Yinran Chen

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EDUCATION

2014 – 2019	Ph.D.	Biomedical Engineering, Tsinghua University Advisor: Jianwen Luo
2010 – 2014	B.S.	Biomedical Engineering, Tsinghua University

ACADEMIC EXPERIENCE

10/2019 – present	Assistant Professor	Xiamen University, China
07/2015 – 08/2015	Visiting Student Advisor: Jan D'hooge	KU Leuven, Belgium

RESEARCH INTEREST

Ultrasound Microvascular Imaging

Online clutter filtering; High-sensitivity spatiotemporal clutter filtering; Doppler-projected micro vector flow imaging; Deep learning-based ultrasound localization microscopy.

Volumetric Ultrasound Imaging

Matrix array-based beamforming; 3D motion estimation and compensation; Multi-mode fused velocity field estimation; Volumetric microvascular imaging.

Ultrafast Ultrasound Beamforming

Deep learning-based ultrafast imaging; Synthetic aperture imaging; GPU accelerated ultrafast beamforming; Compressed sensing-based beamforming.

SELECTED PROJECTS

Matrix Array-based Volumetric Beamforming and Motion Compensation (01/2021 – 12/2023)

- This project focuses on the problems of sacrificing image quality for high frame rate and impacting image quality due to motion artifacts in matrix array-based ultrasound imaging.
- This project proposes a novel beamforming method in ultrasound imaging to increase image quality based on high frame rate data acquisition (TUFFC'17, TMI'21, MICCAI'21).
- This project proposes Doppler-based 1D motion compensation and multi-mode fused 3D motion compensation methods for matrix array-based ultrasound imaging (TUFFC'18, TIP'23).

Online Ultrafast Ultrasound Microvascular Clutter Filtering (01/2025 – 12/2028)

- The batch-based static clutter filtering methods do not match well with the sequential ultrafast beamforming, which becomes the major obstacle to fast realization and clinical application.
- This project proposes new decomposition methods to model tissue and blood flow signals, aiming at increasing the spatiotemporal sensitivity of microvascular imaging (TUFFC'24).
- This project proposes an online computing approach for microvascular clutter filtering. The blood flow signal is extracted from the beamformed data frame-by-frame for ultrafast realization of microvascular imaging (TMI'25).

SELECTED PUBLICATIONS

Google Scholar: https://scholar.google.com/citations?user=daaRpEcAAAAJ&hl=en
Stats: H-index: 7. Journal paper 8, Conference paper: 11.

Journal Publications

J1. **Yinran Chen**, Baohui Fang, Huaying Li, Lijie Huang, and Jianwen Luo. Ultrafast Online Clutter Filtering for Ultrasound Microvascular Imaging. *IEEE Transactions on Medical Imaging* (**IEEE TMI**), 2025. *In press*.

J2. **Yinran Chen**, Baohui Fang, Fengling Meng, Jianwen Luo, and Xiongbiao Luo. Competitive Swarm Optimized SVD Clutter Filtering for Ultrafast Power Doppler Imaging. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* (**IEEE TUFFC**), 2024.

J3. Fengling Meng, **Yinran Chen***, and Xiongbiao Luo. Accurate and Robust Sperm Tracking via Adaptive Marginalized Particle Filtering. *IEEE Signal Processing Letters* (**IEEE SPL**), 2024.

J4. **Yinran Chen**, Zichen Zhuang, Jianwen Luo, and Xiongbiao Luo. Doppler and Pair-Wise Optical Flow Constrained 3D Motion Compensation for 3D Ultrasound Imaging. *IEEE Transactions on Image Processing* (**IEEE TIP**), 2023.

J5. **Yinran Chen**, Jing Liu, Xiongbiao Luo, and Jianwen Luo. ApodNet: Learning for High Frame Rate Synthetic Transmit Aperture Ultrasound Imaging. *IEEE Transactions on Medical Imaging* (**IEEE TMI**), 2021.

J6. **Yinran Chen**, Jing Liu, Julien Grondin, Elisa E Konofagou, and Jianwen Luo. Compressed Sensing Reconstruction of Synthetic Transmit Aperture Dataset for Volumetric Diverging Wave Imaging. *Physics in Medicine & Biology* (**PMB**), 2019.

J7. **Yinran Chen**, Jan D'hooge, and Jianwen Luo. Doppler-based Motion Compensation Strategies for 3-D Diverging Wave Compounding and Multiplane-Transmit Beamforming: A Simulation Study. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* (**IEEE TUFFC**), 2018.

