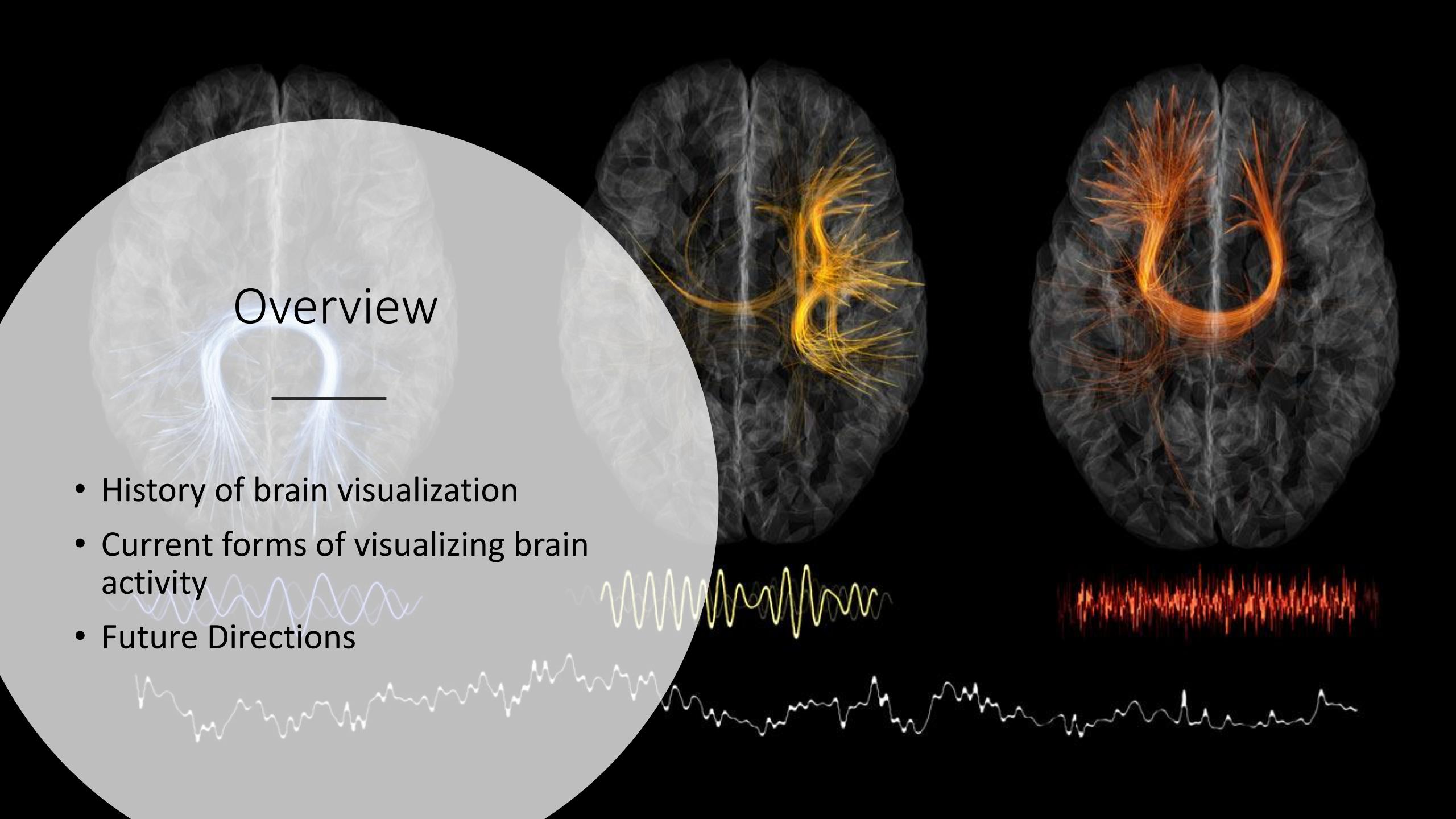


Data Visualization of Brain Activity

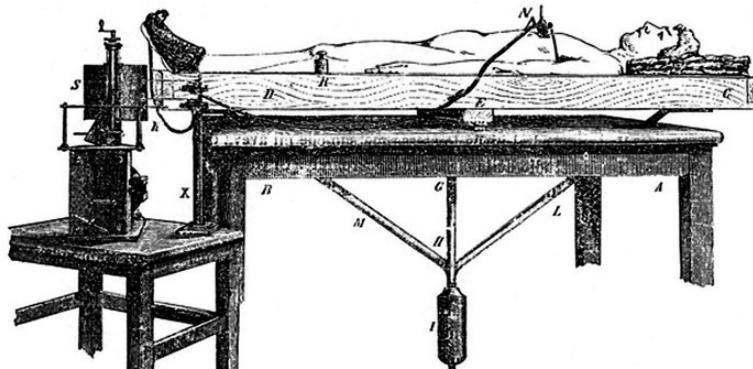
K.B. Zaidi

Overview

- History of brain visualization
- Current forms of visualizing brain activity
- Future Directions



