# Harvard and Google Scientists Create Revolutionary Human Brain Map



### Groundbreaking Human Brain Map Created by Harvard and Google Scientists

Dr. Jeff Lichtman, a professor of molecular and cellular biology at Harvard University, has led a decade-long effort to create the most detailed map of a human brain sample ever produced. The collaborative project with Google’s scientists has resulted in a substantial dataset derived from a tiny, 1-cubic-millimeter brain tissue sample from a patient with severe epilepsy. This tissue contained 57,000 cells, 230 millimeters of blood vessels, and 150 million synapses.

The process began by slicing the tissue into ultra-thin sections with a diamond blade, each section being about 30 nanometers thick. These slices were stained and processed to create a 3D representation of the brain sample at a microscopic level. Since the data amassed from this procedure was enormous—about 1,400 terabytes, equivalent to the content of over 1 billion books—the team partnered with Google for its AI-based image processing capabilities.

Google’s AI identified cell types and their connections, resulting in a highly detailed interactive 3D model called "Neuroglancer," now available online. This model features 300 million images, the largest dataset of its kind.

The data has unveiled intriguing findings, such as neurons that form more than 50 connections with each other, an unexpected discovery that raises new questions about neuronal communication. The researchers hope that understanding these connections will shed light on various neurological conditions and disorders.

The project has received praise from other experts in the field. Michael Bienkowski from USC’s Keck School of Medicine highlighted the importance of human brain-specific data, while Stanford’s Andreas Tolias found the discovery of rare axons particularly significant.

Future plans include mapping a complete mouse brain, which will require an even more massive amount of data. Though mapping an entire human brain presents considerable challenges, including data storage and ethical constraints, experts believe this pioneering work is a significant step toward understanding how the brain functions.

The findings from this project were published in the journal *Science*, and the detailed dataset is now open for further research and investigation.