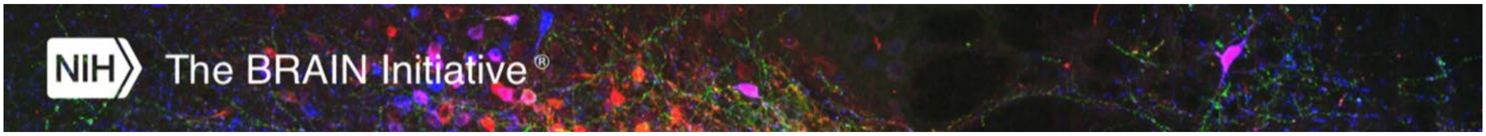


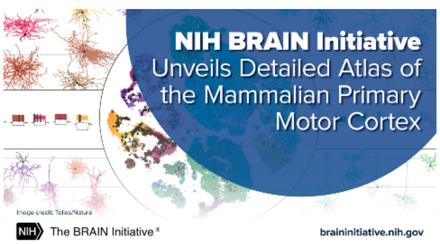
The BRAIN Initiative Mission

At the National Institutes of Health (NIH), the *Brain Research Through Advancing Innovative Neurotechnologies®* (BRAIN) Initiative aims to revolutionize our understanding of the human brain by accelerating the development and application of innovative technologies.

The BRAIN Initiative is uniquely situated for cross-cutting and accelerated discovery in neuroscience that goes beyond the capability of any single Institute or Center at the NIH by tapping into synergies across multiple fields to address the personal and societal challenges imposed by human brain disorders.

John Ngai, Ph.D.
Director
NIH BRAIN Initiative

Accelerating Interdisciplinary Neuroscience Discoveries Across Institutions



Integrating neuroscience across 10 participating NIH Institutes or Centers:

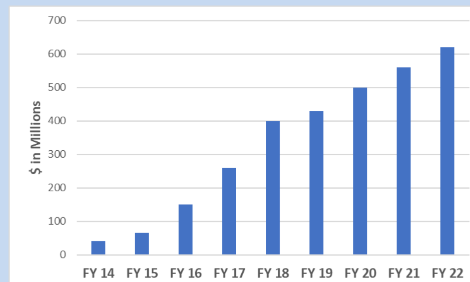
- NINDS
- NIDCD
- NIDA
- NIA
- NCCIH
- NIMH
- NICHD
- NIBIB
- NEI
- NIAAA

Scientific Vision: BRAIN Priority Areas

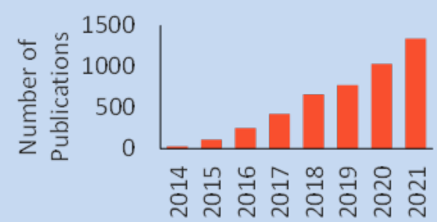
- Discovering diversity: Identify different brain cell types and determine their roles in health and disease.
- Maps at multiple scales: Generate circuit diagrams that vary in resolution from synapses to the whole brain.
- The brain in action: Tool development to monitor large-scale neural activity to produce a dynamic picture of the brain.
- Demonstrating causality: Interventional tools to establish causal links between patterns of brain activity and behavior.
- Fundamental principles: Theoretical & analytical tools for conceptual understanding of neural processes.
- Advancing human neuroscience through innovative technologies to understand the brain and treat its disorders.
- Integrate technological/conceptual approaches to discover neural basis of cognition, emotion, perception, and action.

BRAIN by the Numbers

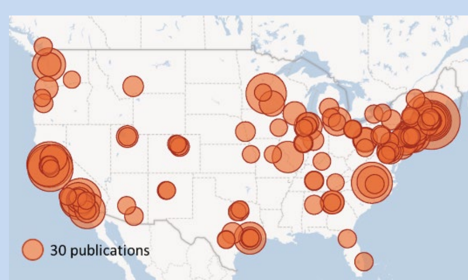
Budget: 2014-2022



Publications: 2014-2021

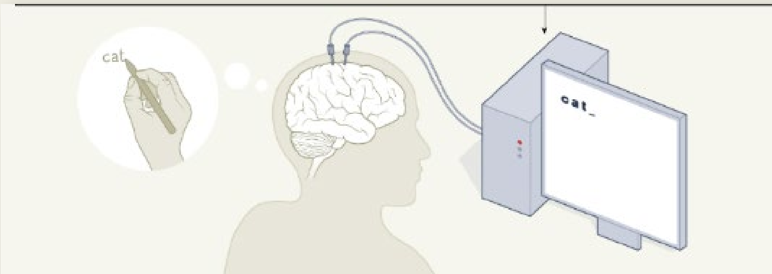


1022 PIs across
168 Institutions
supported by
771 BRAIN Awards



From tools to treatments: Leveraging best-in-class technology for novel applications to treat human brain disorders

