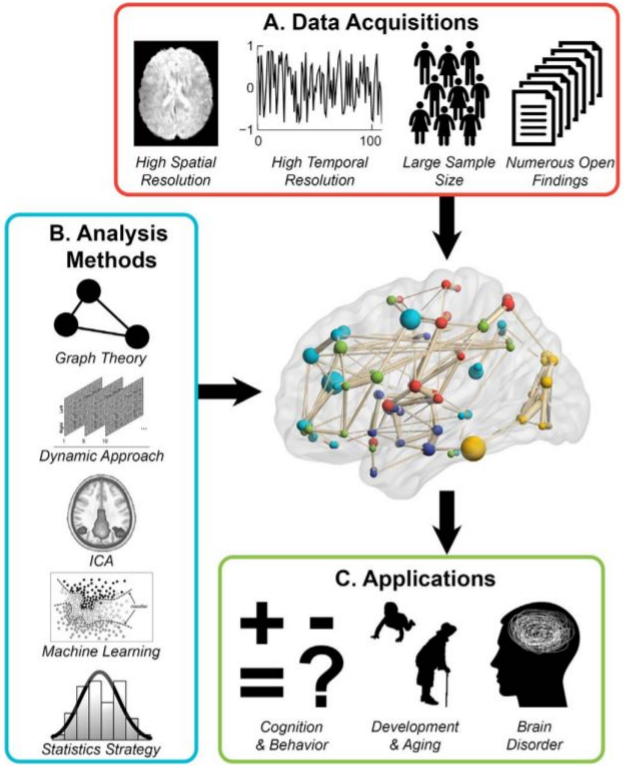
Functional Connectomics from a “big data” Perspective

Mingrui Xia, Yong He

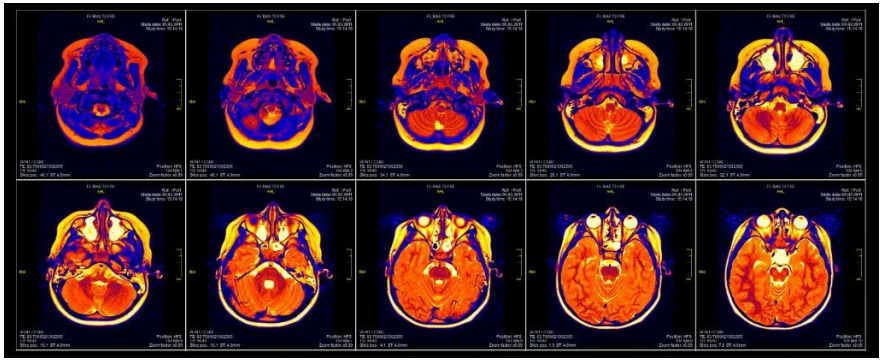
Opportunity

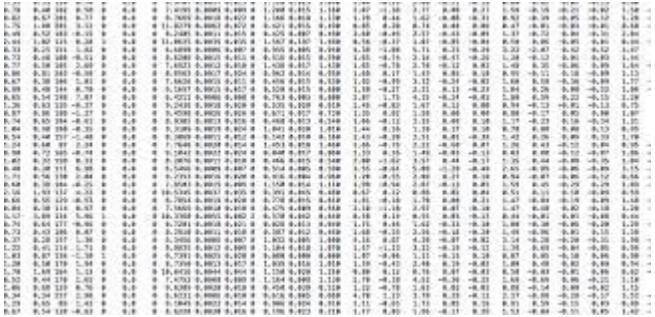
- Dramatic growth in Connectomics has led to the build up of immensely large amounts of data in the form of:
  - Neuroimaging scans
  - Cognitive data
  - Genetic and environmental data
  - Clinical Measurements
- Many large scale projects are involved, including the Human Connectome Project
- New Technologies have increased the accuracy of brain scans to better display brain functions



Challenge

- Due to new technologies, data is much more precise
- How do you analyze such a high volume data?
- Results should be re-testable
- Big Data vs Small Data





Action

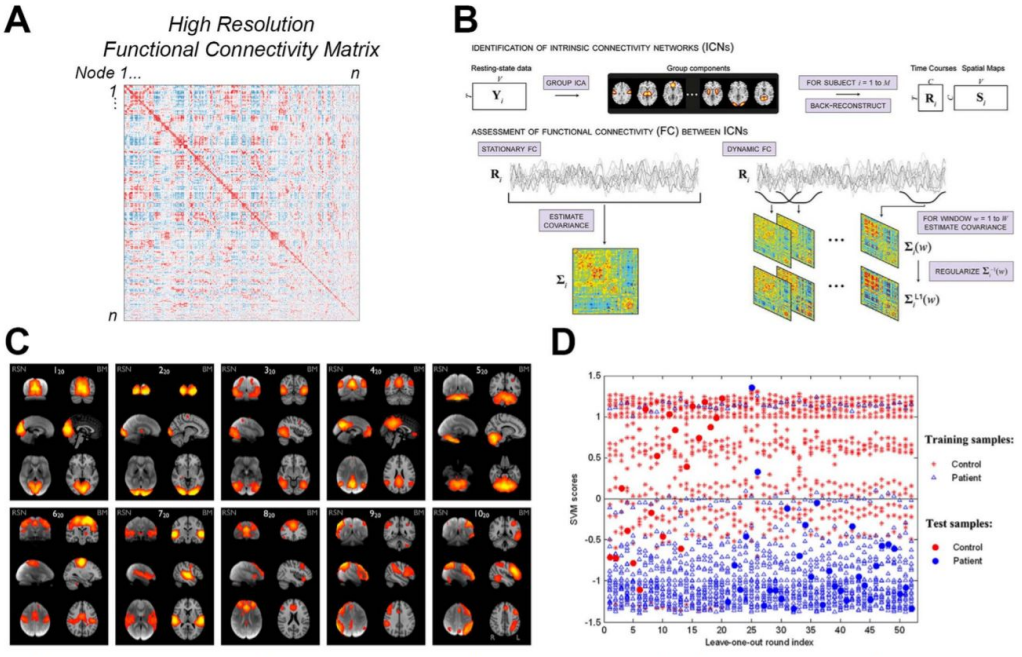
Graph Theoretical Approach

Dynamic Functional connectome

Independent Component Analysis

Machine Learning Algorithms

Statistical Analysis Strategies



Resolution

Application Research of Functional Connectomic Big Data

Cognition and Behavior

Development and Aging

Brain Disorders

Feedback/Future Work

There is still much unknown about the functions of the brain, and there are still limits on technology and data analysis tools.

Strengths: Good overview of present Connectomics research, References a large variety of research in Functional Connectomics and explains their significance

Weaknesses: Seems to be targeting only Connectomicsn Researchers, References complicated details without explanation, citations get in the way of a fluid reading,