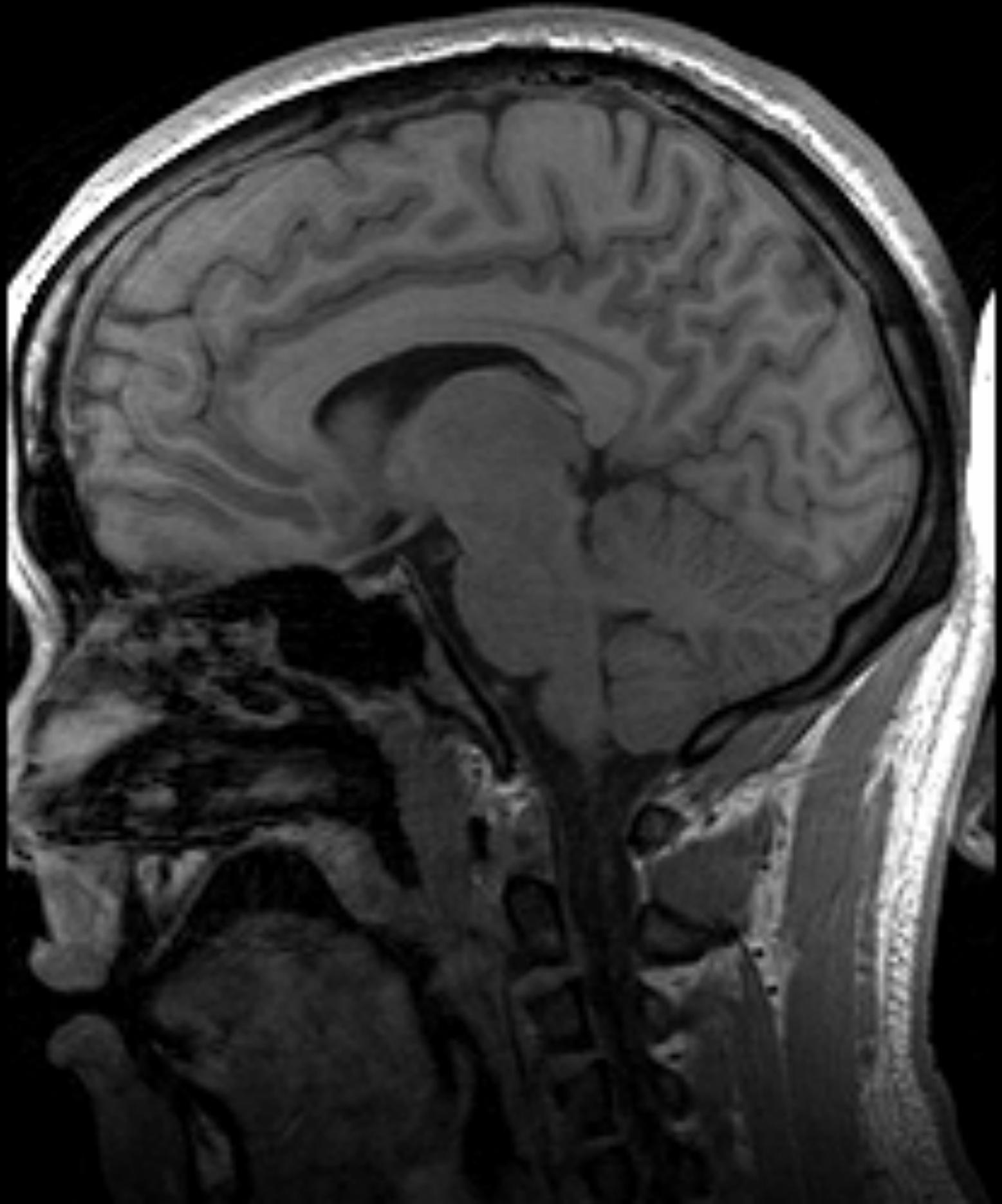
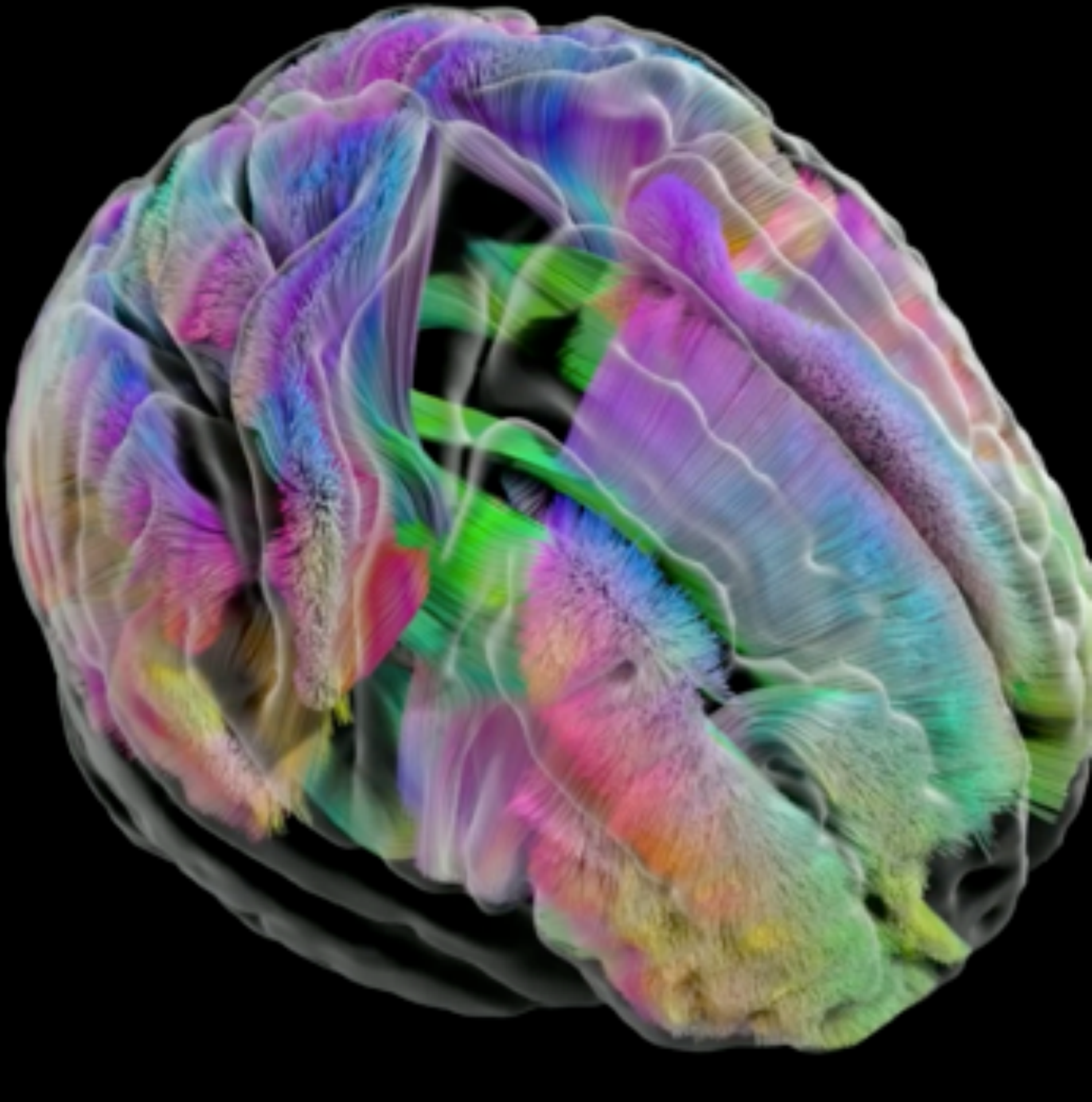
Towards the goal of comparative connectomics

