

Yunhui Jiang

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Research Interests

- Photoacoustic-ultrasound dual-modal imaging and system integration
- Programmable and flexible laser-induced ultrasound sources based on optical absorption structures
- Focused ultrasound for non-invasive biomedical applications

Education

ShanghaiTech University

M.Sc. in Electronic Science and Technology

Shanghai, China

Sept. 2022 – June 2025

- GPA: 3.48/4.0
- Supervisor: Prof. Fei Gao, Prof. Xiran Cai
- Thesis: Research on photoacoustic ultrasound dual-modal imaging system based on low-cost opto-acoustic window

Xi'an University of Posts and Telecommunications

B.S. in Optoelectronic Information Science and Engineering

Xi'an, China

Sept. 2017 – June 2021

- GPA: 3.41/4.0 (Average Score: 85.59/100, Rank: 3/256)
- Thesis: High-Temperature Storage Characteristics of Ga₂O₃ with Ti/Al/Pt/Au Multilayer Ohmic Contacts

Working Papers

1. **Yunhui Jiang**, Fan Zhang, Yuwei Zheng, Ruixi Sun, Xiran Cai*, and Fei Gao*, "Disposable Opto-Acoustic Window Enabled Plug-and-Play Photoacoustic-Ultrasound Dual-modal Imaging", *Optics Letters*(2025) [PDF]
2. Sheng Liao, Ruixi Sun, **Yunhui Jiang**, Fan Zhang, Youshen Xiao, Yuwei Zheng, Hengrong Lan, Fei Gao*, "Photoacoustic tomography of human eye and oxygenation quantification: a feasibility study", *Optics Letters*(2025) **Under Review**
3. Youshen Xiao, Zhengyuan Zhang, Ruixi Sun, Yiling Shi, Sheng Liao, Fan Zhang, **Yunhui Jiang**, Xiyu Chen, Arunima Sharma, Manojit Pramanik, Yuyao Zhang*, Fei Gao*, "Resolution Enhancement of Under-sampled Photoacoustic Microscopy Images using Neural Representation", *IEEE Transactions on Computational Imaging*(2025) [PDF]

Research Experience

1. Programmable Laser-Induced Ultrasound Design and Simulation via k-Wave

Principal Investigator, Ongoing

July 2025 – Present

- Designed spatially patterned optical absorbers to generate laser-induced ultrasound with tunable directionality and amplitude under pulsed excitation
- Applied phased-array principles by encoding spatial phase delays through absorber geometry, enabling programmable beam steering and dynamic acoustic focusing
- Developed a k-Wave simulation framework to model ultrasound propagation and assess focusing performance in water and heterogeneous tissue-mimicking media
- Analyzed resolution and energy distribution across different pattern configurations to guide the practical design of flexible acoustic focusing patches

2. Dual-modal Photoacoustic-Ultrasound Imaging Using Laser-Induced Ultrasound from Black Tape

Principal Investigator, Published in Optics Letters

July 2024 – June 2025

- Designed a plug-and-play opto-acoustic window enabling coaxial photoacoustic and ultrasound imaging triggered by a single laser pulse

- Streamlined the fabrication process using black PVC tape, achieved high reproducibility and low cost
- Validated signal stability and dual-modal imaging performance through *ex vivo* and *in vivo* experiments on various phantoms and human tissues

3. Noninvasive Intracranial Pressure(ICP) Monitoring via Transcranial Photoacoustic Imaging

Co-Investigator, Completed Project

Aug. 2024 – Feb. 2025

- Developed a customized photoacoustic imaging platform integrating a tunable near infrared laser, linear-array ultrasound probe, high-speed DAQ, and a stabilized transcranial probe mount
- Conducted *in vivo* transcranial photoacoustic imaging experiments on human volunteers with physicians, synchronized with invasive ICP monitoring to enable validation against clinical gold-standard measurements
- Developed a linear regression model correlating photoacoustic-derived sO₂ with measured ICP, demonstrated a strong inverse relationship

4. Speckle Imaging through Scattering Layers

Primary contributor, Course: Biomedical Photonics and Imaging

Sept. 2024 – Jan. 2025

- Reproduced speckle imaging methods using memory effect for optical reconstruction
- Evaluated imaging methods for high-resolution, wide-FoV reconstruction, validating performance under dynamic and complex scattering conditions

5. Development and Integration of Data Acquisition(DAQ) for Real-Time Photoacoustic Imaging

Principal Investigator, Completed and in active use

Sept. 2023 – June 2024

- Diagnosed and resolved key signal acquisition issues in a designed DAQ system for stable data capture
- Integrated DAQ into the photoacoustic imaging system for optimized performance
- Conducted *ex vivo* and *in vivo* experiments to validate acquisition stability and imaging quality in functional and structural imaging

6. Mini Review: Algorithms for Photonic Spiking Neural Networks

Course-based Research Project, Course: Optical Computing and Optical Neural Networks

Sept. 2022 – May. 2023

- Reviewed spiking neuron models in biology and photonics for neuromorphic computing frameworks
- Analyzed spike encoding and photonic spike timing dependent plasticity mechanisms implemented via semiconductor optical amplifiers and electro-absorption modulators
- Evaluated photonic spiking neural networks for fully optical implementations and proposed enhancements to spike-based supervised learning algorithms

Awards and Honours

Outstanding Graduate of ShanghaiTech University	2025
National Graduate Academic Scholarship	2022, 2023, 2024
University-Level Graduate Scholarship	2022, 2023, 2024
Outstanding Graduate of Shaanxi Province	2021
National Encouragement Scholarship	2019, 2020
Shanghai Way-on Semiconductor Co., Ltd. Scholarship	2019

Skills

Programming Language: Matlab, Python, LaTeX, Markdown

Professional software: Solidworks, Comsol, Auto-CAD, Origin, 3D Slicer, 3ds Max, KeyShot

Languages: Mandarin (Native), English (Fluent)