Biographical Information
Dr. Jay N. Giedd received his M.D. from the University of North Dakota in 1986. He received his training in adult psychiatry at the Menninger Foundation in Topeka, KS, and in child and adolescent psychiatry at Duke University in Durham, NC. Dr. Giedd is a practicing psychiatrist and chief of Brain Imaging at the Child Psychiatry Branch, National Institute of Mental Health, where for the past 19 years he has conducted a longitudinal project combining neuroimaging, genetics, and psychological assessments to explore the neurobiology of development in health and illness. The data set for this project consists of over 5,000 scans from 2,000 subjects, approximately half typically developing (of these approximately half are twins), and half from one of 25 clinical populations including ADHD, autism, and childhood onset schizophrenia. In addition to serving as comparisons for the diagnostic groups, results from the normative populations have provided novel insights about brain changes during adolescence, male/female differences, and genetic/environmental influences on brain development trajectories. The project has been highly collaborative, with resulting papers published by over 500 coauthors representing 80 different institutions.

Presentation Abstract (4:30 pm)
Imaging the Developing Brain
Magnetic Resonance Imaging (MRI), with its lack of ionizing radiation, provides safe and unprecedented access to the anatomy and physiology of the living maturing human brain. Converging results from longitudinal structural MRI (sMRI) studies of children and adolescents indicate roughly linear increases in white matter and inverted-U shaped developmental trajectories of gray matter. Peak gray matter thickness occurs at different times in different structures/regions. The prefrontal cortex, a high association area involved in neural circuitry subserving such functions as impulse control, judgment, and long range planning, is particularly late to reach adult morphology. Although male and female brains are much more alike than dissimilar, on average female brains reach peak gray matter size 1 - 3 years earlier and morphometric measures of male brains are more highly variable across all structures examined. Pediatric MRI studies of brain function (fMRI) generally show task specific changes in frontal/limbic balance, moving from a diffuse to a focal pattern of activations, and increasing integration of widely distributed circuitry. Overall these findings paint adolescence as a distinct neurobiological stage (as opposed to a simple linear transition from childhood to adulthood) with highly dynamics changes in structure and function. The relationship between these neuroimaging findings and changes in cognition, behavior, and emotion is far from elucidated and remains an area of active research. Likewise, studies of influences, for good or ill, on developmental brain trajectories are in early stages. In this presentation, Dr. Giedd will summarize results to date from the longitudinal structural MRI project and discuss genetic and environmental influences on brain development in health and illness.