How do patterns in graph topology characterize neurological phenotypes?



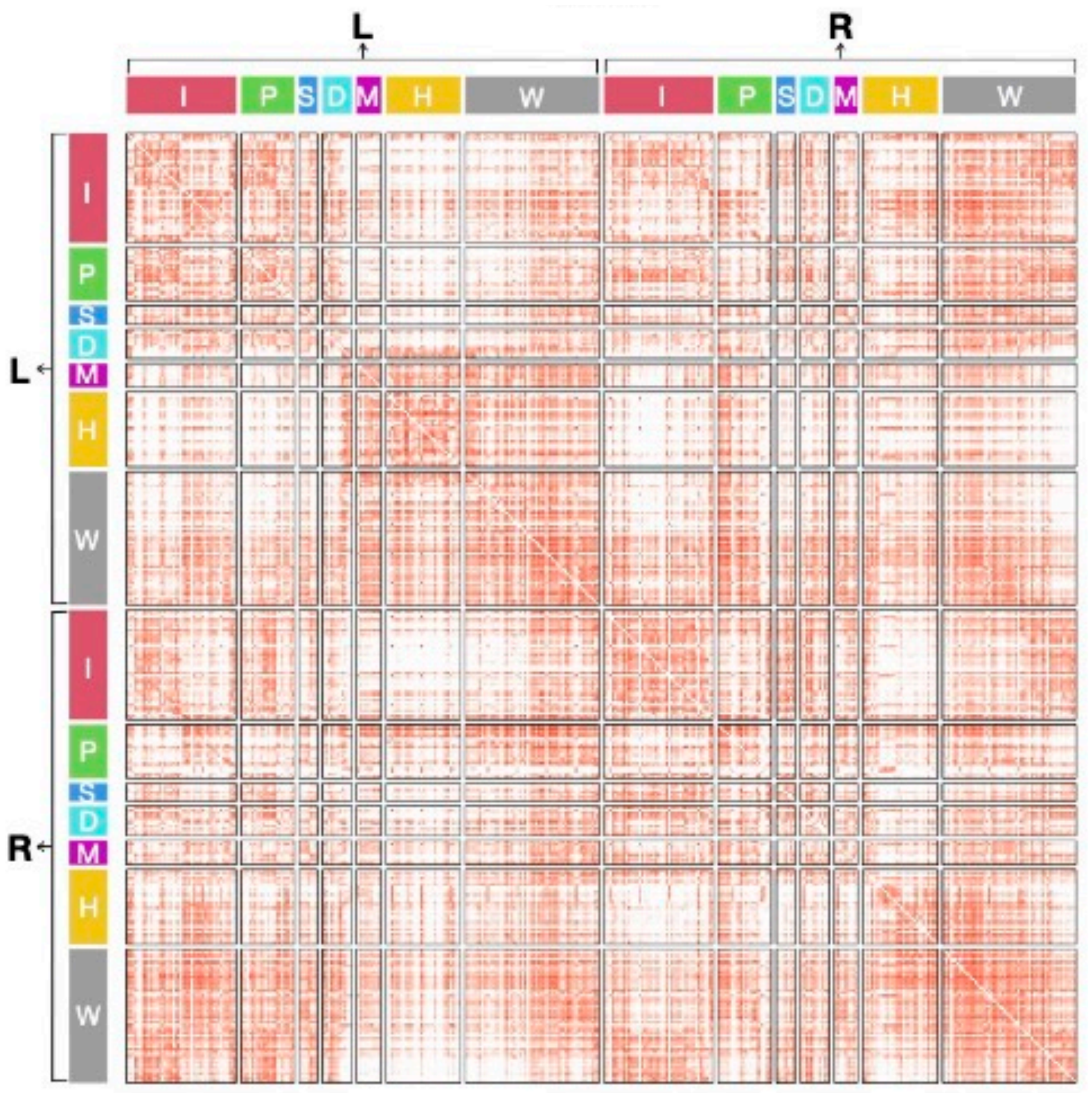
Neuroimaging (1970s)
(Source: Wiki Commons)



Tractography (1990s)
(Source: USC)

Statistical inference on graphs (?)

