



MRS 2026 Symposium

Institute of Biomedical Engineering
Boğaziçi University · Istanbul, Türkiye

19 October 2026 | 11:00–13:00

Kandilli Deep Tech Base (Kandilli Derin Teknoloji Üssü), BTK-1

Zoom participation: Please email esin.ozturk@bogazici.edu.tr to obtain the link.

Program

Time	Session
11:00–11:30	AI-informed Progression Mapping for Precision Radiotherapy Planning in Neuro-oncology Prof. Dr. Janine Lupo University of California, San Francisco
11:30–12:00	Mapping Brain Metabolism in Psychiatric Disorders Assoc. Prof. Dr. Yan Li University of California, San Francisco
12:00–12:30	Functional Magnetic Resonance Metabolic Imaging: Opening a New Window into Brain Function Asst. Prof. Dr. Lijing Xin École Polytechnique Fédérale de Lausanne
12:30–13:00	Open Discussion and Q&A



Janine Lupo



Yan Li



Lijing Xin

AI-informed Progression Mapping for Precision Radiotherapy Planning in Neuro-oncology



Prof. Dr. Janine Lupo

University of California, San Francisco

Abstract

Despite the benefits of radiation therapy for tumor control in patients with glioblastoma, most tumors still recur within a year, and up to ~30-40% of these patients experience progression that is outside the treated volume. This is partly due to clinical practice still treating a uniform 2cm isotropic expansion of the T2-lesion that may or may not contain tumor cells, while infiltrating tumor cells that extend beyond this boundary into otherwise normal brain tissue remain untreated. This talk will demonstrate the feasibility of using a novel deep learning-based approach for predicting future regions of tumor progression from various types of MR images and generating hypothetical target volumes for RT treatment. Our deep learning models with multi-parametric MRI outperformed the standard uniform 2cm expansion volume for covering the progressed lesion while sparing more healthy brain, highlighting the potential of this approach for modifying future personalized RT planning paradigms.

About the Speaker

Janine Lupo, PhD, is a Professor and Associate Chair of Faculty Mentoring in the Radiology and Biomedical Imaging, and co-chair of UCSF/UC Berkeley Graduate Group in Bioengineering. She received her BSE in Bioengineering at the University of Pennsylvania, School of Engineering and Applied Science in Philadelphia before completing her PhD at the UCSF/UCB Joint Graduate Program in Bioengineering. Her current research focuses on the development and application of novel MR imaging processing and analysis techniques for incorporating physiologic and metabolic MR imaging into AI-based models for the evaluation of patients with brain tumors. This includes leveraging deep learning approaches to predict underlying biological characteristics from pathology, the migration of tumor cells leading to progression, and prognosis from metabolic and physiologic MRI, with the ultimate goal of incorporating these tools into routine patient management.

Mapping Brain Metabolism in Psychiatric Disorders



Assoc. Prof. Dr. Yan Li

University of California, San Francisco

Abstract

Magnetic resonance spectroscopy (MRS) offers a unique, non-invasive approach to evaluating brain neurochemistry, complementing conventional MRI by measuring metabolites linked to neuronal function and neurotransmission. This talk will highlight my use of MRS to investigate autism and depression, addressing distinct neurochemical questions in each condition. In autism, I will focus on glutamate and GABA—the brain's primary excitatory and inhibitory neurotransmitters—and their potential to characterize speech-related differences in excitatory–inhibitory balance. In depression, I will discuss alterations in glutamate and N-acetylaspartate (NAA), a marker of neuronal and mitochondrial integrity, and how these measures may provide insight into disrupted neurotransmission, brain metabolism, and treatment-related changes. Together, these studies illustrate the potential of MRS to reveal neurochemical alterations in psychiatric disorders and to provide quantitative, in vivo markers of brain function.

About the Speaker

Yan Li, MBBS, PhD, is an Associate Professor in the Department of Radiology and Biomedical Imaging at the University of California, San Francisco (UCSF). Her research focuses on developing advanced MR spectroscopic imaging methods and metabolic biomarkers to characterize disease biology and improve diagnosis and treatment monitoring. A major focus of her work is whole-brain metabolic imaging using proton MR spectroscopy, with applications in brain tumors and neuropsychiatric and neurologic disorders. Her research also explores emerging metabolic imaging approaches, including hyperpolarized carbon-13 and deuterium MR spectroscopy. A central goal of her program is to translate these technologies into practical tools that can be implemented in clinical settings and ultimately improve patient management.

Functional Magnetic Resonance Metabolic Imaging: Opening a New Window into Brain Function



Asst. Prof. Dr. Lijing Xin

École Polytechnique Fédérale de Lausanne

Abstract

The human brain is a complex network integrating structural, molecular, and functional organization to support cognition and behavior. MRI-based connectomics, particularly diffusion and functional MRI, has provided powerful tools for mapping brain networks, but offers limited information about the molecular and metabolic interactions underlying network function. Magnetic resonance spectroscopy and spectroscopic imaging (MRS/MRSI) can bridge this gap by providing non-invasive measurements of neurochemistry and energy metabolism. Dynamic metabolic mapping with functional MRSI (fMRSI) could add a new dimension to brain connectomics by revealing spatially resolved metabolic responses and neurometabolic connectivity. In this talk, I will present our recent developments in fast 1H and 31P MRSI, demonstrate fMRSI mapping of metabolic responses during visual stimulation, and discuss its potential for investigating the metabolic mechanisms underlying functional brain networks.

About the Speaker

Lijing Xin is an Assistant Professor at the Institute of Physics, École Polytechnique Fédérale de Lausanne (EPFL) and a research staff scientist at the Center for Biomedical Imaging. She obtained her PhD in physics from EPFL and completed her postdoctoral training at the Centre for Psychiatric Neurosciences, Lausanne University Hospital. Her research interests focus on developing cutting-edge multinuclear magnetic resonance spectroscopy (MRS) and imaging methods for better understanding brain function and the pathophysiology of neurological diseases.

She has published over 80 peer-reviewed journal articles, and her research is continuously supported by the Swiss National Science Foundation (SNSF) and other foundation grants. Recently, she was awarded a prestigious SNSF Consolidator Grant to study complex neurometabolic pathways underlying brain networks and to identify potential non-invasive biomarkers for the early detection of psychosis. She previously served as Chair of the “MR in Psychiatry” Study Group of the International Society for Magnetic Resonance in Medicine (ISMRM) and currently serves as Vice-Chair of the “MR Spectroscopy” Study Group. She is also an Associate Editor of Translational Psychiatry and a member of the editorial board of Quantitative Imaging in Medicine and Surgery.