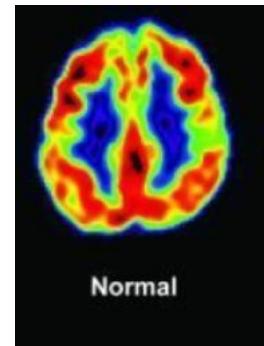
Visualizing Brain Activity



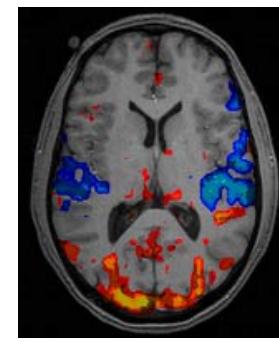
Human Circulation Balance



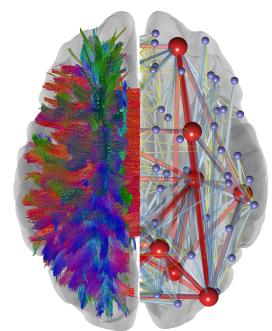
Pneumoencephalography



CT & MRI



SPECT & PET

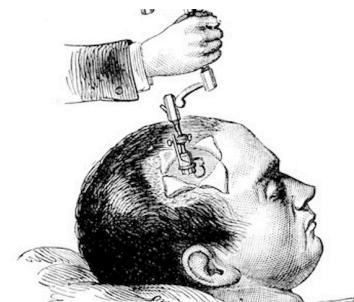


fMRI

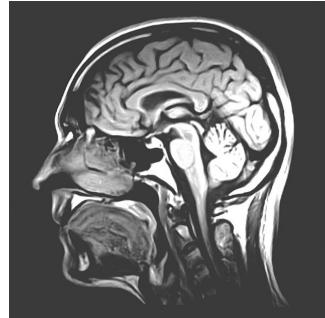
1880

Angelo Mosso

Early 1900s



1970s



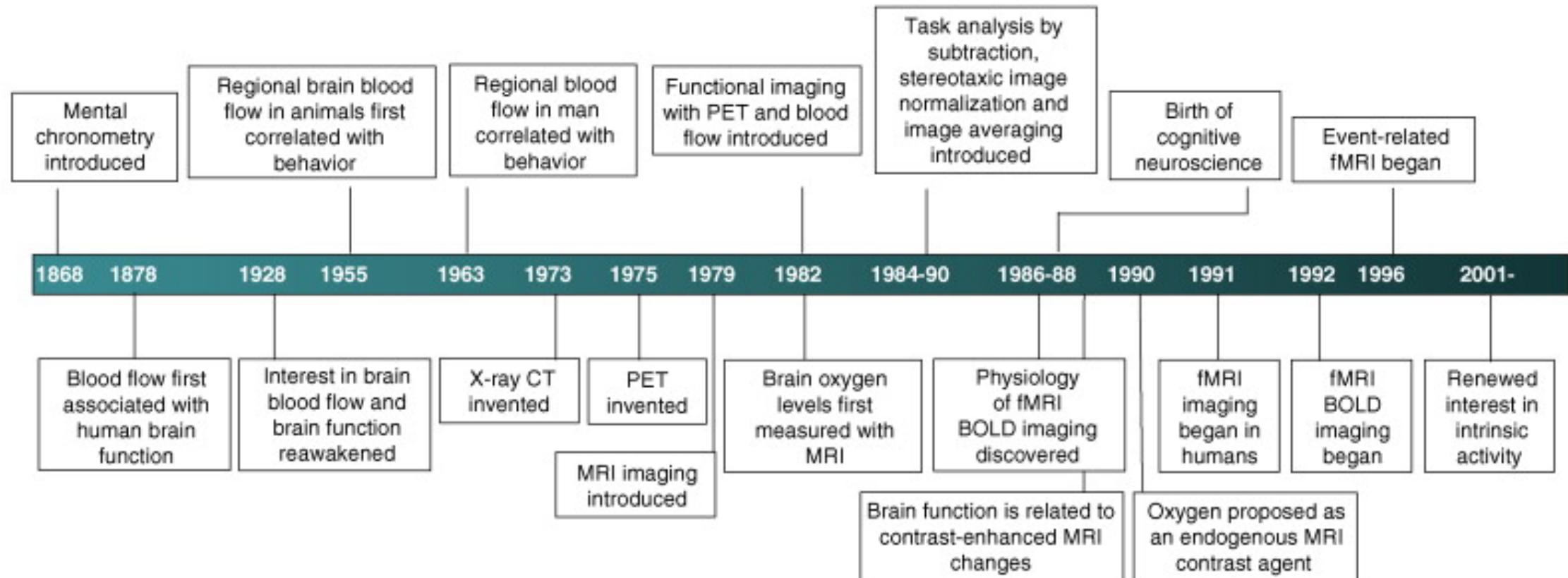
1980s

Raichle, 2008

1991

Today!

