

Global Alzheimer's Association Interactive Network™



Imagine the possibilities if any scientist anywhere in the world could easily explore vast interlinked repositories of data on thousands of subjects with Alzheimer's disease.

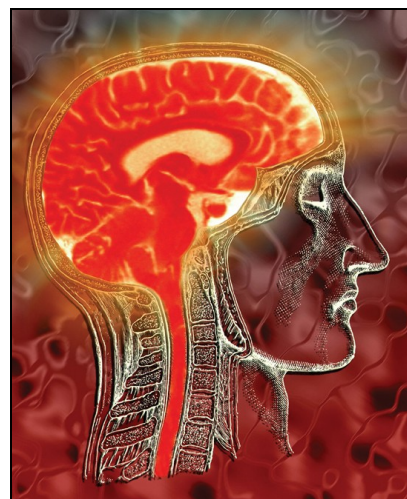
Imagine the pace of discovery if these collective databases were linked to unlimited computational resources.

Imagine how different science would be with intuitive, adaptive and comprehensive tools operating on these data and running on a virtual cloud of computing resources.

Imagine GAAIN

The objective of the Global Alzheimer's Association Interactive Network (GAAIN) is to transform how neuroscience data is shared and accessed by scientists throughout the world. GAAIN is a force multiplier that will catalyze a new global-cooperative of sharing, investigation and discovery and expedite the advances necessary to achieve new treatment paradigms, therapeutic options and ultimately a cure for Alzheimer's disease and other neurodegenerative diseases.

The Alzheimer's Association is launching GAAIN in partnership with the Laboratory of Neuro Imaging (LONI) at the University of California-Los Angeles (UCLA), the National Center for Alzheimer's Disease Research and Care at the Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS), Fatebenefratelli Hospital, Italy, and Intel Corporation. They are building GAAIN on an international database framework already in use by thousands of scientists and local computational facilities in North America and Europe. Extant analytic strategies and electronic infrastructures will be extended so that anyone anywhere can utilize an ever-expanding library of sophisticated tools to analyze and relate images, genetics, clinical and biological data. All of this will be implemented virtually so that data, machines and software are as accessible, global and fluid as the Internet.



Background

Research in neurodegenerative diseases is undergoing a radical transformation spurred by advances in digital technology. Massive amounts of data are being collected in individual studies or as part of larger consortia. Often these are independent efforts where data are only sometimes shared and analytic strategies vary, rendering data incomparable. In recent years efforts to coordinate the collection of data by ensuring a common protocol and thus enabling comparative analysis have been growing. Systems have been developed to share data between studies.



Researchers in the Alzheimer's disease field have been forerunners of this trend. The North American Alzheimer's Disease Neuroimaging Initiative (ADNI) is the most compelling example of dozens of geographically-dispersed researchers working together to share their data on a central database. ADNI has led to the development of a large public imaging database and has inspired similar imaging initiatives in other parts of the world and in other medical domains. However, these efforts could be vastly expanded in scope if linked to a truly global network with enhanced data processing capability. The size of data sets and the tools needed to analyze them are increasingly computationally demanding. Genetics and imaging data can be extracted with accurate algorithms but require hours, sometimes even days, of processing time to analyze even a single subject.

Fortunately the state of technology, in particular the advent of cloud computing, makes possible the development of a framework to link databases throughout the world and expand their data processing capability significantly.

Powered by sophisticated analytic tools and massive computational power, GAAIN will make federated research data available free-of-charge for searching, downloading and processing across a cloud-based, grid-network infrastructure spanning centralized computational facilities in North America and Europe. For the first time, every scientist working to discover a cure for Alzheimer's disease worldwide will have access to a vast amount of neuroscience data made available by the world's foremost laboratories and research consortia, including high-resolution, time-varying, multidimensional data sets of the brain. They will be able to formulate and pose complex questions that could not otherwise be answered. Highly-interactive user-interfaces will facilitate exploring the data, forming populations of interest, visualizing distributions and exporting data.

Due to the nature of the neuroscience data, GAAIN will include innovative functionality that enables the extraction of clinically-meaningful and scientifically-relevant information and the integration of multiple types of data. Few laboratories have the expertise and resources required for this advanced degree of sophisticated computational analysis. GAAIN will not only provide access to shared data; scientists worldwide will be able to query the data and extract very specific information as defined by their own parameters. This is unprecedented and of the utmost importance in brain research, where sometimes thousands of examples are required to observe even the smallest change in the brain.



In addition to being a portal for a substantive amount of Alzheimer's data, GAAIN will enable researchers to make their data available for others to view and learn from. Importantly, all researchers will be allowed to retain ownership of their data and use cloud technology to link data worldwide. Enabling researchers to retain control of their data and ensuring the integrity of its provenance will be vital to encouraging data-sharing in an increasingly-collaborative but competitive field.

