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 their applications in solving inverse imaging problems.

EDUCATION

Harbin Institute of Technology, Harbin, China — Sept. 2022 — Jun. 2024
Master of Engineering in School of Instrumentation of Science and Engineering — Cumulative GPA: 85.8/100

Harbin Institute of Technology, Harbin, China — Aug. 2018 — Jun. 2022
Bachelor of Engineering in School of Instrumentation of Science and Engineering — 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.

The 16th National Smart Car Competition — Jan. 2021 – June 2021

- Worked on the computer vision part.
- Utilized the morphology and graphics algorithms to recognize the color of the traffic light and estimate the distance
- Trained a neural network to segment the lane from real-time captured pictures.
- Integrated the output from the camera and transfer the information to decision-making unit under ROS frame.
- Run all the code on Linix system with a Jeston nano main control board.

Dual-constrained physics-enhanced untrained neural network for lensless imaging — June 2022 - Oct. 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.

Portable lensfree imaging platform based on prior-guided phase retrieval — Mar. 2024–Nov. 2024

- Designed a LEGO-based lensfree microscopy, providing a low-cost DIY microscope scheme for hands-on science education.
- Proposed a prior-guided phase retrieval algorithm prGPR to realize a data-efficient recovery, where only two intensity images are required to perform high-fidelity imaging performance.

PUBLICATIONS

Journal paper

- **Shenghao Zheng**, and Cheng Guo, "Portable lensfree imaging platform based on prior-guided phase retrieval," Journal of the Optical Society of America A 42, 172-182 (2025)

- **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, and 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

- 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

AWARDS

The 16th National Smart Car Competition — China
First prize in the North division — 2021

The 9th National University Students' Opt-Sci-Tech Competition — China
Second prize — 2021

TI Cup Heilongjiang Province Graduate Electronics Design Contest — China, Heilongjiang
Second prize — 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 (LMI) systems, ptychographic iterative engine (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 system, PIE et al). Establish the inverse problems and solve them mathematically.
- **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.

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

ENGLISH SKILL

IELTS (Academic): 7.5 (overall score) — Test date: 12.2024
Listening: 8.0 — Reading: 8.5 — Speaking: 6.0 — Writing: 6.5