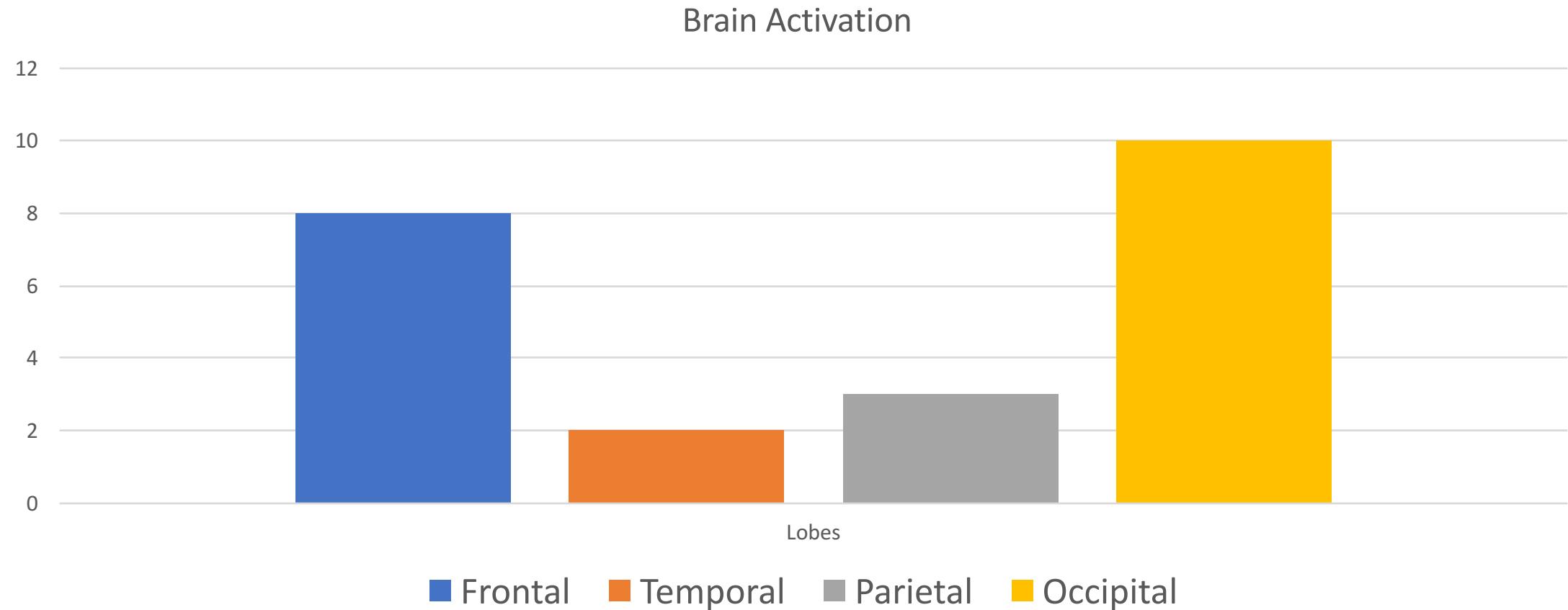
A chronology of human brain imaging with PET and fMRI



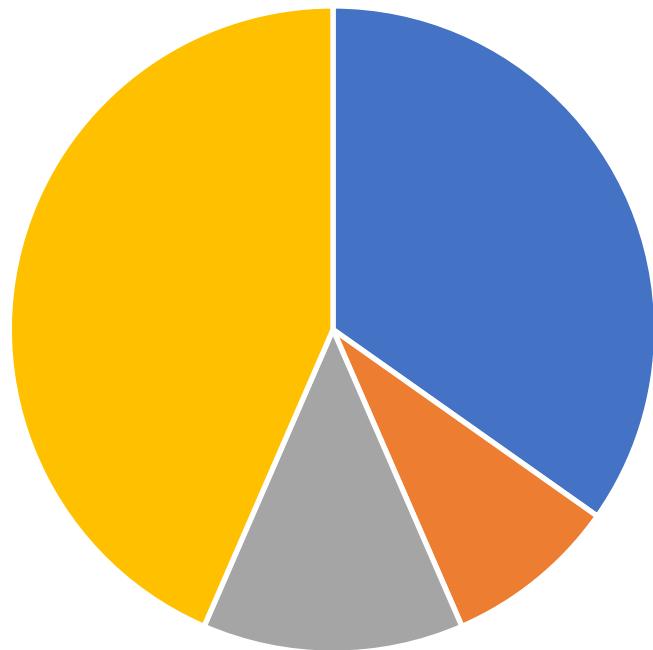
TRENDS in Neurosciences

Raichle, 2008

Why the push to visualize?

