnetic Fields Grade: 95.1/100

AWARDS

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| The 16th National Smart Car Competition
First prize in the North division | China
2021 |
| The 9th National University Students' Opt-Sci-Tech Competition
Second prize | China
2021 |
| The 10th National University Students' Opt-Sci-Tech Competition
Second prize in the North-East division | China
2022 |
| The 11th National University Students' Opt-Sci-Tech Competition
Second prize in the North-East division | China
2023 |
| TI Cup Heilongjiang Province Graduate Electronics Design Contest
Second prize | China, Heilongjiang
2020.11 |
| Outstanding graduate student | China, Harbin Institute of Technology, 2022. |

SELECTED PROFESSIONAL SKILLS AND PERSONAL INTERESTS

Experiment Skills: Construct different kinds of lensless imaging systems including lensless on-chip imaging systems, lensless masked imaging systems, PIE imaging systems et al. Perform the experimental system to achieve the expected results.

Programming Skills:

- **Matlab** (Proficient): Use programming language to reproduce physical processes. Build up mathematical models for the imaging system (LMI, lensless on-chip imaging system, PIE et al). Establish the inverse problem and solve the problem with numerical methods.
- **Python** (Proficient): Construct various kinds of neural network models using Pytorch package. Perform supervised and self-supervised training. Call the pre-trained networks in matlab. Combine the advantages of the two programming languages (Python, Matlab) to solve the image inverse problems.
- **SolidWorks** (Proficient): Design 3-D printed adapters and connectors. Opto-mechanical system design and process.

Personal Interests: Skiing and Snowboarding (skillful in snowboarding) — Badminton — Swimming