Abstract
In development and adulthood, cognitive symptoms of disorders are preceded by neuroanatomical abnormalities that are indicative of disease vulnerability. There are growing bodies of literature identifying neuroanatomical markers of psychosis in adolescence and dementia in adulthood. Prevention is an increasing target of intervention for reducing the burden of these disorders. Establishing early biomarkers for disease is critical for identifying individuals who are at risk and may benefit from early therapy. In this talk, we will briefly discuss tools developed in collaborative work to characterize healthy developmental patterns of neuroanatomy and cerebral blood flow through adolescence. We will then focus in depth on identifying neuroanatomical features associated with Alzheimer’s disease risk. We propose and develop a framework for testing the association of a high-dimensional imaging measurement with a diagnostic outcome, and for localizing signal to identify regions of the brain that are associated with disease. Our procedure is based on a modification of the score test that projects the imaging data to a lower dimensional subspace. Local regional inference can then be performed using the score statistics that are projected into the lower dimensional space, which have smaller variance and degrees of freedom.