

Yihao Xia, Ph.D.

Postdoctoral Scholar

Neuroimaging and Informatics Institute,
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Education

Ph.D., Electrical Engineering

University of Southern California, June 2023

M.S., Electrical Engineering

University of Southern California, May 2017

B.S., Electrical Engineering

Sichuan University, June 2013

Research Interests

Medical image analysis; brain connectomics; medical image harmonization; white matter bundle reconstruction; machine learning and artificial intelligence in healthcare; statistical methodologies for neuro-degenerative disease diagnosis.

Research Experience

Postdoctoral Scholar - Research Associate

Neuroimaging and Informatics Institute, University of Southern California July 2023–Present

- Conduct research on medical image harmonization to mitigate biases across imaging sources, ensuring consistent and reliable analyses.
- Design and implement machine learning algorithms and software to enhance white matter segmentation accuracy.
- Build a multi-modality framework to integrate diverse imaging data, yielding actionable biomarkers for Alzheimer’s disease research.

Graduate Research Assistant

University of Southern California August 2017–June 2023

- **Personalized Diffusion MRI Harmonization**
Developed multiple harmonization methods to eliminate inter-scanner discrepancies in large-scale dMRI datasets (6,000+ subjects), improving reliability through stratified A/B testing and effect size analysis.
- **Groupwise Tractography Filtering**
Introduced a message-passing algorithm for robust outlier removal in tractography, enhancing anatomical accuracy of white matter reconstruction by 30%. Released and maintained the `GroupwiseTractFiltering` Python package for clinical and research use.
- **Automatic Intervertebral Disc Segmentation**
Designed a U-Net-based deep learning model with multiscale feature extraction to improve disc segmentation in spinal MRI. Achieved a Dice score of 0.91 in collaboration with UCLA Neurosurgery for clinical translation.

Research Intern

CIBORG Lab, Children's Hospital Los Angeles

May 2016 - September 2016

- Processed and analyzed perfusion MRI data to assess cerebral blood flow dynamics.
- Investigated arterial transit time alterations in a sickle cell disease cohort to uncover cerebrovascular abnormalities.

Research Assistant

Research Center of Laser Fusion, CAEP, China

July 2013– July 2015

- Measured surface fluctuations of fusion target capsules via 2D Fourier and harmonic analysis.
- Detected structural defects using wavelet transforms and pattern recognition.

Manuscript Review

European Journal of Medical Research; International Journal of Computer Assisted Radiology and Surgery; International Conference on Computer-Assisted Interventions (IPCAI); IEEE International Symposium on Biomedical Imaging (ISBI); International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI); Medical Imaging meets NeurIPS (MedNuerIPS)

Publications

- **Xia, Y.**, Li, Y., and Shi, Y., 2024. Diffusion MRI harmonization via personalized template mapping. *Human Brain Mapping*, 45(5), p.e26661.
- **Xia, Y.** and Shi, Y., 2022, September. Personalized DMRI harmonization on cortical surface. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 717-725). Cham: Springer Nature Switzerland.
- **Xia, Y.** and Shi, Y., 2020. Groupwise track filtering via iterative message passing and pruning. *NeuroImage*, 221, p.117147.
- Schilling, K.G., Rheault, F., Petit, L., Hansen, C.B., Nath, V., Yeh, F.C., Girard, G., Barakovic, M., Rafael-Patino, J., Yu, T. and Fisci-Gomez, E. *et al.* (incl. **Xia, Y.**), 2021. Tractography dissection variability: What happens when 42 groups dissect 14 white matter bundles on the same dataset?. *Neuroimage*, 243, p.118502.
- Meng, J., Zhao, X., Tang, X., **Xia, Y.**, Ma, X. and Gao, D., 2017. Surface characterization of ICF capsule by AFM-based profilometer. *High Power Laser Science and Engineering*, 5, p.e21.
- Gaonkar, B., **Xia, Y.**, Villaroman, D.S., Ko, A., Attiah, M., Beckett, J.S. and Macyszyn, L., 2017. Multi-parameter ensemble learning for automated vertebral body segmentation in heterogeneously acquired clinical MR images. *IEEE journal of translational engineering in health and medicine*, 5, pp.1-12.