

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
Doctor of Philosophy in Electrical and Computer Engineering
Master of Science in Electrical and Computer Engineering
Adviser: Professor Ashok Veeraraghavan

Houston, TX
Jan 2024
Mar 2021

Carnegie Mellon University
Bachelor of Science in Electrical and Computer Engineering
With University Honors; **GPA: 3.93/4.00**

Pittsburgh, PA
Dec 2017

Professional Experience

Metalenz
Senior Computer Vision Engineer
Computer Vision Engineer

Boston, MA (remote)
Nov 2025 – Present
Feb 2024 – Oct 2025

❖ Developing machine learning algorithms polarization-based spoof detection

Samsung Research America
Research Intern

Plano, TX
May 2023 – Aug 2023

❖ Worked in Mobile Processor Innovations (MPI) team
❖ Developed AI algorithm for mobile image processing

Amazon AWS
Software Development Engineer Intern
❖ Worked on Amazon AWS, Elastic Compute Cloud Team
❖ Designed and implemented a container service

Seattle, WA
May 2017 – Aug 2017

Publications

Peer reviewed journal and conference papers

[9] Tasneem Z., **Zhao Y.**, et al. "Privacy-aware Meta-Optics for Person Detection." *ACS Photonics*. (2026).

[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,” U.S. Patent 12,507,895 B2.

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 ❖ 2-year fellowship with \$25,320 stipend and partial tuition support	Jan 2021 – Dec 2022
Best Paper Runner-Up at IEEE ICCP for Confocal ToF-DOT paper	May 2021
John Clark Jr. Fellowship Award ❖ Fellowship supporting first-year graduate studies at Rice University	Aug 2018
Frank J. Marshall Scholar Award ❖ Annual award for one graduating CMU ECE undergraduate for academics and research	May 2018

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)