Xinhe Zhang

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Cambridge, MA

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Education

Harvard University	Ph.D.	Electrical Engineering	Expected 2027
Harvard University	M.Sc.	Electrical Engineering	2024
Carnegie Mellon University	M.Sc.	Electrical and Computer Engineering	2020
Carnegie Mellon University	B.Sc.	Electrical and Computer Engineering	2018

Main Research Interests

My research focuses on the development of **multimodal AI systems for biomedical sciences**. I develop computational methods that integrate heterogeneous biomedical data—such as imaging, genomics, physiological signals, and clinical records—into unified models for biologically meaningful inference. Through rigorous model design and evaluation, I aim to advance AI methodologies that improve disease characterization, mechanistic understanding, and predictive modeling in complex biological systems.

Awards and Distinctions

2025	Poster Presentation Third Place	The Eric and Wendy Schmidt Center Symposium: Biomedical Science and AI
2024	Poster Competition Runner-Up	The NIH BRAIN Initiative NeuroAI Workshop
2024	Early-Career Scholar Honoree	The NIH BRAIN Initiative NeuroAI Workshop
2019	ECE GHC Scholarship	Carnegie Mellon University
2018	University Honors	Carnegie Mellon University
2018	CIT Research Honors	Carnegie Mellon University
2018	Dean's List	Carnegie Mellon University
2016	Elected Member	IEEE-Eta Kappa Nu (HKN)

Talks and Presentations

2025	Poster	Harvard University Center for Brain Science Retreat
2025	Poster	The Eric and Wendy Schmidt Center Symposium: Biomedical Science and AI
2025	Poster	The NSF Workshop on Reinforcement Learning
2024	Poster	The NIH BRAIN Initiative NeuroAI Workshop
2024	Lecture	Harvard University BE131 Neuroengineering
2024	Lecture	Harvard University BE129 Introduction to Bioelectronics

Workshop and Conference Organization

2025	Student Volunteer	The NSF Workshop on Reinforcement Learning
2017-2018	Co-President	CMU Summit on US-China Innovation and Entrepreneurship

Teaching

Teaching Fellow	Fall 2025	AM226 Theory of Neural Computation
Harvard University	Fall 2025	BE129 Neuroengineering
	Fall 2024	BE129 Neuroengineering
	Fall 2022	AC207 Systems Development for CS
Teaching Assistant	Fall 2020	10-707 Deep Reinforcement Learning
Carnegie Mellon University	Spring 2020	18-290 Signals and Systems
	Fall 2019	18-290 Signals and Systems
	Spring 2018	18-290 Signals and Systems
	Spring 2017	15-112 Fundamentals of Programming
	Fall 2016	18-290 Signals and Systems
	Spring 2016	15-112 Fundamentals of Programming
	Fall 2015	15-112 Fundamentals of Programming
	Summer 2015	15-110 Principles of Computing
CRLA Certified Level II:	2015-2020	15-110 Principles of Computing
Advanced Tutor		15-112 Fundamentals of Programming
Carnegie Mellon University		15-122 Principles of Imperative Computing
		15-150 Functional Programming
		15-213 Computer Systems
		18-100 Introduction to ECE
		18-290 Signals and Systems
		21-127 Concept of Math
		21-141 Matrices and Linear Transformations
		33-141 Physics for Engineering

Mentorship

First-Year Advisor	2022-2024	Harvard University
Academic Peer Advisor	2020	Carnegie Mellon University

Community Services

Student Representative	2026	Harvard Student Wellbeing Council
Peer Staffer & Mentor	2025-2026	Harvard InTouch Peer Support Network

Journal Publications

4. Qiang Li†, Ren Liu†, Zuwan Lin†, **Xinhe Zhang**†, Wenbo Wang†, Israeli Galicia Silva, Mai Liu, Zihan Gao, Samuel D. Pollock, Juan R. Alvarez-Dominguez‡ and Jia Liu‡, *Implanted flexible electronics reveal principles of human islet cell electrical maturation.* Science, 391(6787), p.eaeb3295.