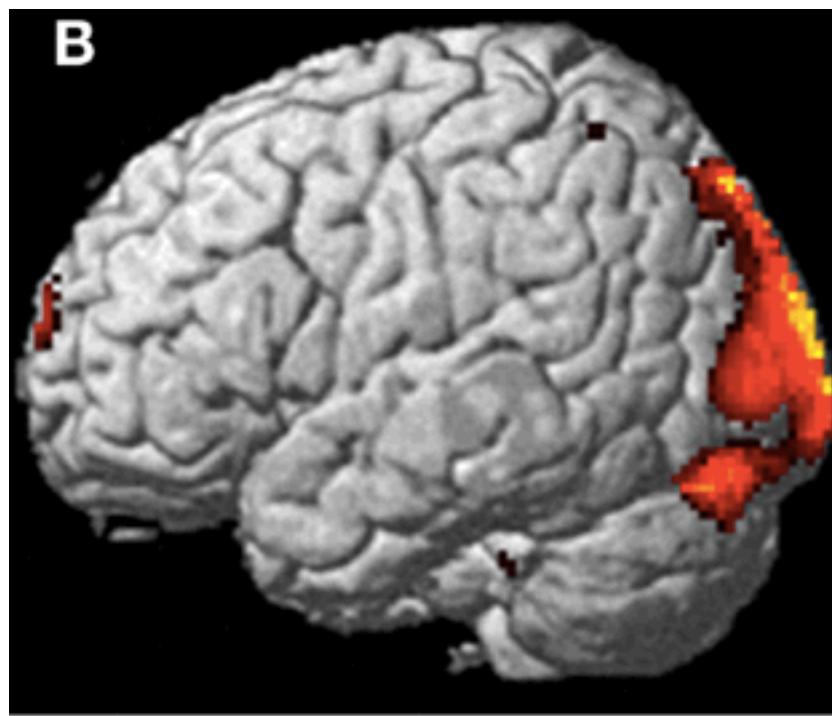


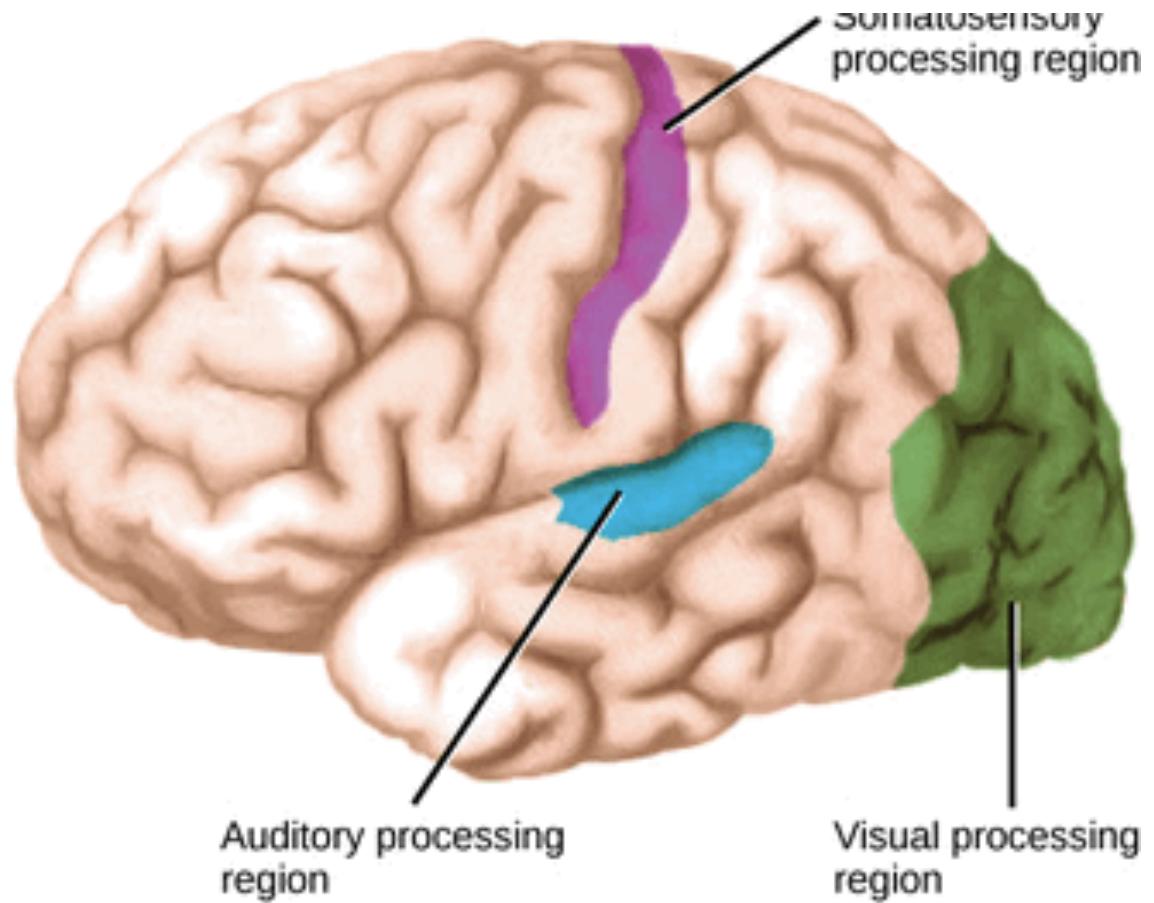
Brain Activation

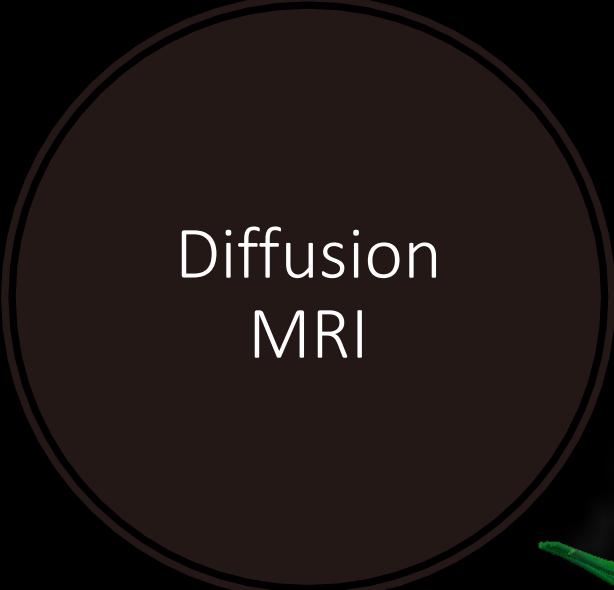


