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"Measuring Structural and Functional Brain Connectivity using MRI: Increasing our understanding of human behavior in health and disease".

Neuroimaging methods such as structural and functional MRI enable us to study the brain as a complex system with multiple nodes (individual brain regions) and numerous connections between nodes (represented by mono- and polysynaptic neuronal connections and/or direct white-matter fiber bundles). This model is currently widely used to increase our understanding of normal brain-behavior relationships and also helps to explain or predict symptoms of neurologic and psychiatric diseases. In this seminar, I will describe some of the recent innovations in brain imaging methods and analytic approaches that were in part driven by the Human Connectome Project. I will argue that these technical improvements offer tools to better track changes in human cognitive states from moment-to-moment and from day-to-day and that novel metrics of brain network integrity hold promise as in vivo biomarker of neurologic and psychiatric disease states.**