THE CAMPAIGN FOR
Mass General

NEUROSCIENCES

Leaders in neurology, psychiatry and neurosurgery collaborate to create essential therapies for patients.

A Pivotal Moment

Disorders of the brain and nervous system account for greater disability, economic cost and human suffering than any other disease. Across the globe, a revolution in how we understand and treat brain-based conditions is underway. Landmark scientific breakthroughs—many pioneered at Mass General—are advancing the field at a rate unparalleled in the history of medicine. Cutting-edge imaging technologies are unlocking innovative techniques that can help researchers understand the brain in entirely new ways. Advances in genomics and stem cell technology are opening avenues for targeting and treating illnesses previously thought incurable. And access to heretofore unimagined amounts of data is helping us understand how to make even more breakthroughs in the years ahead.

At Mass General, we are fearlessly imagining a world in which human suffering from brain diseases is eliminated. We are committed to building a collaborative, international network to revolutionize both the treatment and prevention of brain disorders around the world. Philanthropy will allow us to accelerate the speed of our progress, amplify the reach of our discoveries and improve patient care throughout the world.

Uniquely Positioned for Impact

Mass General Neuroscience is driven to unlock the mysteries of the brain to improve patient outcomes—and we are poised to deliver on this opportunity like no other institution. With world-class clinical services situated within the world's top research hospital, we seamlessly connect basic and applied neuroscience, engineering and computer sciences, genomics, and molecular biology with game-changing clinical innovation and compassionate patient care.

Nothing demonstrated the strength of this integrated approach more than our response to the COVID-19 pandemic. Within 24 hours, we created entirely new testing practices to better identify those who have the virus and those who don't, isolating patients as needed and developing more effective treatment strategies. Within 48 hours, we used this data to train physicians across the country in this approach. Our talented teams of researchers—from across all hospital specialties—shifted their focus to COVID-19 clinical research. Within two weeks, 15 clinical trials had been approved and are moving forward.

Now, these combined strengths position us to play a leadership role in tackling the immense and costly problems that brain disorders pose to patients, their families and society. We are defined and empowered by the unique integration among our core clinical and research departments—Neurology, Neurosurgery and —as well as our signature research facilities, including the Athinoula A. Martinos Center for Biomedical Imaging, the Center for Genomic Medicine and the Center for Regenerative Medicine.

Together, we will advance our understanding of how the brain works and discover new treatments, cures and preventive strategies for many diseases of the brain and nervous system.

Bold Breakthroughs.
Compassionate Care.
Revolutionary Results.

Our Vision

Imagine a future where treatments for psychiatric illnesses, such as depression and schizophrenia, are personalized, timely and accessible. Where debilitating brain disorders are routinely prevented as part of a patient's standard primary care experience. Where now-deadly diseases like Parkinson's and Alzheimer's are not only reversible, but preventable. And where people who were previously paralyzed can once again move freely.

Mass General is ideally positioned to fulfill this vision, thanks to our unequaled expertise and our scientific and clinical excellence, which extends from primary care to specialized services. We are focused on making unprecedented investments in areas that hold the most promise in the treatment and prevention of brain disorders, including:

» **Advanced Human Brain Neuroimaging.** Mass General's Martinos Center will build the Brain Architecture Machine (BAM), which represents a moonshot for biomedical imaging. This integrated, multimodal imaging system will reconstruct the living, working human brain, allowing researchers to dynamically observe neurochemical modulation in real time.

» **New Neurotechnologies to Re-route Brain Circuits.** We seek to develop an array of innovative neurotechnology tools that allow our physicians and researchers to target and modulate specific neural circuits identified by the BAM. These tools will stimulate the brain more deeply than ever before, allowing patients to wear devices that provide stimulative treatments with just a tap on their smartphone screen.

