Xingjian Zhang

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Research Interests

Computer vision and deep learning for biomedical imaging. Core expertise in AI/ML approaches: microscopy image processing, medical image classification/segmentation, and cellular morphology analysis. Contributing experience in physics-based modeling and AI-driven integration of spatial imaging with temporal data. Interdisciplinary background bridging machine learning and biomechanics.

Education

École Polytechnique, Institut Polytechnique de Paris — France

Ph.D. candidate in Biomechanics	2023 - Present
M.S. in Mechanics - Biomechanics and Biomedical Engineering	2021 - 2023
B.S. in Computer Science and Mathematics	2018 - 2021

Experience

PhD candidate @ LadHyX, École Polytechnique | LTCI, Télécom Paris — Nov 2023 - Present

- **Conducting** deep learning research to study cellular nuclear deformations on microgroove substrates to develop a functional in-vitro diagnostic tool for laminopathies and breast cancer.
- **Contributing** to collaborative research projects across domains including 4D MRI flow modeling, tabular machine learning on surgery data, and spatial-temporal imaging integration.
- **Teaching** assistance in master-level (Deep Learning, Medical Imaging, Object Recognition) and bachelor-level (Machine Learning, Web Programming) courses at Télécom Paris and École Polytechnique.
- **Supervising** M2 research projects on computer vision topics at Télécom Paris.

Deep Learning Intern @ Dassault Systèmes — Mar 2023 - Sep 2023

- **Conducted** research in 3D tumor segmentation for the TwinOnco project, advancing beyond existing methods that relied on 2D slice segmentation and aggregation.
- **Designed and implemented** deep learning models to segment tumor boundaries in complex medical imaging datasets in 3D.

Research Intern @ LOB, École Polytechnique — Apr 2022 - Mar 2023

- **Developed** segmentation algorithms for axons and dendrites in noisy THG microscopy images of mouse cerebellum.
- **Created** a computational model to quantify muscle fiber orientations from pSHG microscopy of protein organizations in zebrafishes.
- **Developed** BioImageLoader, a Python library providing a unified interface for bioimage datasets in machine learning applications.

Publications

Peer-reviewed

- C. Leclech, G. Cardillo, B. Roellinger, <u>X. Zhang</u>, J. Frederick, K. Mamchaoui, C. Coirault, A. I. Barakat, "Microscale topography triggers dynamic 3D nuclear deformations", *Advanced Science (IF 14.1)*, 2025.
- A. Hauguel, K. Kasani, V. Chevance, <u>X. Zhang</u>, A.I. Barakat, S. Haulon, A. Azarine , "Changes in ascending aorta and aortic arch secondary flow patterns following endovascular repair of the descending thoracic aorta", *European Journal of Vascular and Endovascular Surgery (IF 6.8)*, 2025.
- B. Asadipour, E. Beaurepaire, <u>X. Zhang</u>, A. Chessel, P. Mahou, W. Supatto, MC. Schanne-Klein, C. Stringari, "Modeling and predicting second harmonic generation from protein molecular structure", *Physical Review X (IF 15.7)*, 2024.
- <u>X. Zhang</u>, C. Leclech, B. Roellinger, C. Coirault, E. Angelini, A.I. Barakat, "Myoblast mutation classification via microgroove-induced nuclear deformations", *International Conference on Medical Imaging with Deep Learning*, 2024.
- G. Pogudin, <u>X. Zhang</u>, "Interpretable exact linear reductions via positivity", *International Conference on Computational Methods in Systems Biology*, 2021.

Pre-prints / under review

- B. Asadipour, R. Ronzano, J. Morizet, <u>X. Zhang</u>, A. Chessel, P. Mahou, M. Aigrot, B. Stankoff, A. Desmazieres, E. Beaurepaire, C. Stringari, "Label-free multimodal non-linear microscopy to probe metabolism and myelin distribution in organotypic cerebellar slices", 2024.
- S. Lim, <u>X. Zhang</u>, E. Beaurepaire, A. Chessel, "BioImageLoader: Easy handling of bioimage datasets for machine learning", 2023.

Awards

PhD Full Fellowship from École Polytechnique, IP Paris
Master's Scholarship from École Polytechnique, IP Paris

Skills

Programming: 🐍 Python, ⬡ Julia, Ⓡ R, ◢ Matlab, C++ C/C++,
Machine Learning: ⟳ Pytorch, 🔥 TensorFlow, Multi-GPU training
Languages: Chinese (native), English (C2), French (B2)