



Keck
Medicine
of USC

AIM: The Artificial Intelligence
in Medicine Program at the
USC Mark and Mary Stevens
Neuroimaging and Informatics
Institute

A case for support

By harnessing the power of artificial intelligence and machine learning, we can illuminate the hidden intricacies of the human brain—and the undiscovered pathways toward new and better treatment.

- Billions of neurons in the human brain.*
- Incalculable connections and variations.*
- Untold hidden pathways to disease.*
- Somewhere, buried in the chaos, is a pattern.*
- Somewhere, there is a path toward hope.*

COVER IMAGE: DTI fiber bundle representation of the brain. Researchers at the USC Stevens Neuroimaging and Informatics Institute have been developing scalable tools for modeling fiber bundles using diffusion MRI and applying them to better understand how the structure of the human brain changes in health and disease.

IMAGE THIS PAGE: MRI scans of the brain from a large dataset of different subjects and studies.

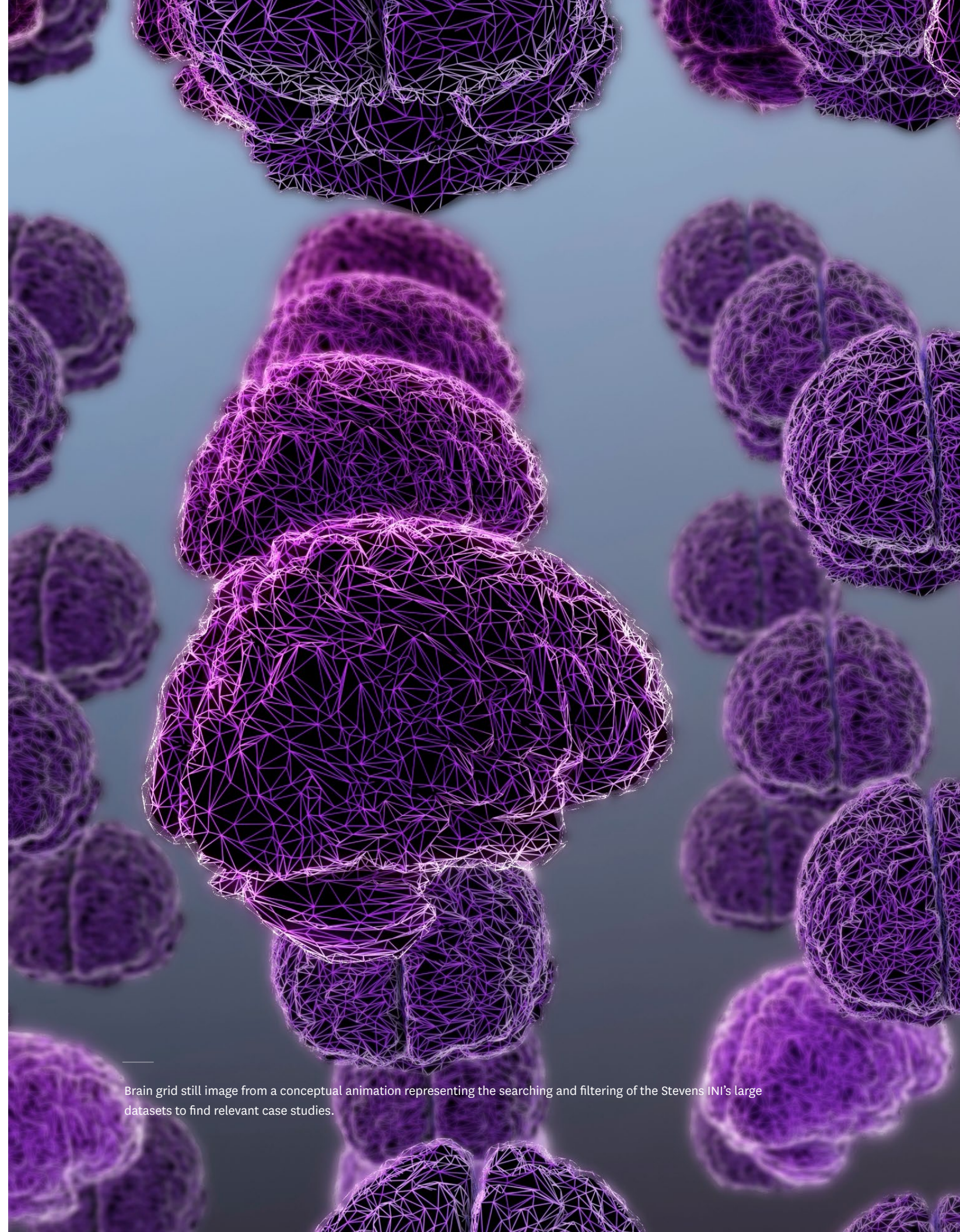
A New Frontier In Neurological Medicine

For many neurological diseases there is no cure. For too long, this has been the bottom line for patients and families facing neurological disease and damage. With advances in technology, we have new opportunities to change that.

We have now produced more data on the human brain than ever before—but amounts of data so massive and complex as to be impenetrable. The knowledge we need could be just within our reach—but remains obscured.

This is the great promise of **AIM: The Artificial Intelligence in Medicine Program at the USC Mark and Mary Stevens Neuroimaging and Informatics Institute.**

Brain grid still image from a conceptual animation representing the searching and filtering of the Stevens INI's large datasets to find relevant case studies.



Unlocking the Potential of Big Data

Humans simply can't compete with machines in speed and thoroughness. Through AI, we can synthesize incredible amounts of data and make it actionable.

IMAGINE:

- The ability to predict your individualized risk for Alzheimer's disease.
- Tools that can predict the path and progress of your illness so physicians can better target and personalize therapy.
