

Haohuan Zhong

Biomedical Engineering | Photoacoustic Imaging and Reconstruction | Multiphysics Simulation | Medical Devices
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Profile

Biomedical engineering graduate working on medical imaging, with experience in photoacoustic imaging, multiphysics simulation, array-data processing, parameter inversion, and reproducible research. Independently completed COMSOL/k-Wave modeling and quantitative validation for an undergraduate thesis, supported by clinical exposure to CT/DR quality control, laboratory workflows, and medical-device teardown.

Education

Tianjin Medical University | B.Eng. in Biomedical Engineering Aug 2022 - Jun 2026
School of Biomedical Engineering and Technology; joint program with Tianjin University, where core major courses were completed and assessed. Capstone: 90/100 | Total credits: 198.

- Relevant coursework: Scientific Computing and MATLAB (94), Medical Microcontroller Technology Practicum (92.1), Clinical Engineering Design (90), Microcomputer Principles (89.2), Biomedical Image Processing Design (88.1), Modeling of Biological Systems and Signal Processing (86.5).

Research Experience

Simulation-Based 3D Reconstruction for Microvascular PA / SW Viscoelasticity Dec 2025 - Jun 2026
Undergraduate thesis | Optoacoustic Sensing and Intelligent Imaging Laboratory (OSSII Lab) | Advisor: Prof. Haigang Ma

- Simulation modeling: Independently developed a joint PA/SW simulation framework; mapped microvascular geometry into COMSOL Multiphysics and simulated transient pressure-acoustic and harmonic solid-mechanics responses.
- Algorithms & data: Completed k-Wave time-reversal 3D reconstruction for 256-channel PA array data acquired from four sides; built a 64-channel bottom-array SW workflow spanning preprocessing, cross-correlation delay estimation, parameter inversion, and error analysis.
- Method development: Estimated shear-wave speed, shear modulus G , and dynamic viscosity η using the Maxwell viscoelastic model; generalized the workflow into a transferable framework for multichannel optical/acoustic and EEG/EMG time-series analysis.
- Quantitative validation: Achieved ROI reconstruction PSNR of 9.70 dB and SSIM of 0.72; errors were 0.76% for wave speed, 5.87% for G , and 6.3% for η , with wave-speed error below 1.5% at noise levels of 30 dB and above. Produced a thesis, poster, reproducible scripts, and a VessMAP vascular-network model.

Clinical & Medical Device Practice

Tianjin Fourth Central Hospital | Clinical Laboratory & Radiology Assistant May 2025 - Jun 2025

- Imaging systems: Studied CT/DR imaging principles, parameter configuration, and routine quality control; supported pre-exam positioning guidance and parameter presets under supervision, gaining insight into clinical constraints on imaging algorithms and device-level quality assurance.
- Device teardown & analysis: Disassembled a decommissioned urine-sediment analyzer and analyzed key modules, operating principles, and potential failure points, developing an engineering workflow from device structure and functional chains to fault localization.
- Laboratory workflow: Supported specimen collection and processing, including centrifugation and culture-plate inoculation, and documented and reported critical values, linking clinical data accuracy and procedural compliance to equipment reliability.

Selected Projects & Leadership

- Biomedical Image Processing Design: Implemented edge detection, noise filtering, and ROI feature extraction in MATLAB using an iterative cycle of implementation, result review, and parameter adjustment.
- Teaching Assistant, International Summer School (Jul - Aug 2024): Supported international faculty and provided bilingual coordination to ensure accurate communication of academic content.
- Head, Arts & Sports Department (Aug 2023 - Jul 2024): Led a 10-member team, organized major campus events, and coordinated resources across departments.

Skills & Honors

Tools	MATLAB, COMSOL Multiphysics, k-Wave, LaTeX; working familiarity with Python, C, Git, Linux, OpenCV, and PyTorch.
Language	English literature research, technical writing, and academic communication.
Honor	National Second Prize, 8th National College Student Five-Minute Research Presentation in English Competition.