Introduction to Imaging Genetics

Organizers:

Jason Stein
UNC-Chapel Hill, Chapel Hill, NC, United States

Jean-Baptiste Poline
University of California at Berkeley, Berkeley, CA, United States

This course will introduce the fundamentals of "Imaging Genetics," the process of modeling and understanding how genetic variation influences the structure and function of the human brain as measured through brain imaging. The course begins with a lecture on the fundamentals of genetics, including the types of variation observed in the human, the mechanism by which that variation develops, and understanding how to relate genetic variation to a measured phenotype. We will then delve more into applications of genetics to neuroimaging phenotypes with an overview of imaging phenotypes. We will provide the student with modern tools to perform associations to both common and rare variation, conduct imputation and meta-analysis, and interpret significant findings. Overall this course will provide the neuroimager who is not familiar with genetics techniques both theoretical and practical understanding of the genetics field when exploring neuroimaging phenotypes.

Course Schedule:

8:00-8:30
Structure, Measurement & Analysis of Genetic Variation
Sven Cichon, Research Center Jülich, Germany

8:30-9:00
Neuroimaging Phenotypes & Heritability
Roberto Toro, Institut Pasteur, Paris, France

9:00-9:30
Reproducibility of Imaging Genetics Findings: Power, candidate genes and other issues
Jean-Baptiste Poline, University of California at Berkeley, Berkeley, CA, United States

9:30-10:00
Searching for common variants
Derrek Hibar, University of Southern California, Los Angeles, CA, United States

10:00-10:30
Break

10:30-11:00
Imputation & Meta-analysis
Alexander Teumer, Universitätsmedizin Greifswald, Greifswald, Germany

11:00-11:30
Rare variant discovery using family based studies
David Glahn, Yale University, Hartford, CT

11:30-12:00

After the association: Functional and Biological Validation of Variants

Jason Stein, UNC-Chapel Hill, Chapel Hill, NC, United States,