■ Frontal ■ Temporal ■ Parietal ■ Occipital

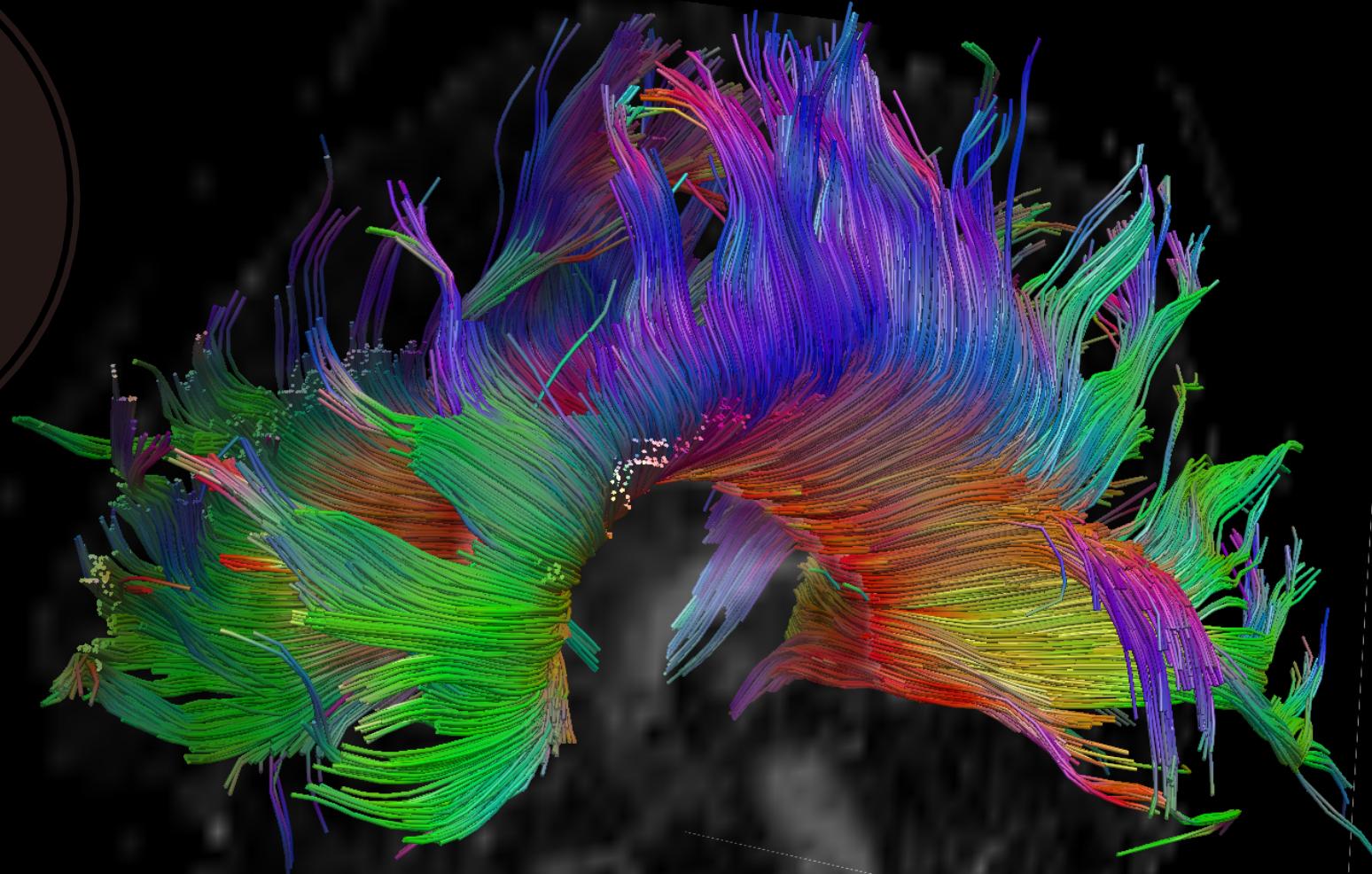
Lobes	Brain Activity
Frontal	8
Temporal	2
Parietal	3
Occipital	10