3. Junya Aoyama†, Ren Liu†, **Xinhe Zhang**†, Anthony Y. Zhu, Pichayathida Luanpaisanon, Nivedhitha Velayutham, Jessica C. Garbern, Fang Cao, Irving Barrera, Hannah Fandl, Morgan Sokol, Satvik Dasariraju, Eun Seok Gil, Elton Aleksi, Toshi Amanuma, Jeffrey J. Saucerman,

Fei Chen, Jia Liu‡ and Richard T. Lee‡, *Flexible nanoelectronics reveal arrhythmogenesis in transplanted human cardiomyocytes.* Science, 390(6774), p.eadw4612.

2. Arnau Marin-Llobet‡, Sergio Sánchez-Manso, Arnau Manasanch, Lluc Tresserras, **Xinhe Zhang**, Yining Hua, Hao Zhao, Melody Torao-Angosto, Maria V Sanchez-Vives‡ and Leonardo Dalla Porta‡, *Riemannian geometry for the classification of brain states with intracortical brain recordings.* Advanced Intelligent Systems, p.e202500480.

1. Xin Tang†, Jiawei Zhang†, Yichun He†, **Xinhe Zhang**, Zuwan Lin, Sebastian Partarrieu, Emma Bou Hanna, Zhaolin Ren, Hao Shen, Yuhong Yang, Xiao Wang, Na Li, Jie Ding‡ and Jia Liu‡, *Explainable multi-task learning for multi-modality biological data analysis.* Nature Communications, 14(1), p.2546.

Conference Proceedings

3. Yuyang Zhang, **Xinhe Zhang**, Jia Liu and Na Li, *Error-in-variables methods for efficient system identification with finite-sample guarantees.* In 2025 IEEE 64th Conference on Decision and Control (CDC) (pp. 438-443). IEEE.

2. Ren Liu, **Xinhe Zhang**, Hao Sheng and Jia Liu, *In vivo neural stimulation and recording using flexible bioelectronics.* In 2024 IEEE International Electron Devices Meeting (IEDM) (pp. 1-4). IEEE.

1. Tom Bu†, **Xinhe Zhang**†, Christoph Mertz and John M.Dolan, *CARLA simulated data for rare road object detection.* In 2021 IEEE International Intelligent Transportation Systems Conference (ITSC) (pp. 2794-2801). IEEE.

Preprints

11. Ariel J. Lee†, Hao Sheng†, Arnau Marin-Llobet, Zheliang Wang, Jaeyong Lee, Ren Liu, **Xinhe Zhang**, Emma Hsiao, Jongmin Baek, Almir Aljovic, Ding Liu, Yichun He, Nanshu Lu, Jia Liu‡, *Growth-adaptive spring electronics for long-term, same-neuron mapping in the developing rat brain.* bioRxiv, 2026.

10. Jaeyong Lee†, Zuwan Lin†, Wenbo Wang†, Jongmin Baek†, Ariel J. Lee, Almir Aljović, Arnau Marin-Llobet, **Xinhe Zhang**, Ren Liu, Na Li and Jia Liu‡, *DeviceAgent: An autonomous multimodal AI agent for flexible bioelectronics.* bioRxiv, 2025.

9. Arnau Marin-Llobet†, Zuwan Lin†, Jongmin Baek†, Almir Aljovic, **Xinhe Zhang**, Ariel J. Lee, Wenbo Wang, Jaeyong Lee, Hao Shen, Yichun He, Na Li and Jia Liu‡, *An AI Agent for cell-type specific brain computer interfaces.* bioRxiv, 2025.

8. Hao Zhao‡, **Xinhe Zhang**‡, Arnau Marin-Llobet, Xinyi Lin and Jia Liu, *Benchmarking spike source localization algorithms in high density probes.* arXiv, 2025.