High-throughput pipelines (2010s)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fcon_1000.projects.nitrc.org/indi/abide/

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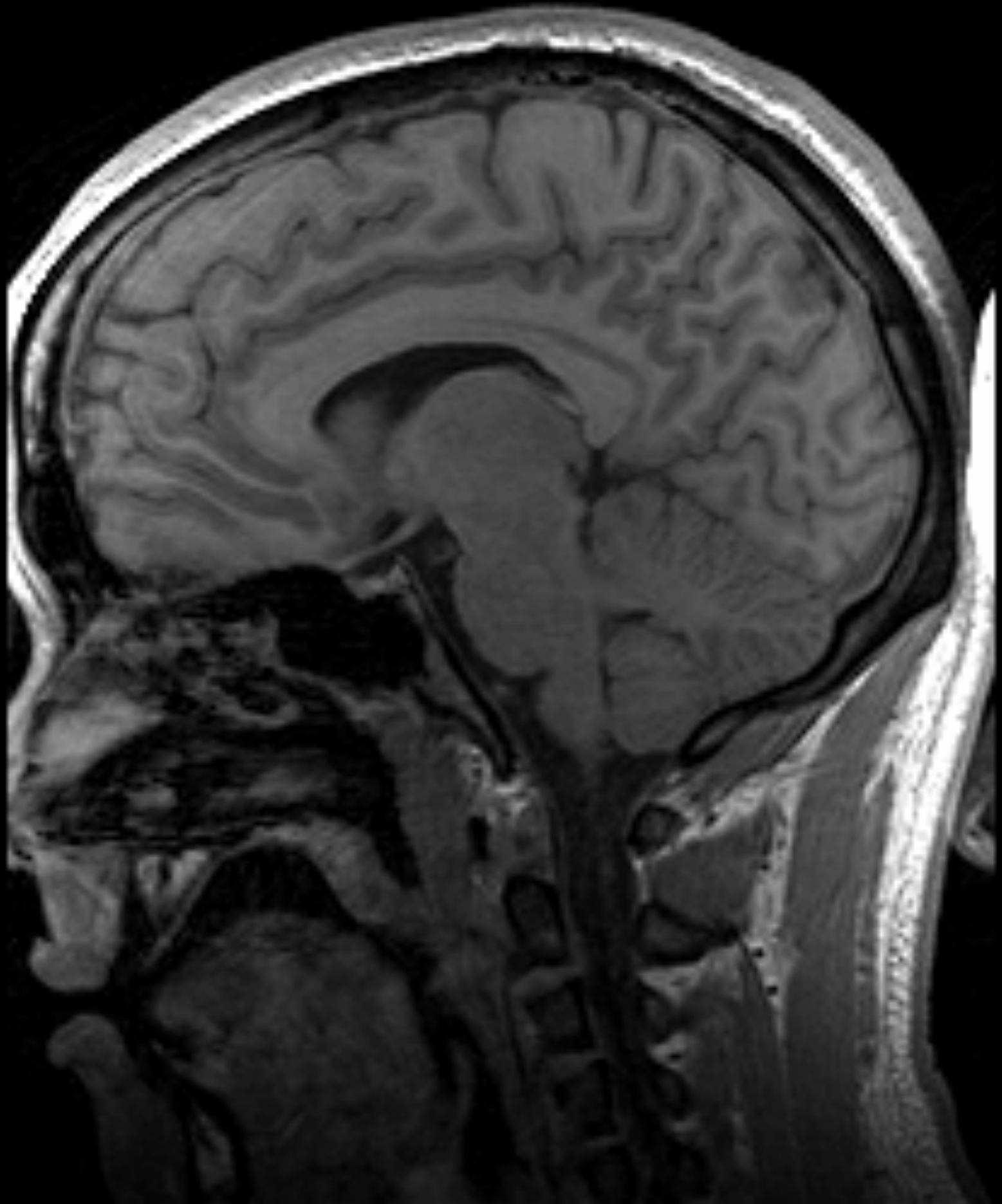
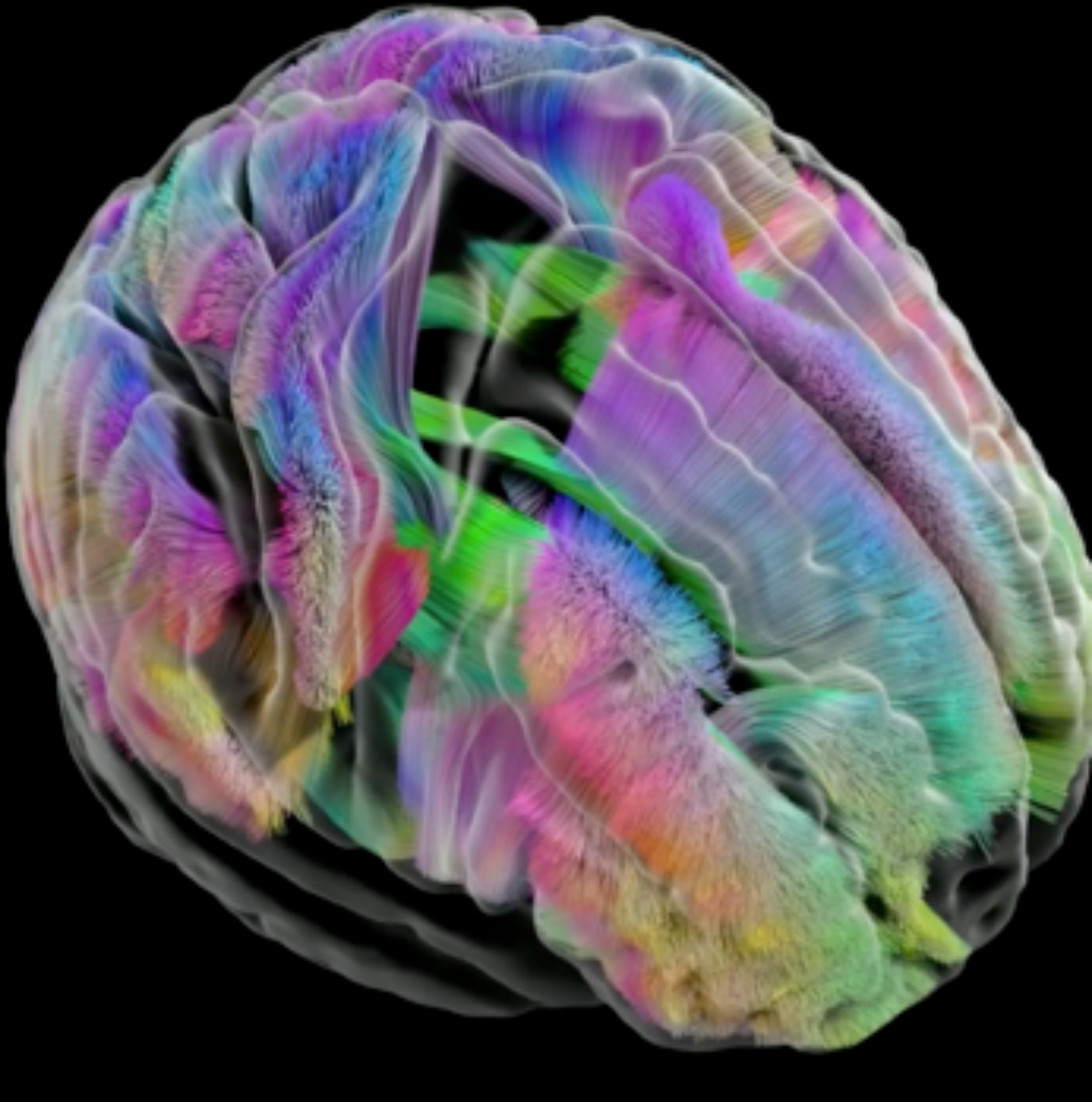
Welcome to the Autism Brain Imaging Data Exchange!