GAAIN Leadership and Management

GAAIN is being built on an international infrastructure that includes the considerable computational facilities at LONI, which hosts several neurodegenerative disease databases and provides a large suite of image processing applications, and the neuGRID project in Europe, which developed the prototype of a grid-based infrastructure where neuroscientists have uniform access through a simple web browser to large imaging databases. As such, GAAIN leadership includes representatives from the Alzheimer's Association, LONI, the IRCCS – Fatebenefratelli Hospital and also Intel Corporation. The leadership team will identify and invite scientists conducting qualified studies in Alzheimer's research to become partners and make their research data available through GAAIN.

William Thies, PhD, and Maria Carrillo, PhD, chief medical and scientific officer and senior director of medical and scientific relations at the Alzheimer's Association, respectively, will supervise the development of GAAIN in conjunction with co-principal investigators Art Toga, PhD, and Giovanni Frisoni, MD, as well as strategic partner Enrique Castro-Leon, PhD. Dr. Toga is a distinguished professor of neurology at UCLA and founder and director of LONI, a large brain imaging and informatics facility at the university. Dr. Frisoni is a neurologist and deputy scientific director at the National Center for Alzheimer's Disease Research and Care at the IRCCS – Fatebenefratelli Hospital. He is the principal investigator for neuGRID and will lead the work of the project in Europe. Mr. Castro-Leon, who will serve as a consultant, is an enterprise and data center architect and technology strategist for Intel Digital Enterprise Group. He is a world leader in cloud computing.

Outcome, Objectives and Goal

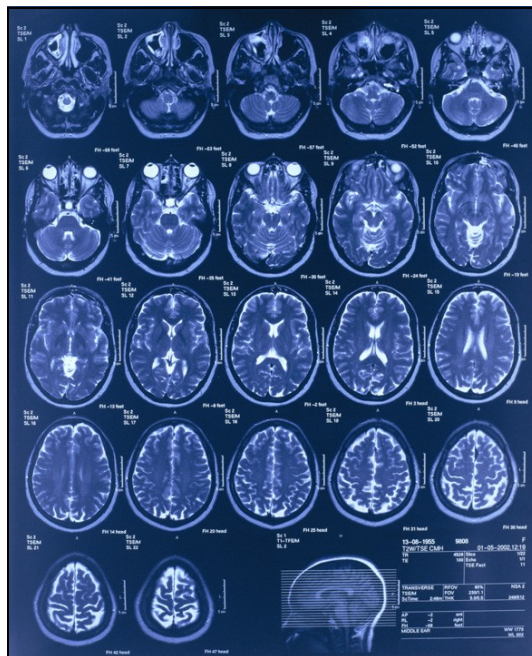
The leadership team is seeking to accomplish four objectives spanning five years in support of the project's outcome, which is the development, launch and utilization of GAAIN:

Objective 1 – DATA: The leadership team will develop an extensible, distributable network of Alzheimer's-related data. User interfaces will be intuitive, compelling and web enabled. They will be accompanied by online tutorials and other enhancing features.

Objective 2 – TOOLS: The leadership team will build software tools and analytic libraries. All software and data will comply with open access protocols.

Objective 3 – NETWORK: The leadership team will build a cloud-enabled database infrastructure and federated network composed of nodes.

Objective 4 – PROMOTION: The leadership team will conduct an international awareness campaign to promote GAAIN.



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The goal of GAAIN is to accelerate the discovery of effective treatment, prevention methods and ultimately a cure for Alzheimer's disease and other neurodegenerative diseases.

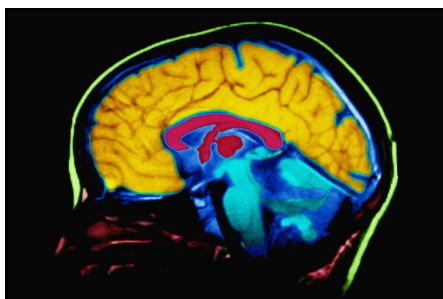
Financial Summary

The Alzheimer's Association is committed to seeing GAAIN become an invaluable resource to the research community, and it is proud to launch this initiative with a grant of \$5 million over five years to LONI and the IRCCS – Fatebenefratelli Hospital.

Start-up expenses are projected to total \$10 million, with most of the costs being incurred by LONI. Following the five-year start-up period, costs are projected to total \$900,000 annually. The Alzheimer's Association will fund these ongoing expenses. It considers this project important enough to the advancement of Alzheimer's science to commit to making it a structural cost. The database will be scalable and designed to facilitate and grow with future technologies, which could result in significant savings.



A World Without Alzheimer's



An estimated 5.4 million Americans suffer from Alzheimer's disease today and, without prevention or a cure, as many as 10 million members of the baby boom generation could develop the disease over the next few decades. GAAIN—an innovation not previously possible—promises to expedite the pace of discovery in Alzheimer's disease science and help stave off the imminent public health crisis that will be caused by the disease's rising prevalence.

The Alzheimer's Association hopes that you will consider helping it to fulfill its extraordinary commitment by making a gift to support GAAIN and spur Alzheimer's science toward the achievement of the Association's *Vision Of A World Without Alzheimer's™*.