7. Almir Aljović†‡, Zuwan Lin†‡, Wenbo Wang, **Xinhe Zhang**, Arnau Marin-Llobet, Ningyue Liang, Bradley Canales, Jaeyong Lee, Jongmin Baek, Ren Liu, Catherine Li, Na Li, Jia Liu‡, *An autonomous AI agent for universal behavior analysis.* bioRxiv, 2025

6. Xinyi Lin, **Xinhe Zhang**, Zheliang Wang, Juntao Chen, Jaeyong Lee, Ariel J. Lee, Hang Yang, Antoine Remy, Hao Shen, Yichun He, Hao Zhao, Xuyue Zhang, Wenbo Wang, Almir Aljović,

Joost J. Vlassak, Nanshu Lu and Jia Liu‡, *Plastic-elastomer heterostructure for robust flexible brain-computer interfaces*. bioRxiv, 2025.

5. Zuwan Lin†, Wenbo Wang†, Arnau Marin-Llobet, Qiang Li, Samuel D. Pollock, Xin Sui, Almir Aljovic, Jaeyong Lee, Jongmin Baek, Ningyue Liang, **Xinhe Zhang**, Connie Kangni Wang, Jiahao Huang, Mai Liu, Zihan Gao, Hao Sheng, Jin Du, Stephen J. Lee, Brandon Wang, Yichun He, Jie Ding, Xiao Wang, Juan R. Alvarez-Dominguez‡ and Jia Liu‡, *Spatial transcriptomics AI agent charts hPSC-pancreas maturation in vivo*. bioRxiv, 2025.

4. Zuwan Lin†, Arnau Marin-Llobet†, Jongmin Baek, Yichun He, Jaeyong Lee, Wenbo Wang, **Xinhe Zhang**, Ariel J. Lee, Ningyue Liang, Jin Du, Jie Ding, Na Li, Jia Liu‡, *Spike sorting AI agent*. bioRxiv, 2025.

3. Ren Liu†, Zhaolin Ren†, **Xinhe Zhang**†, Qiang Li, Wenbo Wang, Zuwan Lin, Richard T. Lee, Jie Ding, Na Li‡ and Jia Liu‡, *An AI-Cyborg System for Adaptive Intelligent Modulation of Organoid Maturation*. bioRxiv, 2024.

2. Siyuan Zhao†, Hao Shen†, Shanshan Qin, Shouhao Jiang, Xin Tang, Madeleine Lee, **Xinhe Zhang**, Jaeyong Lee, Juntao Chen and Jia Liu‡ *Realigning representational drift in mouse visual cortex by flexible brain-computer interfaces*. bioRxiv, 2024.

1. Jin Du, **Xinhe Zhang**, Hao Shen, Xun Xian, Ganghua Wang, Jiawei Zhang, Yuhong Yang, Na Li, Jia Liu‡ and Jie Ding‡, *Drift to remember*. arXiv, 2024.

†: Contributed equally.

‡: Corresponding author(s).

Academic Services

Journals reviewing: *Nature Communications*; *Heliyon*; *International Journal of Microbiology*; *Discover Oncology*; *Frontiers in Neurology*; *Briefings in Functional Genomics*; *PLOS One*; *PeerJ Computer Science*; *International Journal of Clinical Practice*; *Open Life Sciences*; *Biochemical Genetics*; *Computational and Mathematical Methods*; *Gene Reports*

Workshops reviewing: ICML Workshop on Geometry-grounded Representation Learning and Generative Modeling; COLM Workshop on Socially Responsible Language Modelling Research; NeurIPS Workshop on Symmetry and Geometry in Neural Representations; NeurIPS Workshop on Structured Probabilistic Inference and Generative Modeling; Topology, Algebra, and Geometry in Data Science (TAG-DS)

Industry

Software Engineer	2021	JPMorgan Chase & Co
Tech Intern	Summer 2019	Guangdong Sanjiu Brain Hospital
Software Engineer	2018-2019	Duolingo
Engineer Intern	Fall 2018	Expii
Software Engineer Intern	Summer 2018	Facebook (Meta)
Software Engineer Intern	Summer 2017	Google
Engineering Intern	Summer 2016	Google