J8. **Yinran Chen**, Ling Tong, Alejandra Ortega, Jianwen Luo, and Jan D'hooge. Feasibility of Multiplane-transmit Beamforming for Real-time Volumetric Cardiac Imaging: A Simulation Study. *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control* (**IEEE TUFFC**), 2017.

Conference Publications

C1. **Yinran Chen**, Jing Liu, Jianwen Luo, and Xiongbiao Luo. A Data-Driven Approach for High Frame Rate Synthetic Transmit Aperture Ultrasound Imaging. *International Conference on Medical Image Computing and Computer Assisted Intervention* (**MICCAI'21**), 2021.

C2. Huaying Li, Baohui Fang, Zelin Ye, Fengling Meng, and **Yinran Chen***. Attention USR-Net: An End-to-End Mapped Ultrasound Localization Microscopy. *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Joint Symposium* (**UFFC-JS'24**), 2024.

C3. Baohui Fang, Huaying Li, and **Yinran Chen***. Total Variational Robust PCA for Ultrasound Microvascular Clutter Filtering. *IEEE Ultrasonics, Ferroelectrics, and Frequency Control Joint Symposium* (**UFFC-JS'24**), 2024.

C4. Baohui Fang, Fengling Meng, **Yinran Chen***, Jianwen Luo, and Xiongbiao Luo. A Competitive Swarm Optimized SVD-based Clutter Filter. *IEEE International Ultrasonics Symposium* (**IUS'23**), 2023.

C5. **Yinran Chen**, Jianwen Luo, and Xiongbiao Luo. A Feasibility Study of 3D Motion Compensation in 3D Diverging Wave Compounding. *IEEE International Ultrasonics Symposium* (**IUS'22**), 2022.

C6. **Yinran Chen**, Jing Liu, Xiongbiao Luo, and Jianwen Luo, A Self-supervised Deep Learning Approach for High Frame Rate Plane Wave Beamforming with Two-way Dynamic Focusing. *IEEE International Ultrasonics Symposium* (**IUS'21**), 2021.

C7. **Yinran Chen**, Xiongbiao Luo, and Jianwen Luo, A 3D Motion Compensation Method for High Frame Rate Volumetric Ultrasound Imaging based on Velocity Vector Estimation: A Simulation Study. *IEEE International Ultrasonics Symposium* (**IUS'20**), 2020.

C8. **Yinran Chen**, Mathieu Pernot, Clement Papadacci, Jan D'hooge, and Jianwen Luo, Multi-plane-transmit (MPT) Volumetric Imaging based on A Matrix Array: Experimental Validation. *IEEE International Ultrasonics Symposium* (**IUS'19**), 2019.

C9. **Yinran Chen**, Xianquan Shi, Linxue Qian, and Jianwen Luo, S-Sequence Encoded Multiplane Wave Imaging: Phantom and In-Vivo Validation. *IEEE International Ultrasonics Symposium* (**IUS'18**), 2018.

C10. Ruoshi Li, Hao Qi, Xing Chen, and **Yinran Chen***. Integrating Multi-Scale Compression Attention with Edge Detection for Ultrasound Tumor Segmentation. *IEEE International Conference on Acoustics, Speech, and Signal Processing* (**ICASSP'25**), 2025. *In press*.

C11. Kaiyun Zhang, Wenkang Fan, **Yinran Chen***, and Xiongbiao Luo, DGN: Descriptor Generation Network for Feature Matching in Monocular Endoscopy 3D Reconstruction, *IEEE International Conference on Acoustics, Speech, and Signal Processing* (**ICASSP'23**), 2023.

INVITED TALKS

Self-supervised Deep-learning-based Ultrafast Ultrasound Beamforming. CSBME, 2022.
Online Ultrafast Ultrasound Microvascular Imaging. CSBME, 2024.

ACADEMIC SERVICES

Journal Review:

IEEE Transactions on Medical Imaging (TMI) (Distinguished Reviewer)
IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC)
IEEE Transactions on Biomedical Engineering (TBME)
IEEE Transactions on Instrumentation and Measurement (TIM)
IEEE Robotics and Automation Letters (RAL)
IEEE Photonics Technology Letters (PTL)
Physics in Medicine & Biology (PMB)

Conference Review:

ICASSP 2023, 2024, 2025. MICCAI 2022.

Program Committee:

IUS'23 (Poster Session Chair)

HONORS AND AWARDS

2024 IEEE UFFC-JS Student Travel Support Award
2022 Young Teachers Teaching Skills Competition of Xiamen University
2019 Excellent Doctoral Dissertation of Tsinghua University (Top 10%)
2019 Excellent Graduate of Tsinghua University

2019 National Scholarship

2016 IEEE IUS Student Travel Support Award