

Some Recent and Ongoing Work on Intracranial Neurodata Analysis

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Abstract:

Intracranial neurodata refers to data related to the brain that is collected from within the skull. This kind of data provides rich sources and insights into the function and structure of the brain, and is highly valuable in neurology, neurosurgery, and neuroscience research. In this talk, we begin with two recent projects, one on ordinary differential equation modeling, and the other on dynamic mediation analysis, that are useful for modeling intracranial neurodata. We also discuss some ongoing projects on deep brain stimulations based on intracranial neuronal signals acquired from electrodes implanted within the brain.

Short Bio:

Lexin Li, Ph.D., is a Professor of Biostatistics at the Department of Biostatistics and Epidemiology, and Helen Wills Neuroscience Institute, of the University of California, Berkeley. His research interests include neuroimaging analysis, deep brain stimulation, brain-computer-interface, reinforcement learning, ordinary differential equations, tensor data analysis, and network data analysis. He is a Fellow of the American Statistical Association (ASA), a Fellow of the Institute of Mathematical Statistics (IMS), and an Elected Member of the International Statistical Institute (ISI). He is the Editor-in-Chief of the Annals of Applied Statistics for 2025-27.

Relevant papers:

- [1] Dai, X. and Li, L. (2023). Orthogonalized kernel debiased machine learning for multimodal data analysis. *Journal of the American Statistical Association*, 118, 1796-1810.
- [2] Dai, X. and Li, L. (2024). Post-regularization confidence bands for ordinary differential equations. *Journal of Machine Learning Research*, 25, 1-51.
- [3] Luo, L., Shi, C., Wang, J., Wu, Z., and Li, L. (2023). Multivariate dynamic mediation analysis under a reinforcement learning framework. *arXiv:2310.16203*, 1-41.