Diffusion
MRI



Human Connectome Project

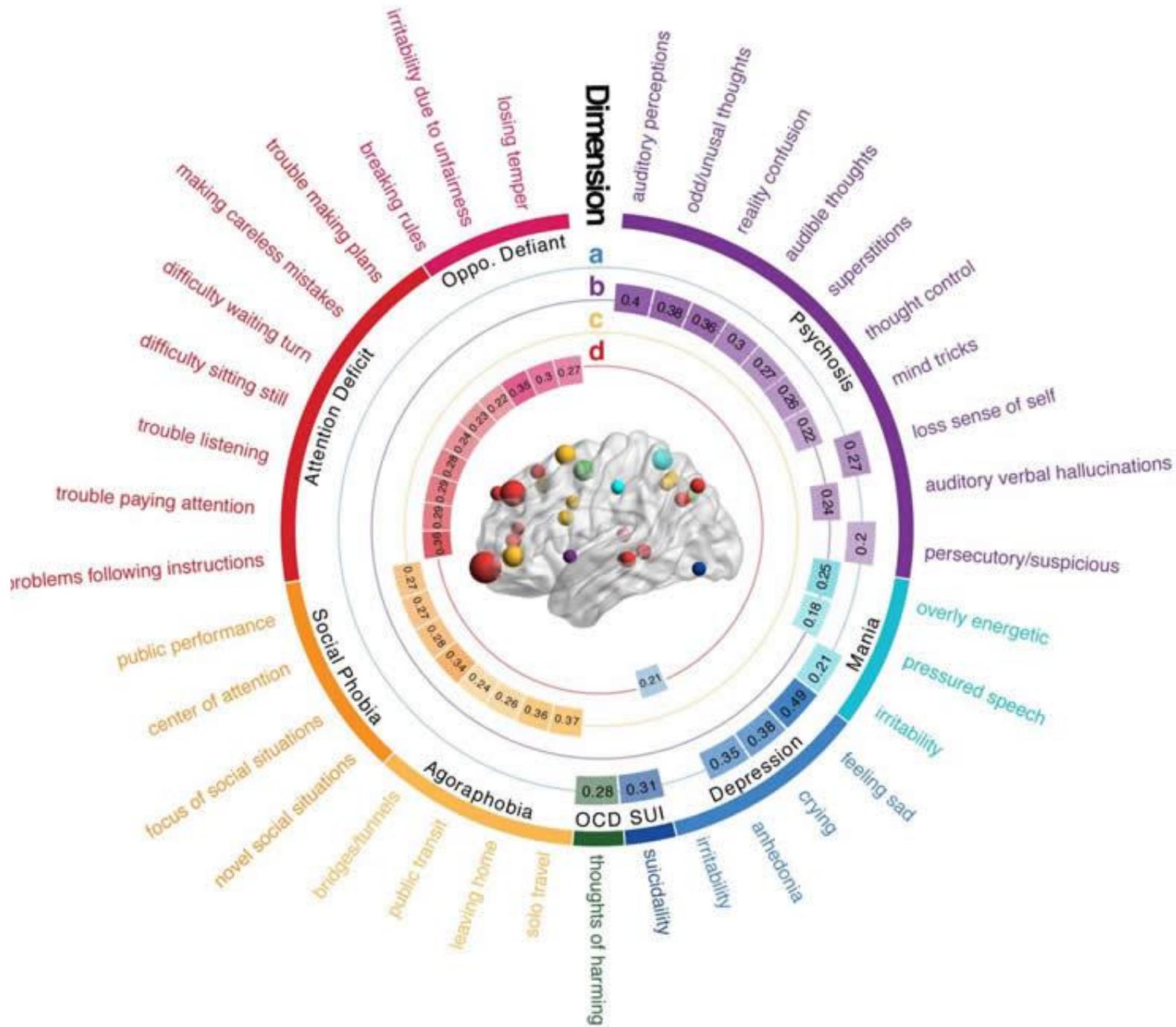


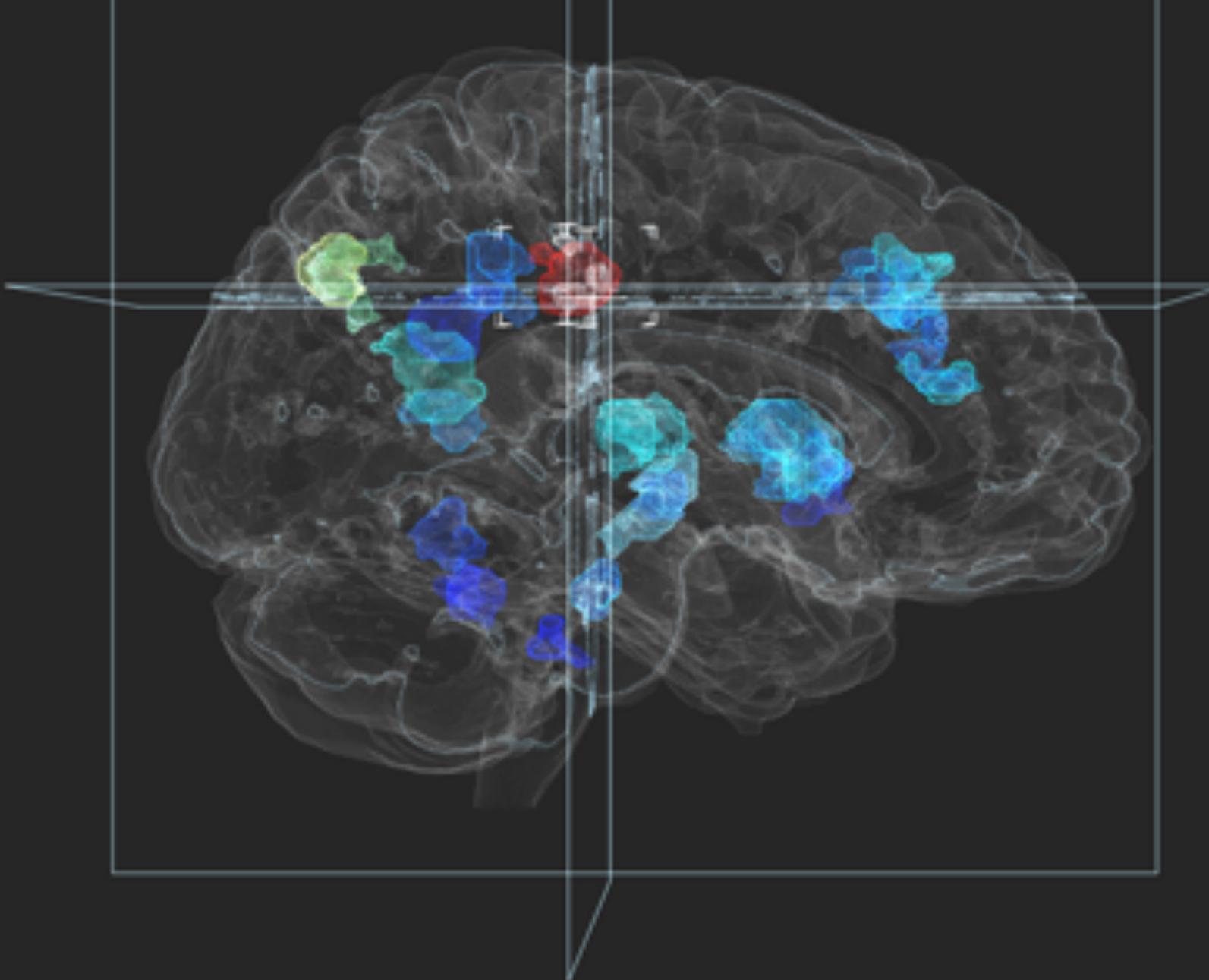
Latest Projects

- Focus on functional networks and connectivity
- Human Connectome Project
- The Human Connectome Project aims to provide an unparalleled compilation of neural data, an interface to graphically navigate this data and the opportunity to achieve never before realized conclusions about the living human brain

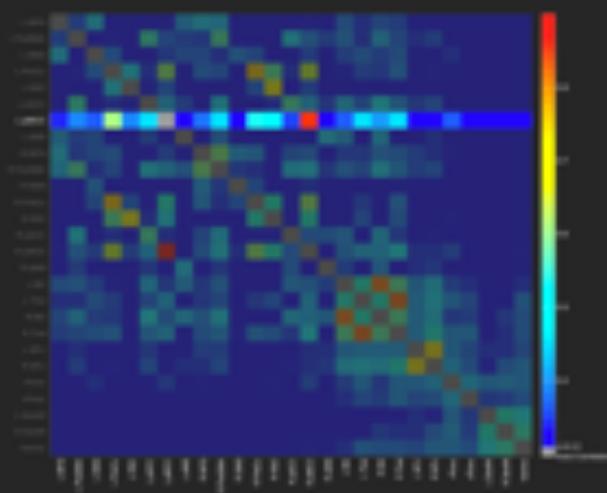
Precision Medicine Revolution

- Cross-reference an individual's personal history and biology with patterns found worldwide
- Proto-type of healthy and diseased brain
- Utilize that network of knowledge to pinpoint and deliver care that's preventive and targeted



