Yongyi Zhao

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Introduction: My research is in computational imaging and machine learning for end-to-end hardware and algorithm co-design. I have worked on several projects spanning data-driven biomedical optical imaging, neural rendering, polarimetric imaging, metasurface design, and AI mobile processing. My research has been published in top tier journals (Optica, TPAMI) and conferences (ECCV, ICCP). I am fluent in scripting languages (Python, Matlab), machine learning frameworks (Pytorch), and experienced with system-level languages (C/C++, Cuda), and rendering/3D design software (Blender, Solidworks, Mitsuba).

Education

Rice University — **Houston, TX**
Doctor of Philosophy in Electrical and Computer Engineering — **Jan 2024**
Master of Science in Electrical and Computer Engineering — **Mar 2021**
Adviser: Professor Ashok Veeraraghavan

Carnegie Mellon University — **Pittsburgh, PA**
Bachelor of Science in Electrical and Computer Engineering — **Dec 2017**
With University Honors; **GPA: 3.93/4.00**

Professional Experience

Metalenz — **Boston, MA (remote)**
Senior Computer Vision Engineer — **Nov 2025 – Present**
Computer Vision Engineer — **Feb 2024 – Oct 2025**
- Developing machine learning algorithms polarization-based spoof detection

Samsung Research America — **Plano, TX**
Research Intern — **May 2023 – Aug 2023**
- Worked in Mobile Processor Innovations (MPI) team
- Developed AI algorithm for mobile image processing

Amazon AWS — **Seattle, WA**
Software Development Engineer Intern — **May 2017 – Aug 2017**
- Worked on Amazon AWS, Elastic Compute Cloud Team
- Designed and implemented a container service

Publications

Peer reviewed journal and conference papers

[9] Tasneem Z., **Zhao Y.**, et al. “Privacy-aware Meta-Optics for Person Detection.” *ACS Photonics*. Under Review.

[8] Guo Z., **Zhao Y.**, “Noninvasive monitoring of fetal tissue oxygenation level using time-domain NIRS.” *Journal of Biomedical Optics.* (2025).

[7] **Zhao Y.**[*], Farrell S.[*], et al. “SCREEN: SCatteREr ENabled optical asymmetry.” *Optica*. (2025).

[6] Guo Z., Yang Y., **Zhao Y.**, et al. “High spatial resolution diffuse optical tomography with directional information.” *Optics Letters.* (2025).

[5] Wang F., Kim H. K., **Zhao Y.**, et al. “High-Speed Time-Domain Diffuse Optical Tomography With a Sensitivity Equation-Based Neural Network.” *IEEE Transactions on Computational Imaging*. (2023).

[4] **Zhao Y.**, Raghuram A., et al. “Unrolled-DOT: An Interpretable Deep Network for Diffuse Optical Tomography.” *Journal of Biomedical Optics*. (2023).

[3] Dave A., **Zhao Y.**, Veeraraghavan A. "PANDORA: Polarization-Aided Neural Decomposition Of Radiance." *European Conference on Computer Vision (ECCV)*. (2022).

[2] Kim H. K., **Zhao Y.**, et al. Ultrafast and Ultrahigh-Resolution Diffuse Optical Tomography for Brain Imaging with Sensitivity Equation based Noniterative Sparse Optical Reconstruction (SENSOR). *JQSRT*. (2021).

[1] **Zhao Y.**[*], Raghuram A.[*], et al. “High Resolution, Deep Imaging Using Confocal Time-of-flight Diffuse Optical Tomography.” *IEEE Transactions on Pattern Analysis and Machine Intelligence*. (2021).

[*]Indicates authors contributed equally

Patents

[1] **Zhao Y.**, Raghuram A., et al. “GDOT: Gated Diffuse Optical Tomography,” US20230233085A1. Patent Pending.

Book chapters

[1] Raghuram A., **Zhao Y**., et al. “Measuring Physiological Parameters Under the Skin Using Visible/NIR Light.” Encyclopedia of Sensors and Biosensors 4, pp. 133-142. (2023) Book Chapter.

Posters and presentations

[2] Kim H. K., Raghuram A., **Zhao Y.** et al. “Ultrahigh spatiotemporal resolution fluorescence molecular tomography with a sparsity constrained dimensional reduction reconstruction model.” *High-Speed Biomedical Imaging and Spectroscopy VII.* (2022). Poster.

[1] **Zhao Y.** “Real-time Algorithms for Non-Invasive Imaging Through the Skull.” *NLM Informatics Research Training Conference.* 2021. Oral Presentation.

Fellowships and Awards

National Library of Medicine Fellowship in Bioinformatics and Data Science **Jan 2021 – Dec 2022**
- 2-year fellowship with $25,320 stipend and partial tuition support

Best Paper Runner-Up at IEEE ICCP for Confocal ToF-DOT paper **May 2021**

John Clark Jr. Fellowship Award **Aug 2018**
- Fellowship supporting first-year graduate studies at Rice University

Frank J. Marshall Scholar Award **May 2018**
- Annual award for one graduating CMU ECE undergraduate for academics and research

Skills

Programming/Computing:
- **Strong:** Python (including PyTorch, OpenCV, Numpy libraries), Matlab
- **Proficient:** C/C++, Cuda, Linux, Mitsuba (physics-based renderer)
- **Working understanding:** Version Control (Git), SolidWorks, Blender

Experimental:
- Optical system design (i.e. constructing scanning and fiber-based time domain diffuse optical imaging system)
- Imaging on model organisms (e.g. mice, sheep)

Volunteer / Service

Teaching Assistant (TA)

- Served as an ECE TA for 9 semesters (3 during undergraduate; 6 during PhD); courses included: signal processing, computer architecture, digital logic design, introductory programming, and deep learning
- Performed TA tasks including teaching recitations, special topic lectures, grading, and office hours

Research Mentor

- Mentored 3 Rice University undergraduate students (for 7 semesters total) in computational imaging research
- Mentored six middle and high school teachers in Houston ISD for PATHS-UP RET program (Summer 2019)