Cerebral ischemia can result in significant gray and white matter injury, with previous studies showing that white matter, after adjusting for metabolic demands, is even more vulnerable to ischemia than gray matter. Notwithstanding, many studies focus on cortical damage and lesion overlap as an indicator for clinical representation and recovery potential. Unfortunately, in some cases this approach has turned out to be incomplete and several studies have shown that mapping the extent of white matter damage, using connectivity studies, could potentially complete this picture. Although many of these studies solely focus on the number of tracts present, it is plausible that not only the presence of streamlines, but also the integrity along the streamlines plays an important role and could reveal important information. In this talk, I will discuss the importance of microstructure of the residual language network using Diffusional Kurtosis Imaging (DKI). DKI is an extension of the conventional diffusion tensor imaging (DTI), but estimates the kurtosis (non-Gaussianity) of the diffusion process. Water in the brain follows a restricted non-Gaussian diffusion pattern due to the different biological structures. This non-Gaussian pattern cannot be measured using diffusion tensor imaging, but can be directly assessed with DKI. We will briefly cover the basics of DKI, improved kurtosis based white matter fiber tracking and the white matter tract integrity model. The latter is a biophysical model that has been developed to interpret DKI metrics, providing biologically relevant descriptors of the microstructural environment. The remainder of the time, I will present some exciting recently published data using these techniques, that demonstrated an association between therapy-related reduction in semantic speech production errors and an increase in mean kurtosis in the left Inferior Longitudinal Fasciculus (ILF). ILF microstructure was not related to changes in phonemic production errors. These results are directly in line with the dual stream model suggesting that with therapy the ILF becomes increasingly complex as fewer semantic errors are being made.

Location: University of South Carolina, Discovery I, Room #140, 915 Greene Street, Columbia, SC 29208
Date: Thursday, September 28th, 2017. Time: 2pm – 3pm EDT
This event will be catered!

The lecture can also be followed online from your computer, tablet or smartphone, via the following GoToMeeting address (no password required): https://global.gotomeeting.com/join/667426173
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