- A biomarker that does for Alzheimer's disease what identifying cholesterol has done for heart health.

At the Stevens Institute's AIM Program, work toward these breakthroughs has already begun.

IMAGE: Neurons firing within the human brain.

The Nexus for Innovation and Discovery

At AIM, our goal is to develop, validate, and disseminate artificial intelligence methods and techniques to fight disease and improve health. As an integrated part of the Keck School of Medicine of USC's unparalleled ecosystem for neuroscience research, few such programs anywhere share our unique capacity to advance AI and machine learning research for a worldwide clinical population.

IMAGINE:

- **AI Expertise:** We have the deep bench of multidisciplinary experts to develop complex and novel algorithms that can gain better insights into biological patterns, trends, and associations.
- **Big Data in Harmony:** A pivotal challenge for AI research is that data aggregated from different sources, such as different imaging machines, must be made equal. We are a national leader for massive and complex data harmonization efforts.
- **A Collaborative Hub:** We are the national repository for Alzheimer's and other neurodegenerative disease research data, trusted by the NIH, the Alzheimer's Association, and others worldwide to store, manage, and share data to facilitate collaborations.
- **Health Equity:** With our incredibly diverse patient population, we can ensure our study results are applicable to all patients regardless of ethnicity and race—an advantage that is not possible at most other leading academic medical centers.

The Bridge to Breakthroughs

AIM is working to make a difference for patients worldwide—but philanthropy is critical at this stage of research and discovery. Your support can give our top researchers what they need to advance studies at the cutting-edge of neuroscience and technology. With multiple new and ongoing projects, you can provide essential resources and momentum toward our efforts.

WITH A GIFT IN SUPPORT OF AIM, YOU CAN HELP:

Improve the diagnosis and treatment of brain diseases.

