ROBERT LOUGHNAN's DEFENSE

UNDERSTANDING THE GENETIC INFLUENCE ON TRAITS RELATED TO BRAIN AND BEHAVIOR IN ADULTS AND CHILDREN

Abstract:

Twin studies have established that the influence of genetics on human traits related to brain and behavior are pervasive. For a large majority of complex human traits, uncovering which genetic variants are associated with phenotypic variations, by performing Genome Wide Association (GWA) studies, has been difficult due these traits being highly polygenic – many genetic variants with small effects that have a larger effect in aggregate. Conversely, some traits have been shown to have a mendelian genetic architecture – a single genetic variant imparting a large effect. In this thesis I explore the genetic contribution to variability of traits relating to brain and behavior in large GWA datasets for phenotypes of increasing complexity: a) mendelian traits, b) polygenic traits and c) polygenic and multi-dimensional traits. Firstly, I will present analysis of the neurological impact of individuals with hereditary hemochromatosis, a mendelian disorder which results in an excess of iron being absorbed by the body. Next, I present two projects investigating the genetic propensity/liability of i) psychopathology and ii) cognitive performance in a large sample of typically developing children aged 9-10 years old. Finally, I will present a method for analyzing polygenic and multi-dimensional traits and apply it to the phenotype of human cortical morphology (cortical area, thickness and sulcal depth). In the age of large genomic databases this work may prove to be important for early detection of at-risk groups as well as understanding the genetic determinants that give rise to complex human traits.

ROBERT LOUGHNAN
TO DEFEND

FRIDAY
AUGUST 20, 2021
AT 9 AM

VIA Zoom

COMMITTEE MEMBERS:

Terry Jernigan, Chair,
Cognitive Science

Anders Dale, Co-Chair
Neurosciences

Eran Mukamel, Cognitive Science

Brad Voytek, Cognitive Science

Wesley Thompson, Family Med
and Public Health

Chun Chieh Fan, Radiology