Xingjian Zhang

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Research Interests

Computer vision and deep learning for biomedical imaging. Core expertise in AI/ML methods for microscopy image analysis, medical image segmentation, and cellular morphology classification. Interdisciplinary background bridging machine learning and biomechanics. Interested in expanding AI methods to multimodal biomedical signals and data types.

Education

École Polytechnique, Institut Polytechnique de Paris

Ph.D. candidate in AI for 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.
- **Worked on** collaborative research projects across domains including 4D flow MRI modeling and ML on tabular surgery data (Marie Lannelongue Hospital), time-series electrical impedance data (Sensome), and skin conductance data (EloCare, NUS).
- **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.
- **Supervised** 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

- M. C. Yagüe, <u>X. Zhang</u>, M. Volpatti, Y. Wei, G. Lebedev, J. Gamby, A. I. Barakat, "Noninvasive real-time monitoring of cellular spatiotemporal dynamics via machine learning-enhanced electrical impedance spectroscopy", *Science Advances (IF 13.7)*, 2025.
- 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, M. C. 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. D. 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.

Selected Presentations

- "Deep learning classification of laminopathy mutations on microgroove substrates", *ESB 2025 Congress*, Zürich, Switzerland
- "Myoblast mutation classification via microgroove-induced nuclear deformations", *MIDL 2024*, Paris, France
- "Interpretable exact linear reductions via positivity", *CMSB 2021*, Bordeaux, France

Skills

Programming: 🐍 Python, 🔵 Julia, Ⓡ R, 📐 Matlab, ᴄ⁺⁺ C/C++,
Machine Learning: ᗡ Pytorch, 🔶 TensorFlow, 🛰 JAX, Multi-GPU training
Languages: Chinese (native), English (C2), French (B2)