KENICHI OISHI, MD, PHD

Professor:
The Russell H. Morgan Department of Radiology and Radiological Science
Department of Neurology
The Richman Family Precision Medicine Center of Excellence in Alzheimer's Disease
https://www.hopkinsmedicine.org/inhealth/alzheimers

Affiliated Faculty:
Institute For Computational Medicine, Whiting School of Engineering

Leadership:
Image Analysis Center, Metformin in Alzheimer's Dementia Prevention (MAP) Study
Image Analysis Center, Biomarkers of Cognitive Decline Among Normal Individuals: the BIOCARD Cohort Study

Areas of expertise: Magnetic Resonance Imaging (MRI), Brain Atlas, Diffusion MRI, Deep Learning, Neuroimage, Neurology, Dementia, Alzheimer's disease, Neurodevelopment, Hypoxic Ischemic Encephalopathy

Experience in collaboration with companies and non-governmental funding agencies:

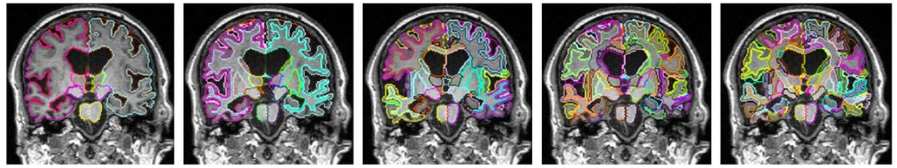
- Gates Venture – Unlocking the power of data and advanced neuroimaging analysis tools to forge a comprehensive platform that enhances our understanding of Alzheimer's disease and related disorders and accelerates breakthroughs.
- NeuroXT - Leverage the power of artificial intelligence (AI) to analyze brain MRIs, allowing for the precise identification of patients who stand to gain the most from treatment while effectively minimizing the risk of unwanted side effects.

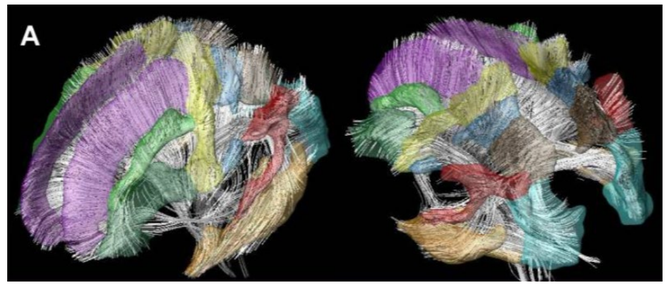
ACCOMPLISHMENTS

Pioneering the Future of Neuroimaging with Multimodal Human Brain Atlases

Developed groundbreaking **brain atlases** that reshaped our understanding of human white matter architecture, previously thought to be a uniform structure. Just as geographers rely on maps, neuroscientists need atlases to superimpose functional data, such as neuronal structures, neurotransmitters, and connectivity.

- Widely Adopted & Essential for Research: The atlases provide researchers with clear, reliable boundaries within white matter, enabling precise interpretation of neuroimaging data.
- Critical for Advanced Brain Mapping: Freely Accessible & Integrated into Leading Software.
  - **Available electronically**
    - NITRC (https://www.nitrc.org/projects/mricloud)
    - USC (https://resource.loni.usc.edu/resources/atlases/)
    - JHU (https://www.mristudio.org/)
  - **Implemented in premier neuroimaging tools**
    - FSL (Oxford: https://fsl.fmrib.ox.ac.uk/fsl/oldwiki/Atlases.html)
    - 3D Slicer (MIT/Harvard: https://www.slicer.org/)
  - **Expanding the Boundaries of Neuroimaging:**
    - The entire human lifespan (from neonates to the elderly).
    - Cross-species comparisons (including non-human primates).





ACCOMPLISHMENTS

Innovative Brain Atlas Applications:
Enhanced detection of subtle brain abnormalities using a novel atlas combined with AI technologies, surpassing traditional methods and improving predictions of neurological outcomes in MRI analyses.
https://github.com/OishiLab/OpenMAP-T1

Leadership in High-Throughput MRI Analysis:
Leads Neuroimaging Cores for significant studies, handling over 10,000 cases, and developed a specialized image analysis pipeline using the AI algorithm for accurate segmentation in clinical images.

Comparative Neuroanatomy Research:
Advances understanding of the evolution of the central nervous system by comparing human and non-human primate brains through innovative MRI studies.

Ultra-high resolution MRI for virtual brain biopsy:
Offering a non-invasive imaging technology using ultra-high-resolution MRI to obtain diagnostic information that is comparable to the microscopic observation of brain tissue sections, termed virtual brain tissue biopsy (VBB)

AREAS FOR POTENTIAL COLLABORATION

1. Utilize **electronic health records** and brain MRI scans for precision medicine in infants and older adults:
    - Predict future cognitive decline and responses to medical interventions in older adults.
    - Anticipate the onset of neurodevelopmental disorders in preterm infants and those with hypoxic-ischemic encephalopathy.
    - Develop a high-throughput platform for analyzing real-world clinical big data.
2. Develop **AI algorithms** for brain MRI analysis.
3. Innovate **MRI technology** to reveal microscopic tissue findings in brain diseases.
4. Conduct **clinical trials** that require brain MRI quantification as outcome evaluations.
5. Use **comparative neuroanatomy** to explore the evolution of the human brain and its unique characteristics.