» **Brain Data Hub.** We seek to build a Brain Data Hub to store, manage, visualize, analyze and share the massive amounts of neural data collected across our affiliated partners. Leveraging input from data scientists, visual artists and other experts, we will not only store this wealth of complex information but also find new, innovative ways to make it accessible and interactive.

» **Personalized Therapies.** We have established extensive, global clinical trial networks in psychiatry and neurology, and are now leveraging these groups to launch new clinical trial platforms and clinical approaches to bring personalized therapies to patients faster. We're harnessing big data to create adaptive statistical approaches and precise imaging techniques that will allow us to analyze information from single cells to the whole brain. We can then adapt these tools easily to test therapies for a wide range of brain diseases.

» **Preventing Brain Disease and Preserving Brain Health.** A revolution in heart health and cancer prevention has prevented hundreds of millions of heart attacks and cancers through primary care screenings. Imagine a world where brain health becomes a cornerstone of primary care, much the way heart health is today. Imagine the human potential released if we could prevent brain diseases from ever striking in the first place? Our scientists and clinicians are working hard to make this revolution happen. Mass General's Henry and Allison McCance Center for Brain Health unites the world's leading scientists to discover the indicators of brain health, the interventions that can prevent brain disease, and ultimately integrate these indicators and interventions into primary care. We have launched the Ideal Brain Care Score, which can track our brain health as we age, and we have begun dozens of cutting-edge collaborative investigations to identify those markers that can ultimately evaluate an individual's brain health across their lifespan.

JOIN US

Thank you for your interest in Mass General Neuroscience. With the support of committed partners like you, we will unlock the mysteries of the brain and transform how we treat brain-based conditions for generations to come.

FOR MORE INFORMATION, please contact Rachel Mastone at **rmastone@mgh.harvard.edu** or **(617) 726-2200.**

Massachusetts General Hospital
Founding Member, Mass General Brigham

NEUROSCIENCES: OPPORTUNITIES TO INVEST

This moment demands that we aim high, and we need your help to turn our ambitious vision into reality. The following investment opportunities are tangible ways philanthropy will enable us to reach our goals.

People

Mass General has more biomedical engineers, physicists and chemists than Harvard and MIT combined. But our engineers and scientists must constantly write grants to support their research. They go the extra mile because they want to be here, working together with the most visionary minds in medicine to address the most complex and important questions in science in order to help our patients enjoy their lives. If we can provide these talented individuals with the resources they need, Mass General Neuroscience will not only be able to continue providing top-quality, compassionate care, but also accelerate our research and the dissemination of our discoveries—improving patient outcomes at Mass General and around the world.

We seek to recruit and retain the most talented physicians, researchers and staff by making significant investments in priority areas, such as:

» **Endowed Mass General Chairs and Scholars:** We seek to create and fund a series of endowed positions for key investigators in our three core departments and several research centers. Our faculty are internationally recognized and renowned for their work, and as a result, they are often sought after by other academic research programs and private industry. We must provide stable salary support for faculty and trainees, interim research support during gaps in funding, and seed funding for "high risk, high reward" projects with the potential for transformational impact.

» **Endowed Fellowships:** It is equally essential we support and train the next generation of medical trailblazers. To that end, we seek to fund endowed fellowships that will ensure we can continue to bring top talent to Mass General, capitalizing on the exceptional researchers coming out of the training programs at Harvard, MIT and elsewhere. Not only will these junior investigators bring new ideas and fresh perspectives, they will help us build new fields of expertise as brain and nervous system research continues to evolve. The endowed fellowship provides a reliable revenue stream, allowing us to provide support in perpetuity.

» **Transformative Scholars:** The Transformative Scholars Program in Neurology strengthens our integration of patient care and research by providing the tools early-career researchers need to hasten the development of better ways to treat and prevent brain disorders. This support is critically important for researchers at the instructor level, who are in one of the most precarious funding times of their careers, as they embark on securing grants to support their independent research careers. The return on investment for this program is impressive, with the Scholars not only making significant research progress but also using that progress to leverage additional grant support.

