

方子 Zi Fang

正在寻找算法 / 研究岗位 | 三维感知 | 具身智能 | 医疗机器人

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个人概况

上海交通大学机械工程博士研究生，预计 2026 年 12 月毕业。研究将多传感状态感知、可靠医学影像观测、连续三维表征与机器人导航串联起来，重点关注算法在标定、假体与物理原理样机中的系统级可验证性。

教育经历

上海交通大学 / 机械工程博士研究生 2021.09 — 2026.12

机械与动力工程学院（机器人研究所）。博士论文：甲状腺超声隐式三维重建与穿刺手术导航系统研究。

上海交通大学 / 机械工程学士 2017.09 — 2021.06

机械与动力工程学院试点班，院优秀毕业生。

研究与项目脉络

多传感状态感知、故障诊断与寿命预测 2021 — 2023

从 IMU、电流和编码器时序中提取时域/频域特征，通过特征选择与降维构建紧凑状态表征，用于机器人故障分类和螺栓松动剩余寿命预测；相关系统用于大型航天器姿态调节 AGV 状态监控。

可靠超声观测与二维语义 2024 — 2025

面向自由手超声的接触质量、设备域差异和细小目标，研究有效观测筛选、成像响应规范化与甲状腺/血管/结节/针体的多语义分割，为三维重建提供可信观测。

物理神经场、多扫描配准与三维语义 2023 — 至今

将超声声学先验融入 NeRF/3DGS 连续表征，并将多扫描误差解耦为 sweep 级全局偏差、frame 级局部抖动与受力形变，联合优化位姿、表征与规范空间对齐。

导航坐标链、穿刺路径规划与机器人 2025 — 至今

通过双目近红外定位、探头/针尖标定、连续三维场与组织—器械语义构建导航坐标链；研究柔性针路径规划与小尺寸穿刺机器人，并以可重复假体和原理样机验证模块间坐标连接。

代表性一作论文（以 Google Scholar 公开记录为准）

- Z. Fang, et al. GLA-NeRF: Global-local aligned neural radiance fields for multi-sweep freehand 3D ultrasound. Physics in Medicine & Biology, 2026.

- Z. Fang, et al. Prediction for Loosening Life of Bolted Joints Using IMUs With Dimensionality Reduction. IEEE Transactions on Instrumentation and Measurement, 72, 2023.

- Z. Fang, et al. Fault Diagnosis Method for Industrial Robots based on Dimension Reduction and Random Forest. M2VIP, 2021.

技术能力

三维感知：NeRF / 3DGS、声学物理逆渲染、图像定位、多传感器位姿估计、可变形配准、三维语义。

机器人与工程：路径规划、PyBullet / Isaac、PyQt / C#、STM32、CATIA / SolidWorks、Ansys / Adams。

AI 开发：PyTorch / Lightning、TensorFlow / JAX、Diffusion、VLA、RAG 与多模型应用。

Zi Fang 方子

Seeking research / algorithm roles | 3D Perception | Embodied Intelligence | Medical Robotics

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PROFILE

Ph.D. candidate in Mechanical Engineering at Shanghai Jiao Tong University, expecting to graduate in December 2026. My work connects multi-sensor condition perception, trustworthy medical-image observations, continuous 3D representations, and robot navigation. I focus on methods that remain testable through calibration, phantoms, and physical prototypes.

EDUCATION

Shanghai Jiao Tong University / Ph.D. Candidate in Mechanical Engineering 2021.09 — 2026.12

Robotics Institute, School of Mechanical Engineering. Dissertation: implicit 3D thyroid-ultrasound reconstruction and puncture-navigation systems.

Shanghai Jiao Tong University / B.Eng. in Mechanical Engineering 2017.09 — 2021.06

Pilot honors program; Outstanding Graduate of the School.

RESEARCH TRAJECTORY

Multi-sensor condition perception, diagnosis, and remaining-life prediction 2021 — 2023

Built compact condition representations from IMU, current, and encoder time series through time/frequency feature extraction, feature selection, and dimensionality reduction. Applied the representations to robot fault classification and remaining bolt-loosening life prediction in a production-oriented AGV monitoring system.

Trustworthy ultrasound observations and 2D semantics 2024 — 2025

Studied contact-quality screening, imaging-response canonicalization, and multi-class/multi-instance segmentation of thyroid, vessels, nodules, and needles to provide reliable observations for downstream 3D reconstruction.

Physics-informed neural fields, multi-sweep alignment, and 3D semantics 2023 — present

Integrated ultrasound-acoustic priors into continuous NeRF/3DGS representations. Decomposed multi-sweep error into sweep-level global bias, frame-level local jitter, and force-conditioned deformation, then jointly optimized poses, representations, and canonical-space alignment.

Navigation coordinates, puncture planning, and robotic systems 2025 — present

Connected stereo NIR tracking, probe and needle-tip calibration, continuous 3D fields, and tissue — instrument semantics into a navigation coordinate chain. Explored flexible-needle planning and compact puncture robots with repeatable phantoms and proof-of-principle prototypes.

SELECTED FIRST-AUTHOR PUBLICATIONS

- Z. Fang, et al. GLA-NeRF: Global-local aligned neural radiance fields for multi-sweep freehand 3D ultrasound. Physics in Medicine & Biology, 2026.

- Z. Fang, et al. Prediction for Loosening Life of Bolted Joints Using IMUs With Dimensionality Reduction. IEEE Transactions on Instrumentation and Measurement, 72, 2023. DOI: 10.1109/TIM.2023.3276014.

- Z. Fang, et al. Fault Diagnosis Method for Industrial Robots based on Dimension Reduction and Random Forest. M2VIP, 2021. DOI: 10.1109/M2VIP49856.2021.9665168.

TECHNICAL SKILLS

3D perception: NeRF / 3DGS, acoustic inverse rendering, image localization, multi-sensor pose estimation, deformable registration, and 3D semantics.

Robotics and engineering: path planning, PyBullet / Isaac, PyQt / C#, STM32, CATIA / SolidWorks, Ansys / Adams.

AI development: PyTorch / Lightning, TensorFlow / JAX, diffusion, VLA, RAG, and multi-model applications.