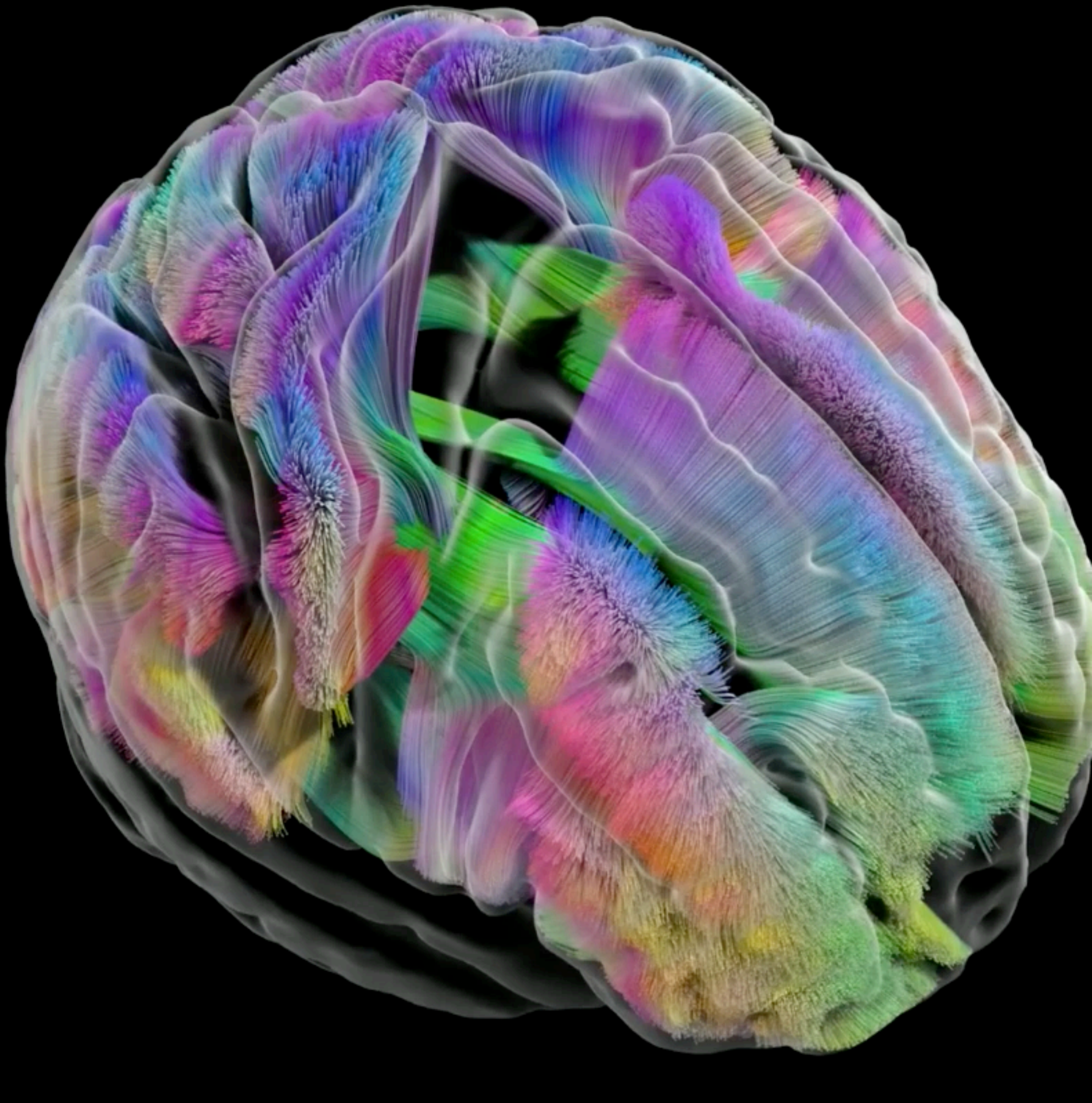
ABIDE
Autism Brain Imaging Data Exchange