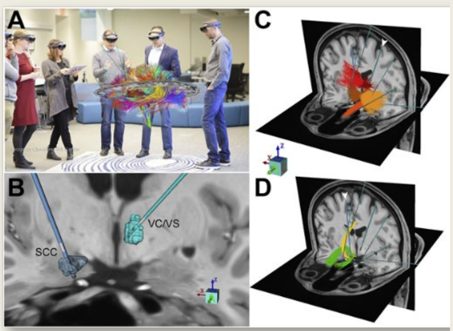
Neural prosthetics. In conditions such as ALS, spinal cord injury, or stroke, brain-machine interfaces allow people who are paralyzed or "locked in" to communicate by converting their brain activity to speech and text. (*Willett et al, Nature 2021*)



Personalized Deep Brain Stimulation for Major Depressive Disorder:

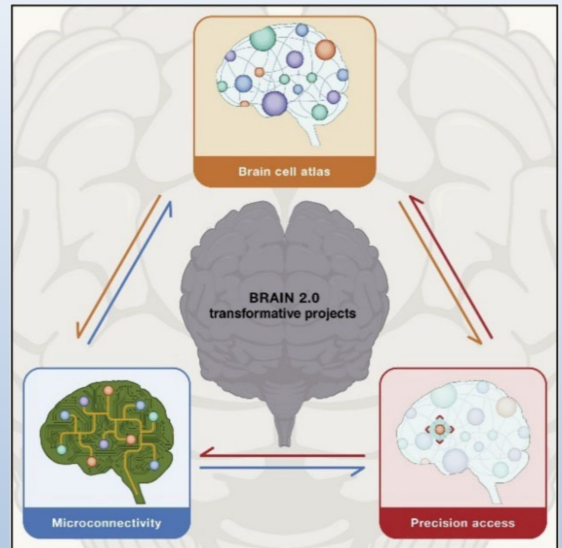
- Surgery planned with holographic augmented reality
- Stimulation tailored to the individual led to remission of symptoms

(Sheth, Biol Psych, 2022)



BRAIN 2.0: Looking to the Future

Transformative Projects that will change the future of neuroscience research and accelerating the search for cures *(Ngai, Cell, 2022)*



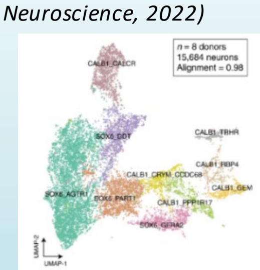
Brain cell atlas: A parts list of the human brain

Microconnectivity: Wiring diagrams of the brain at unprecedented scale

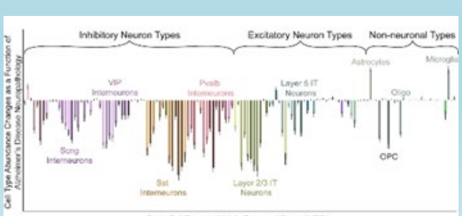
Precision cell access: An armamentarium of tools to access brain cell types with exquisite specificity

Basic research: Laying the foundations for cures and understanding what makes us human

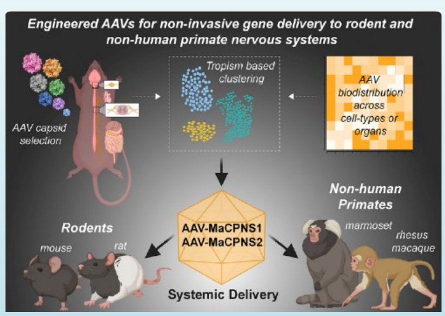
Parkinson's disease: BRAIN Cell Census tools reveal vulnerable brain cell types in humans *(Kamath et al, Nature Neuroscience, 2022)*



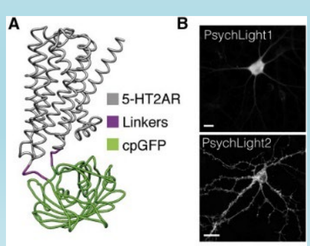
Alzheimer's disease: BRAIN-funded tools used in the SEA-AD cell atlas to identify brain cell types that change in people with Alzheimer's disease *(SEA-AD.org)*



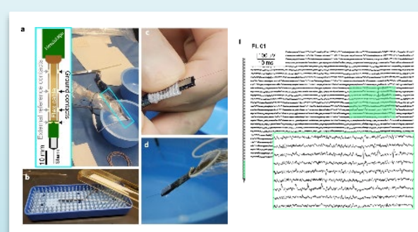
Precise gene delivery to brain cell types across species *(Chen et al, Neuron, 2022)*



PsychLight: Engineering new tools for drug discovery for **depression** *(Dong et al, Cell, 2021)*



New tools for large-scale recordings help listen to neural symphonies in the human brain using "Neuropixel" probes *(Caulk et al, Nature Neuroscience, 2022)*



Brain recordings reveal how humans store memories *(Zheng et al, Nature Neuroscience, 2022)*