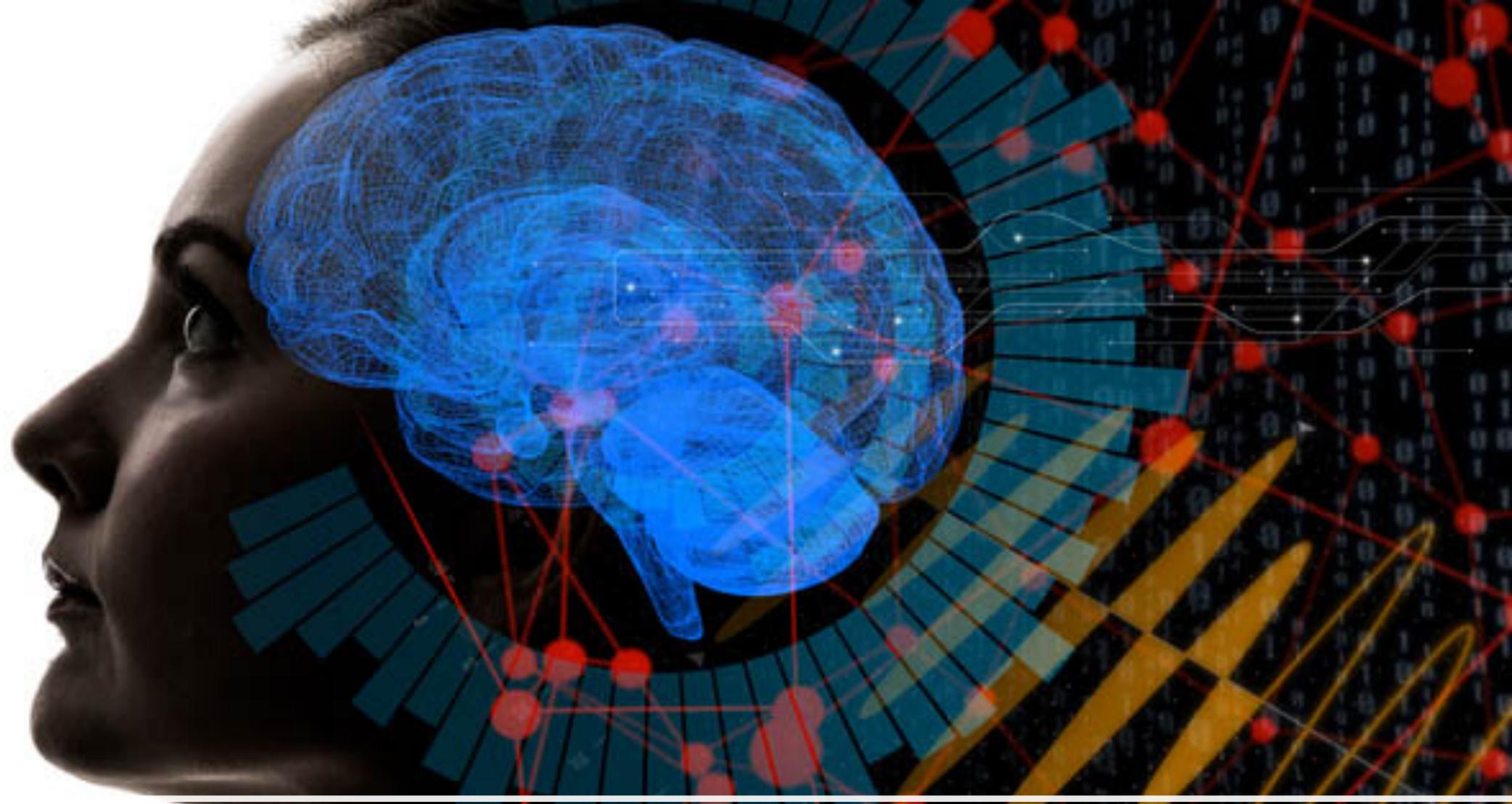


10.860	1.890
Total Flow	PSP Reduction
0.380	9.920
Clustering Coefficient	PSP Reduction