Introduction

Autism spectrum disorder (ASD) is characterized by qualitative impairment in social reciprocity, and by repetitive, restricted, and stereotyped behaviors/interests. Previously considered rare, ASD is now recognized to occur in more than 1% of children. Despite continuing research advances, their pace and clinical impact have not kept up with the urgency to identify ways of determining the diagnosis at earlier ages, selecting optimal treatments, and predicting outcomes. For the most part this is due to the complexity and heterogeneity of ASD. To face these challenges, large-scale samples are essential, but single laboratories cannot obtain sufficiently large datasets to reveal the brain mechanisms underlying ASD. In response, the Autism Brain Imaging Data Exchange (ABIDE) initiative has aggregated functional and structural brain imaging data collected from laboratories around the world to accelerate our understanding of the neural bases of autism. With the ultimate goal of facilitating discovery science and comparisons across samples, the ABIDE initiative now includes two large-scale collections: ABIDE I and ABIDE II. Each collection was created through the aggregation of datasets independently collected across







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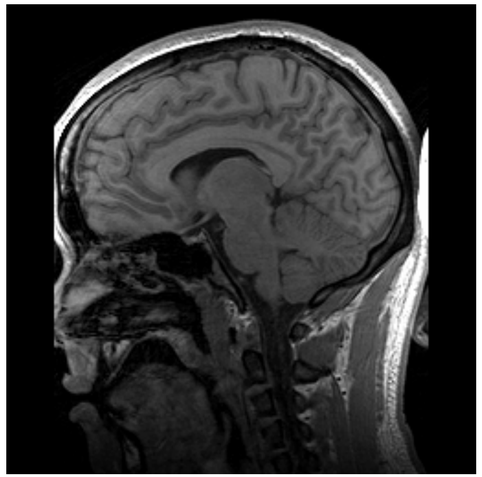

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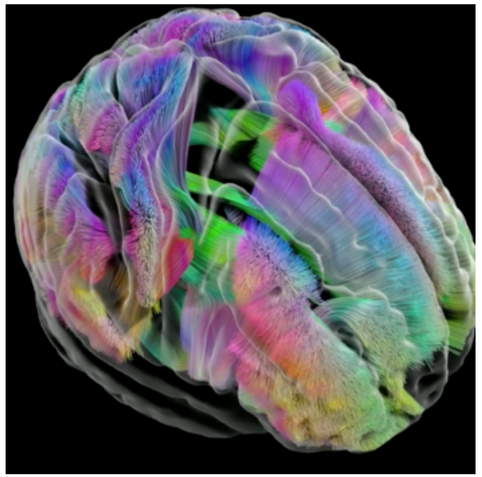

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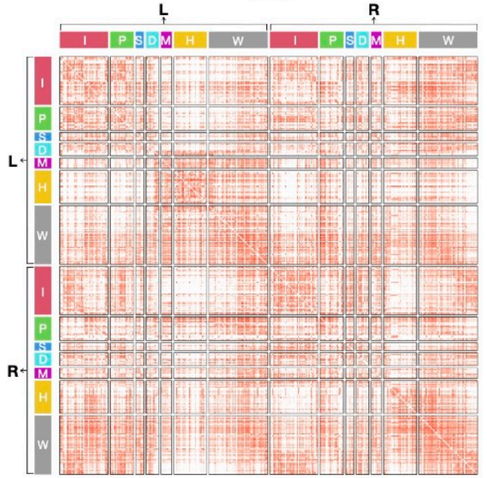

