Brain Mapping Center

# SEMINAR SERIES

**Sponsored by the UCLA Brain Mapping Center Faculty**

The focus of these talks is on advancing the use of brain mapping methods in neuroscience with an emphasis on contemporary issues of neuroplasticity, neurodevelopment, and biomarker development in neuropsychiatric disease.

Hosted By: Roger P. Woods, MD, Neurology, UCLA

## "Imaging Neurodegenerative Disease: Quantitative MRI and Biomarkers for Parkinson's Disease"


### E. Mark Haacke, PhD

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Director of the Perinatal MR Imaging Research Program


129STAGE is a rapid multi-contrast imaging technique that can provide not only standard T1 and T2 like contrasts but also proton spin density weighted images, T2* weighted images, SWI, R2* maps, QSM maps, water content maps, circle of Willis MRA, auto segmentation of white matter, gray matter and cerebrospinal fluid and simulated FLAIR in 3 to 6 minutes. STAGE can be used to create a new series of homogeneous images that have been corrected for both radiofrequency transmit and receive inhomogeneities.

During the last few years, we have focused on measuring iron content and neuromelanin (NM) in the substantia nigra (SN) for comparing idiopathic Parkinson's disease (PD) with healthy controls and patients with other movement disorders. We have found that the volume of NM, the iron content of the SN, volume of the SN and the N1 sign all together can provide an area under the curve (AUC) of 95% in distinguishing PD from healthy controls. We have developed a template of the midbrain to allow for automatic detection and quantification of these properties. During the process, we used tSWI to enhance the N1 sign visibility. Our data have been acquired using STAGE which is a rapid, quantitative, multi-contrast data collection and processing that is vendor agnostic. As such we have created a protocol that can be used for PD studies globally.

More recently, we have been using an intermediate arterial flow saturated magnetization transfer contrast sequence to map the locus ceruleus. This sequence requires less than 5 minutes and covers all the deep gray matter in the brain for iron quantification. One of the key issues is the right choice of flip angle (18o-25o). However, if there is a need to visualize the LC at different flip angles, then an MTC STAGE version of the sequence can be run and the data reprocessed to create the contrast of any desired flip angle. The processing we use for STAGE acquired data is referred to as SPIRIT (signal processing in rapid imaging technology) processing.

## August 21, 2025 11:00am - 12:00pm PDT

**Hybrid: Zoom (https://ucla.in/41aTo7v) and Brain Mapping Center Conference Room (221)**

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