

Lesion-Centric Quantitative Neuroimaging: Integrating MRI Innovation and AI-Driven Analysis for Neurodegeneration



Invited Speaker

Jinwei Zhang

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Zoom Meeting: 801 137 0362

Biography

Jinwei Zhang received his B.S. in Optics and Optical Engineering (2016) and a dual B.S. in Computational Mathematics (2017) from Sun Yat-sen University, China, and his Ph.D. in Biomedical Engineering from Cornell University (2023). He is currently a Postdoctoral Fellow in Electrical and Computer Engineering at Johns Hopkins University and will join the University of Massachusetts Amherst as a tenure-track Assistant Professor in Biomedical Engineering in Fall 2026. His research focuses on accelerated quantitative magnetic resonance imaging, quantitative susceptibility mapping, and lesion-centric imaging analysis in multiple sclerosis and related neurological disorders. He is a recipient of a U.S. Department of Defense Early Investigator Research Award and a Johns Hopkins Data Science and AI Demonstration Award, supporting his efforts to develop and translate lesion-centric imaging biomarkers for neurological diseases.

Abstract

Quantitative magnetic resonance imaging (qMRI) enables noninvasive characterization of tissue microstructure for studying neurodegeneration, but its clinical utility is limited by long scan times and the lack of methods for identifying and tracking individual white matter lesions (WMLs) over time—a hallmark of many neurological disorders. This work develops accelerated qMRI acquisition and reconstruction methods, robust quantitative susceptibility mapping (QSM), and lesion-wise segmentation and tracking algorithms to enable fine-grained analysis of lesion evolution. By integrating pulse sequence programming, physics-informed modeling, and domain-generalizable deep learning, this framework aims to translate lesion-level imaging biomarkers into scalable tools for neurodegenerative disease research and clinical studies.