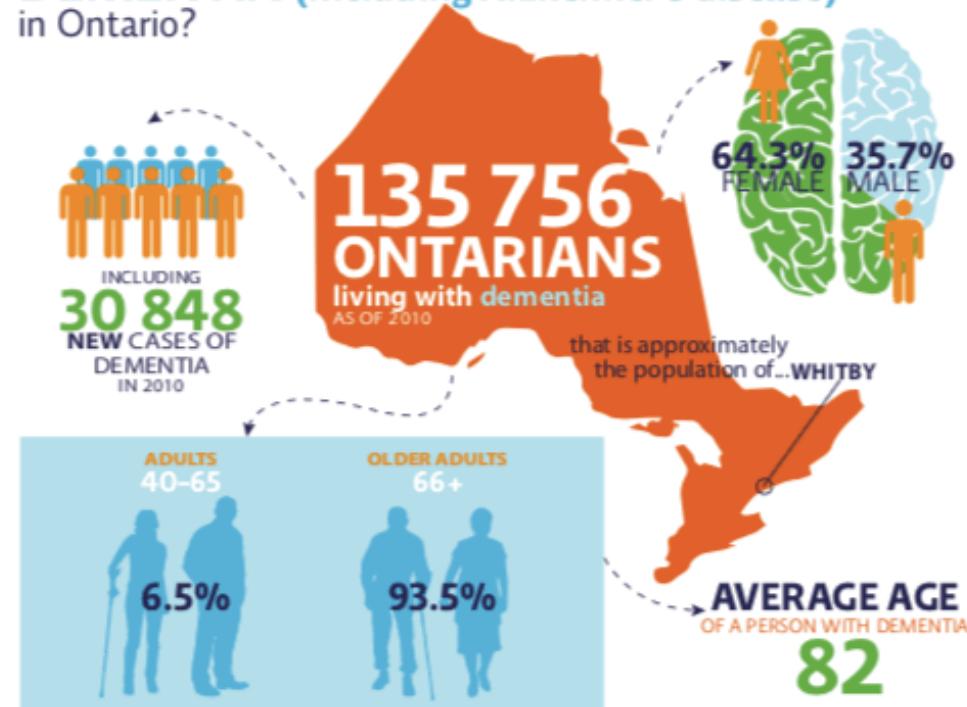
Big Data

- Processing and analyzing large data quickly
- Sharing and collaborations
- BRAIN Initiative



Future Directions

What is the impact of
DEMENTIA (including Alzheimer's disease)
in Ontario?



COMPARED TO THE AVERAGE ONTARIAN,
THE DIRECT COST TO THE HEALTH CARE SYSTEM FOR ONE YEAR IS:

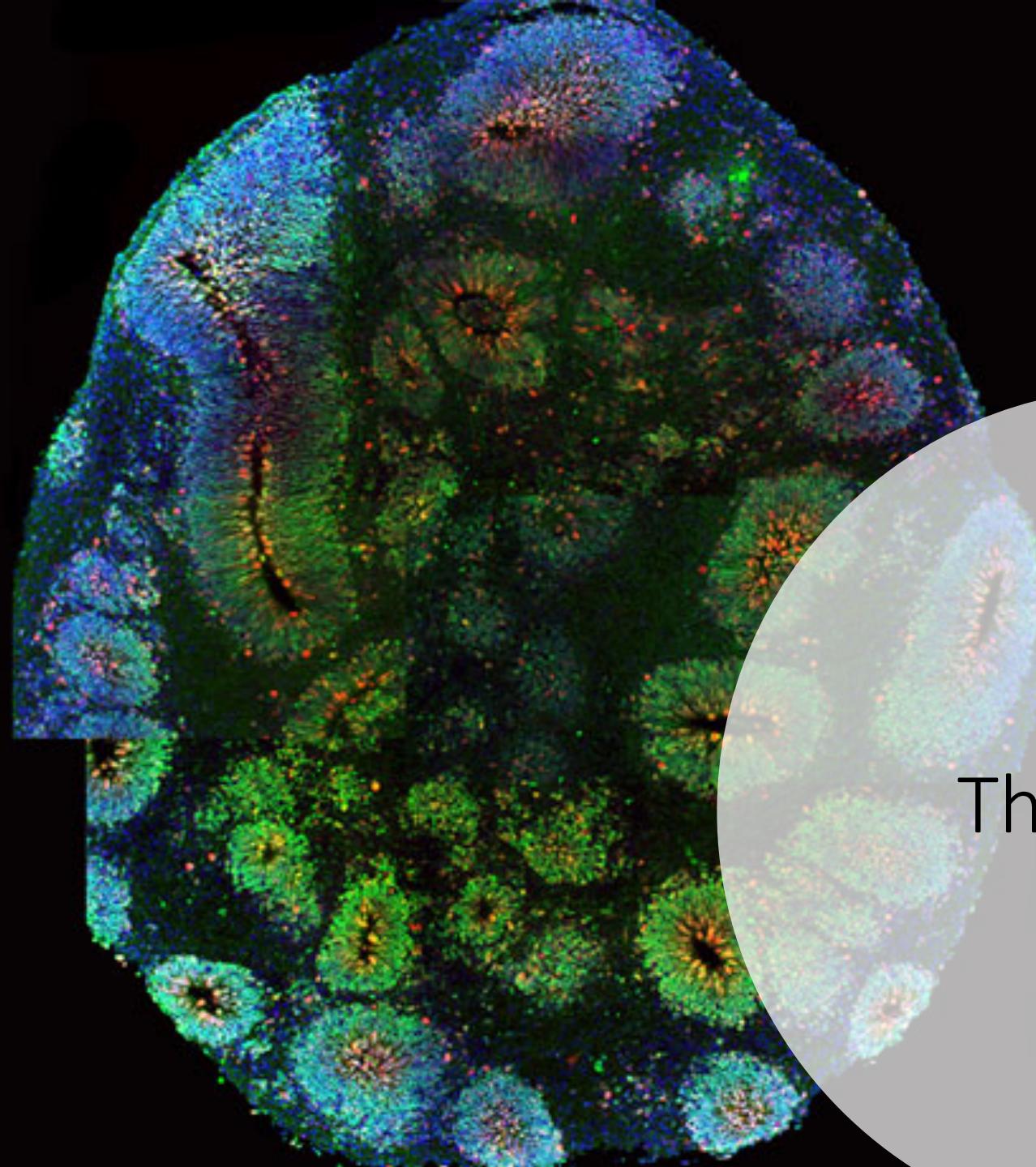
8.1x
FOR EXISTING CASES
OF DEMENTIA



7.0x
FOR NEW CASES
OF DEMENTIA

Learn about the 12 other brain disorders [here](#)

The data in this infographic is from Brain Disorders in Ontario: Prevalence, Incidence, and Costs from Health Administrative Data,



Thank you
