

Exploring brain markers of neurodevelopmental and psychiatric disorders



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**9:30-10:30 am**  
**Mann Hall, Room 203**

**Short Bio:** **Andrew Michael, PhD** received his Bachelor of Engineering (first class) in electronics and communication from the National Institute of Technology, India. His undergraduate degree was sponsored by a full scholarship from the Government of India. He received his MS in electrical engineering from the Rochester Institute of Technology (RIT), New York, where his primary research was on developing algorithms for autonomous cooperative robots. He then joined RIT's Chester F. Carlson Center's unique Imaging Science (CIS) doctoral program where he received training on the physics of image formation, the mathematics of image analysis, and the engineering of imaging instrumentation. At CIS, he worked on a NASA project to analyze images obtained from the Hubble Space Telescope. During his doctoral training, he received the National Radio Astronomy Observatory fellowship to perform algorithm development for interferometry images of the Very Large Array in New Mexico. He then performed his PhD dissertation at the Mind Research Network (MRN), Albuquerque on "Imaging Schizophrenia: Data Fusion Approaches to Characterize and Classify." Andrew continued his work on method development at MRN as a research scientist and program manager. He then moved to Geisinger Health System Pennsylvania as assistant professor and the founding director of the Neuroimaging Analytics Laboratory. At Geisinger he collaborates with psychiatrists, geneticists, neuroscientists, neurosurgeons and engineers to better understand the genetic etiologies and the neural underpinnings of NDPDs. In addition, Andrew is a member of Geisinger's Institute of Advance Applications where he is involved in developing new patient care technologies by applying big data analytics and machine learning approaches to clinical datasets.

**Abstract:** Neurodevelopmental and psychiatric disorders (NDPD), such as autism, ADHD, depression, bipolar, schizophrenia, etc. collectively affect one in five individuals in the US. Although NDPDs are prevalent at an alarming rate, the etiology of NDPDs are not known and current diagnoses and treatments are based on subjective behavioral assessments. Although image based diagnoses are widely used in the clinical settings, they are not used to diagnose NDPDs. Development of new imaging technologies to *in vivo* image the human brain and analysis methods to identify the neural underpinnings of NDPDs is a rapidly growing area of research. Of the various neuroimaging techniques, functional magnetic resonance imaging (fMRI) is leading this effort. This talk will begin with a discussion on the prevalence of NDPDs in the US and the urgent need to find better diagnostic markers. After a brief introduction to fMRI, some of the key fMRI findings in autism and schizophrenia will be presented. We will then discuss speaker's recent results from the Human Connectome Project. The talk will conclude with future directions and a discussion on the BRAIN initiative that can potentially transform the diagnosis and treatment of NDPDs.