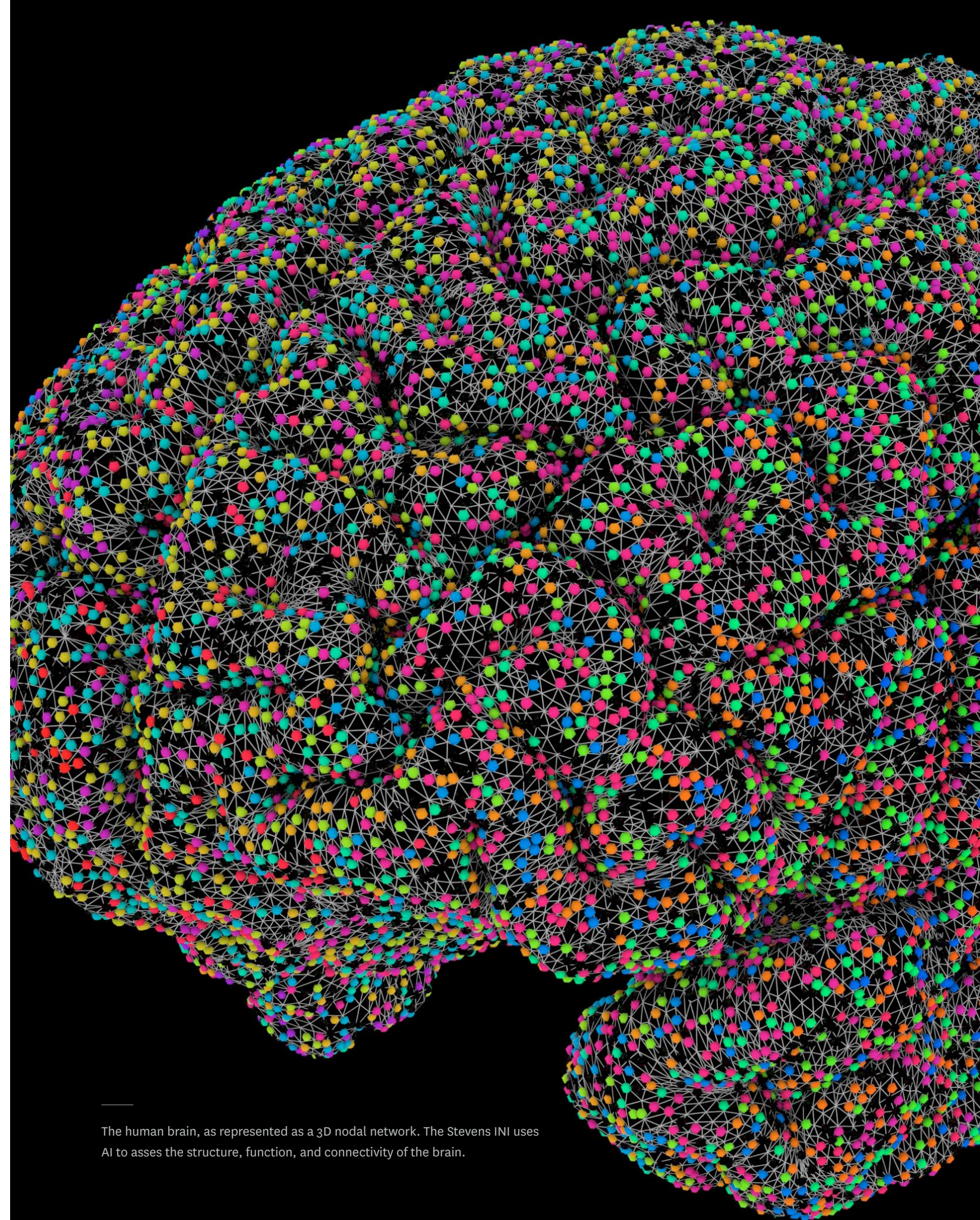
- We are using our massive collection of imaging, genetic, and clinical data to build algorithms that predict disease and treatment outcomes—bolstering precision diagnostics, prognosis, and the development of new treatments.

Identify biological markers of aging and neurodegeneration.

- We are creating algorithms that analyze data at a previously impossible scale to unveil the underlying biology of neurodegenerative diseases—and have already helped to discover new markers linked to brain aging and early detection of Parkinson's disease.

Revolutionize medical imaging.

- We are working to enhance medical imaging protocols with the predictive power of AI, developing algorithms for assessing the structure, function, and connectivity of the living human brain and creating software and computing resources that can streamline disease diagnosis and progression modeling, surgical outcome prediction, and more.



The human brain, as represented as a 3D nodal network. The Stevens INI uses AI to assess the structure, function, and connectivity of the brain.

The Path Toward Hope

Neurological diseases rob of us memories, of movement, even our sense of self. The physical, emotional, and financial burden these illnesses place on patients, families, and caregivers is immense. Millions are waiting for breakthroughs—but instead find a landscape of treatment options that remains stubbornly inadequate.

Through the AIM Program, we are marshalling the full scientific talent and resources at one of the world's leading institutions for neuroscience research to upend this untenable status quo. Your support can help bolster and accelerate this work. You can help bring unprecedented new approaches to Alzheimer's disease, Parkinson's disease, stroke rehabilitation, and more—and open a new path toward hope where it is needed most.

Watch this video to learn more
about AI at the Stevens INI:



TO LEARN MORE, PLEASE CONTACT:

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