Yining Jiao (Ina)

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Research Highlights

I am a postdoc in the Department of Computer Science and Engineering, UC San Diego. **I build AI that knows what it knows — and recognizes what it doesn't.** My research focuses on **spatiotemporal representation learning**, with a dedication to **interpretability** and **uncertainty quantification** within the healthcare domain. My work revolves around four questions:

- **Learning to see shapes** — advanced techniques for image and geometry processing.
- **Learning to model populations** — representing how anatomical shapes vary and evolve.
- **Learning to say "I don't know"** — statistical machine learning for robust uncertainty quantification.
- **Learning to scale up** — toward foundation models for 3D biomedical shape understanding.

Education

2020–2025 **Ph.D. in Computer Science,** *UNC-Chapel Hill*
Advisor: Prof. Marc Niethammer

2017–2020 **M.S. in Biomedical Engineering,** *Shanghai Jiao Tong University*
Advisor: Prof. Qian Wang

2013–2017 **B.Eng. in Electronic Sci. & Tech.,** *Northwestern Polytechnical University, Honors College*

Research Experience

2026–Present **Postdoctoral Scholar,** *Department of Computer Science and Engineering, UC San Diego*
Advisor: Prof. Marc Niethammer

- Individualized spatiotemporal learning; uncertainty quantification for shapes.
- Exploring foundation model approaches for 3D biomedical shape understanding across diverse anatomies and covariates.

2020–2025 **Research Assistant,** *Biomedical Image Analysis Group, UNC-Chapel Hill*
Advisor: Prof. Marc Niethammer

- **Pediatric Airway Shape Analysis:** Developed and maintained the full image processing pipeline — deep-learning-based segmentation, landmark detection, geometry processing, and clinical visualization of pediatric airways.
- **Airway OCT Segmentation & Reconstruction:** First learning-based system to extract 3D geometries from airway OCT scans; benchmarked UNets and transformers; $<46\,\mu$m reconstruction error.
- **Interpretable 3D Shape Modeling:** Developed interpretable neural implicit shape representations for scientific shape analysis. **ICLR 2024 Spotlight · top 5%**
- **Uncertainty-Aware Spatiotemporal Learning:** Built LucidAtlas, a by-construction interpretable atlas representation for modeling spatially varying uncertainty with covariates — supporting individualized prediction, population trend analysis, and OOD detection in a single model. Introduced marginalization theory to interpret dependent covariates.
- **Temporal Uncertainty for 3D Shapes:** Developed PRISM, a probabilistic implicit shape representation that estimates spatially varying temporal uncertainty in closed form by exploiting automatic differentiation on implicit fields — no sampling, single forward pass. A single model for shape evolution, developmental time inference, personalized prediction, and anomaly detection.

2019–2020 **Research Intern,** *United Imaging Intelligence, Shanghai*
Mentor: Dr. Zhong Xue & Prof. Dinggang Shen. Applied EfficientNet for Kaggle RSNA Intracranial Hemorrhage Detection Challenge — **silver medal (top 4%, 1,345 teams)**.

2017–2020 **Research Assistant,** *Medical Image Computing Lab, SJTU*
Advisor: Prof. Qian Wang

- **cuRadiomics:** Developed a CUDA-based tool for fast computation of Radiomics features, **100× speedup**. RNO-AI 2019 Oral · top 10
- **Data Science for Cancer Research:** Applied statistical analysis, survival analysis, and machine learning for treatment outcome prediction; published in *European Radiology*, *Cancer Mgmt. & Research*.

2016–2017 **Research Assistant,** *Northwestern Polytechnical University*
Advisors: Prof. Wei Wei & Prof. Lei Zhang. Implemented convex optimization for hyperspectral image denoising; published in *IEEE Trans. Geoscience and Remote Sensing*.

Selected Publications

1. **Y. Jiao** et al. "PRISM: A 3D Probabilistic Neural Representation for Interpretable Shape Modeling." *Preprint*, 2026.
2. **Y. Jiao** et al. "LucidAtlas: Learning Uncertainty-Aware, Covariate-Disentangled, Individualized Atlas Representations." *TMLR 2026*. [Paper]
3. **Y. Jiao** et al. "NAISR: A 3D Neural Additive Model for Interpretable Shape Representation." *ICLR 2024*. Spotlight · top 5% [Paper] [Demo] [Code]

Other Publications

* equal contribution

4. Q. Liu, Z. Xu, **Y. Jiao**, M. Niethammer. "iSegFormer: Interactive Segmentation via Transformers with Application to 3D Knee MR Images." *MICCAI 2022*. [Paper]
5. W. Wei, L. Zhang, **Y. Jiao** et al. "Intracluster Structured Low-Rank Matrix Analysis Method for Hyperspectral Denoising." *IEEE Trans. Geoscience and Remote Sensing*, 2018. [Paper]
6. S. Wu*, **Y. Jiao*** et al. "Imaging-Based Individualized Response Prediction of Carbon Ion Radiotherapy for Prostate Cancer." *Cancer Mgmt. and Research*, 2019. [Paper]
7. H. Song*, **Y. Jiao*** et al. "Can pretreatment 18F-FDG PET tumor texture features predict osteosarcoma chemotherapy outcomes?" *European Radiology*, 2019. [Paper]
8. **Y. Jiao** et al. "cuRadiomics: A GPU-based Radiomics Feature Extraction Toolkit." *MICCAI RNO-AI 2019*. Oral · top 10 [Paper] [Code]

Technical Skills

Programming Python · C/C++ · CUDA · Git · Bash · LaTeX
ML / Scientific PyTorch · TensorFlow · scikit-learn · Pandas · NumPy · SciPy
Imaging / 3D ITK · VTK · SimpleITK · Open3D · trimesh · 3D Slicer · ParaView
Languages English (fluent) · Chinese (native)

Honors & Awards

2021 ICML Workshop on Computational Biology Fellowship
2020 Outstanding Graduate of Shanghai (4 from department)
2019 SJTU Excellent Graduate Student Award (2 from department)
2019 Kaggle RSNA Hemorrhage Detection Silver Medal (top 4%, 1,345 teams)
2017 Excellent Undergraduate Thesis, Northwestern Polytechnical University

Academic Services

Conference Reviewer: CVPR, ICCV, ECCV, NeurIPS, ICML, ICLR, AISTATS, AAAI, WACV, MICCAI
Journal Reviewer: IEEE TPAMI, IEEE JBHI, Neural Networks