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FACULTY CANDIDATE SEMINAR

MONDAY, APRIL 7, 2025 | 11:45 A.M. - 12:45 P.M. | ARMS 3115

DIFFUSION MRI FOR NEUROSCIENCE: PROBING BRAIN STRUCTURE AND MICROSTRUCTURE IN VIVO



GABRIEL RAMOS LLORDEN, PH.D.

Athinoula A. Martinos Center for Biomedical Imaging
Massachusetts General Hospital
Harvard Medical School

Abstract: Diffusion Magnetic Resonance Imaging (dMRI) has revolutionized our ability to noninvasively probe the architecture of the human brain. By capturing how water diffuses through tissue, dMRI provides unique insights into white matter connectivity and microstructural organization. This talk will highlight how advanced acquisition and modeling techniques enable the mapping of structural connections and microstructural features across the brain. Emphasis will be placed on recent technological developments that enhance spatial resolution, signal-to-noise ratio, and acquisition efficiency—paving the way for mesoscale connectomics and microstructural imaging in vivo. Applications in neuroscience will be illustrated through examples in brain development, human memory research, aging, and neuropsychiatric disorders. The talk will conclude with a discussion on current challenges and future directions for diffusion MRI in bridging structure and function in the living human brain.

Biosketch: Gabriel Ramos Llorden, Ph.D., is Instructor (Junior Faculty) at the Athinoula A. Martinos Center for Biomedical Imaging, Department of Radiology at Massachusetts General Hospital and Harvard Medical School. With over a decade of experience in MR imaging methodology development, his work focuses on advancing acquisition and reconstruction MRI strategies to enhance our understanding of the human brain in health and disease. He holds a Ph.D. in MR Physics from the University of Antwerp, Belgium (2018), and a degree in electrical engineering focused on medical image signal processing from the University of Valladolid, Spain (2012). He is a 2024 NIH Brain Initiative K99/R00 Awardee and a Junior Fellow of the International Society for Magnetic Resonance in Medicine (ISMRM).