

YINING JIAO

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Summary

Postdoctoral Scholar at UCSD specializing in **interpretable biomedical data analysis**. I develop rigorous statistical machine learning frameworks to tackle fundamental challenges in healthcare, focusing on **atlas construction, geometry processing, and spatiotemporal modeling**. My work leverages theoretical insights from **identifiability** and **uncertainty quantification** to build robust, trustworthy AI models for disentangling disease-related variation and enabling personalized inference. **Core strengths:** Interpretability, Atlas Construction, Geometry Processing, Spatiotemporal Modeling, Uncertainty Quantification, Information Geometry, Scientific Visualization.

Education

The University of North Carolina at Chapel Hill

Ph.D. in Computer Science

Shanghai Jiao Tong University

M.S. in Biomedical Engineering

Northwestern Polytechnical University, Honors College

B.Eng. in Electronic Science and Technology

Jan 2021 – Dec 2025

Chapel Hill, NC, U.S.

Sep 2017 – Mar 2020

Shanghai, China

Sep 2013 – Jun 2017

Xi'an, Shaanxi, China

Experience

University of California, San Diego (UCSD)

Postdoctoral Scholar

Jan 2026 – July 2026

San Diego, CA, U.S.

♦ **Information-Geometric Disentanglement:** Developing identifiable frameworks using **Information Geometry** to rigorously decompose and jointly quantify the spatiotemporal effects and uncertainty of distinct covariates (e.g., aging vs. disease progression).

♦ **Individualized Neural Shape Prediction:** Designing implicit shape representations capable of **individualized shape prediction**, enabling precise, patient-specific anatomical forecasting and personalized intervention planning.

The Biomedical Image Analysis Group at UNC-Chapel Hill

Research Assistant, Advisor: Prof. Marc Niethammer

Jan 2021 – Dec 2025

Chapel Hill, NC, U.S.

♦ **Pediatric Airway Shape Analysis:** Developed and maintained the whole image processing pipeline for pediatric airway shape analysis, including the deep-learning-based automatic image segmentation, landmark detection, geometry processing, and visualizations of diseased and normal pediatric airways for medical discoveries.

♦ **Airway OCT Segmentation and Geometry Reconstruction:** Developed the first learning-based system to extract 3D geometries from airway OCT scans, by benchmarking *UNets* and *transformers* on the OCT segmentation task; and then implemented 3D geometry reconstruction from the airway point clouds, leading to < **46 μm reconstruction error** while significantly reducing the workload of creating extensive manual segmentations.

♦ **Interpretable 3D Shape Modeling:** Developed interpretable neural implicit shape representations for scientific shape analysis; implemented experiments to validate the *state-of-the-art performance* and versatile capabilities of the proposed method; designed visualizations of the learned atlas; wrote up and published it in a top machine learning conference.

♦ **Uncertainty-Aware Spatiotemporal Learning:** Built *LucidAtlas*, a unified probabilistic atlas framework that, with a single model, tackles diverse shape analysis tasks—covariate interpretation, individualized prediction, longitudinal growth modeling, variance estimation, and out-of-distribution detection. Introduced marginalization theory to handle incomplete covariates, making large-scale interpretable analysis practically feasible.

♦ **Uncertainty Quantification in 3D Shape Representation:** Developing *PRISM*, the first framework to model uncertainty in neural implicit shape representations. It establishes probabilistic inference for 3D geometries, disentangles covariate effects, and integrates time-warping for spatiotemporal analysis—pioneering uncertainty-aware implicit modeling in computational anatomy.

United Imaging Intelligence

Research Intern, Mentor: Dr. Zhong Xue and Prof. Dinggang Shen

Oct 2019 – May 2020

Shanghai, China

♦ **Kaggle Challenge** Applied EfficientNet for the hemorrhage detection for Kaggle RSNA Intracranial Hemorrhage Detection Challenge, awarded silver medal (top 4% of 1k+ teams).

The Medical Image Computing Lab at Shanghai Jiao Tong University

Research Assistant, Advisor: Prof. Qian Wang

Sep 2017 – Mar 2020

Shanghai, China

♦ **cuRadiomics** Developed a CUDA-based tool for fast computation of Radiomics features, boosting the computational efficiency by **100 \times** .

♦ **Data Science for Cancer Research.** Applied *statistical analysis, survival analysis, and machine learning models* for treatment outcome prediction of prostate cancer and osteosarcoma, cervical cancer classification, diagnosis of Parkinson's disease, etc; summarized the discoveries and published several journal papers.

Computer Science Department at Northwestern Polytechnical University

Research Assistant, Advisor: Prof. Wei Wei and Prof. Lei Zhang

May 2016 – Jun 2017

Xi'an, Shaanxi, China

♦ **Convex Optimization for Image Denoising** Implemented a method based on convex optimization for hyperspectral image denoising; conducted quantitative and qualitative evaluations to prove its *state-of-the-art performance*.

Selected Publications

* indicated equal contribution

Yining Jiao, Marc Niethammer et al. PRISM: A 3D Probabilistic Neural Representation for Interpretable Shape Modeling. *Manuscript in preparation.*

Yining Jiao, Marc Niethammer et al. LucidAtlas: Learning Uncertainty-Aware, Covariate-Disentangled, Individualized Atlas Representations. *Under Review.*

Yining Jiao, Marc Niethammer et al. NAISR: A 3D Neural Additive Model for Interpretable Shape Representation. *ICLR 2024. Spotlight (top 5%).* [DEMO]

Qin Liu, Zhenlin Xu and **Yining Jiao** and Marc Niethammer. iSegFormer: Interactive Segmentation via Transformers with Application to 3D Knee MR Images. *MICCAI 2022.*

Shuang Wu*, **Yining Jiao*** et al. Imaging-Based Individualized Response Prediction of Carbon Ion Radiotherapy for Prostate Cancer Patients. *Cancer Management and Research*, September 2019.

Hongjun Song*, **Yining Jiao*** et al. Can pretreatment 18F-FDG PET tumor texture features predict the outcomes of osteosarcoma treated by neoadjuvant chemotherapy? *European Radiology*, July 2019.

Yining Jiao, Oihane Mayo Ijurra et al. cuRadiomics: A GPU-based Radiomics Feature Extraction Toolkit. *MICCAI 2019 Workshop. Oral, top 10 of submitted papers.*

Skills

Programming: Python, C/C++, CUDA, Git, Scripting (Bash), LaTeX

Software: PyTorch, Tensorflow, ITK, scikit-learn, Pandas, Linux

Language: English (fluent), Chinese (native)

Honors

	ICML Workshop on Computational Biology Fellowship	2021
	Outstanding Graduate of Shanghai (only 4 from department)	2020
	SJTU Excellent Graduate Student Award (only 2 from the department)	2019
	Silver Medal, Kaggle RSNA Intracranial Hemorrhage Detection Challenge	2019
	Excellent Undergraduate Thesis in NWPU	2017

Academic Activities

Journal Reviews: IEEE Journal of Biomedical and Health Informatics, Neural Networks, IEEE Transactions on Pattern Analysis and Machine Intelligence.

Conference Reviews: ICCV 2021, CVPR 2022, ICCV 2023, MICCAI2024, NeurIPS2024, WACV2025, CVPR2025, ICLR2025, ICML2025, NeurIPS2025, AAAI2026.