Bold Breakthroughs.
Compassionate Care.
## Revolutionary Results.

Infrastructure

We seek to build state-of-the-art facilities, building on the strong foundation we already have at the Martinos Center, to expand the technologies we can bring to the bedside and to magnify the scale and scope of our clinical operations. We are eager to leverage our position as the number-one center for neuroimaging in the U.S., with the Human Connectome (offering a gradient field eight times more powerful than a conventional MR machine) and the BrainPET, an MR-compatible PET machine, by partnering with our neuroscience colleagues on new approaches to clinical care. In addition to developing these tools, Martinos Center researchers also design software for the analysis and visualization of structural and functional neuroimaging, as well as for improving our understanding of disease pathology.

Programs

By investing in our existing programs that are already yielding significant results, and funding new efforts that build on those successes and explore uncharted frontiers, we will move ever closer to a future where we can accelerate our understanding of the brain and nervous system, and can turn the promising work we've started today into the everyday tools of tomorrow. We seek to make significant investments in our innovative programs, such as:

» **Brain Atlas.** A Mass General Martinos Center team has already completed a 100-micron resolution scan of the human brain. This is the highest resolution MRI scan of the whole human brain to date, with images 1,000 times more detailed than a standard clinical MRI scan. With your support, we can make this level of detail available to patients by constructing a single-cell, whole-brain atlas with the help of the Brain Architecture Machine. An atlas at this resolution will allow physicians to get a precise view of an individual's neurons— potentially seeing exactly when the first neurons die in Alzheimer's or Parkinson's disease, long before symptoms begin, making early intervention or prevention possible.

» **Platform Trials.** We are developing a new roadmap to evaluate every kind of therapeutic intervention quickly and efficiently. New adaptive statistical tools make it possible to evaluate several promising therapies at the same time, reducing the time it takes to evaluate a drug's effectiveness by 50 percent and reducing the cost of a trial by 30 percent. This revolutionary approach allows researchers to add or drop therapies once their effectiveness is determined, without the need to stop and restart the trial, which allows us to continue testing until cures are found.

» **AI-Assisted Risk Prediction.** Mass General psychiatrists used artificial intelligence and a custom-built computer algorithm to scan 1.72 million electronic health records from the Partners HealthCare system to predict attempted suicides. After scanning every medical code that might be connected to suicide, they generated a model that predicted 45 percent of actual suicide attempts, three to four years in advance, on average. With your support, we can increase the accuracy of this risk prediction tool and adapt it to predict other behavioral health issues, as well as neurological diseases such as stroke and dementia.
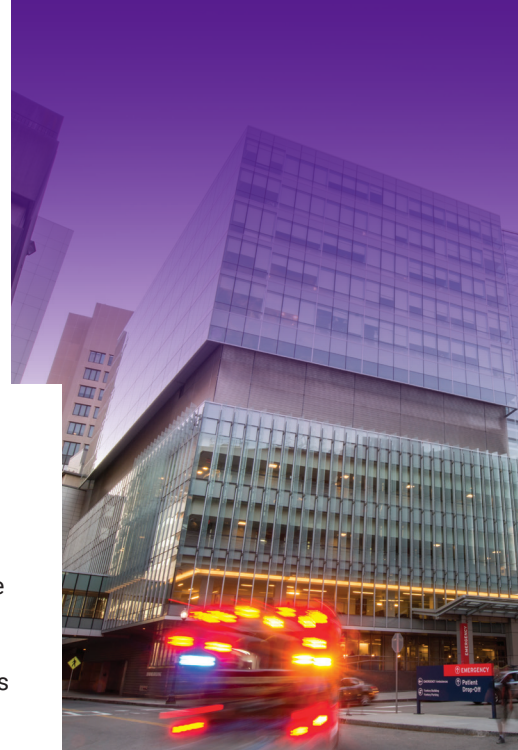
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