High-throughput pipelines (2010s)

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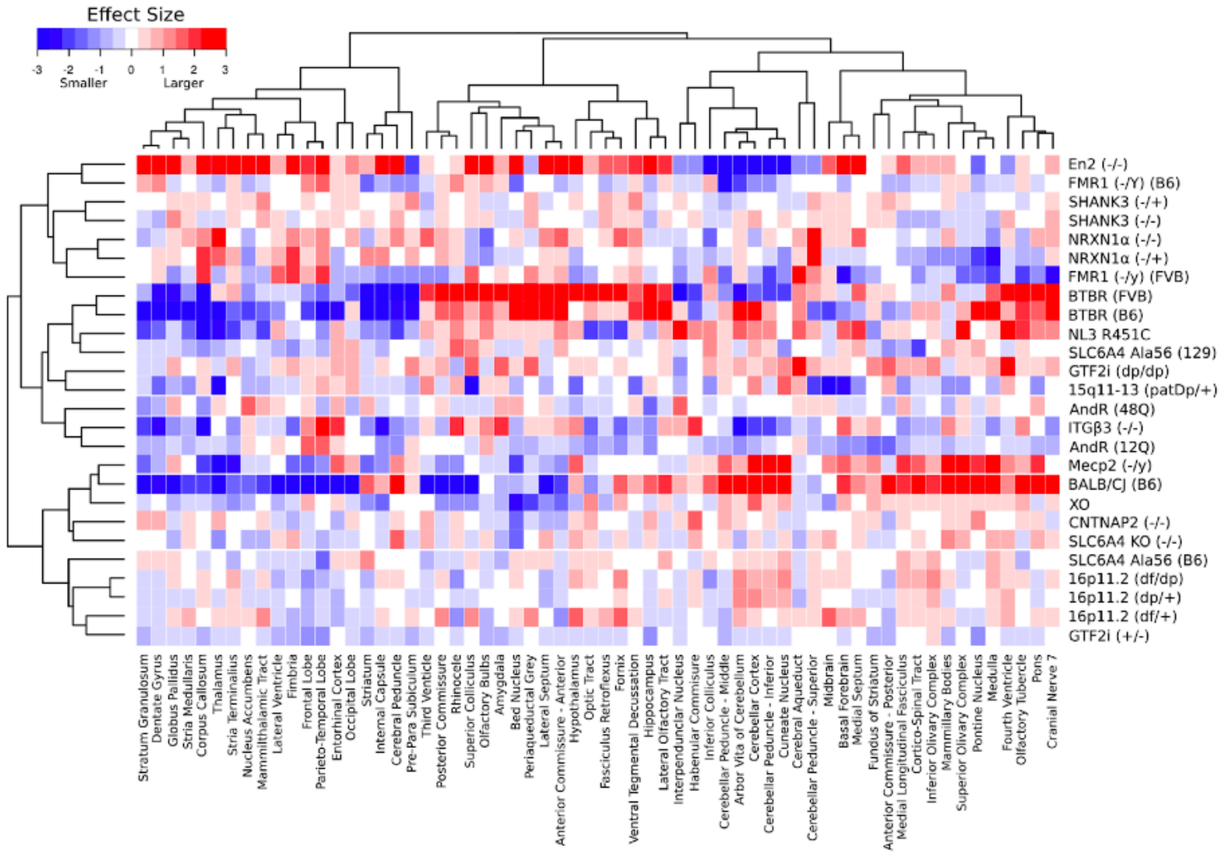
Statistical inference on graphs (?)

How do patterns in graph topology characterize neurological phenotypes?

How to identify heterogenous brain regions?

Approach 1: Neuroanatomical Measurements



Ellegood et al., (Mol Psych) 2014