REQUEST FOR APPLICATIONS

MGH-MIT Strategic Partnership Grand Challenge 3: Neuroscience

Grand Challenge 3: Develop joint ventures which link basic and clinical research in order to accelerate progress towards more effective diagnostic approaches and therapies in clinical neuroscience.

Award Types and Amounts:

- 2 (two) "large" grants at $150,000 (total costs) **per team per year** for up to 2 years
- 4 (four) "small" at $50,000 (total costs) **per team per year** for 1 year
- 3 (three) "continuation" projects at $50,000 (total costs) **per team** for 1 year, to follow a "small" project

Note: Each award amount represents total award, inclusive of IDC/fund fees, 10% at MIT and 15% at MGH.

Letter of Intent (LOI): To be eligible to apply for this award, you must submit an e-mail notification with a letter of intent to apply as well as an award coversheet by February 6, 2015. Letters of intent should include the attached cover sheet, the names of the principal investigators and a brief description of the project. Please submit the LOI and coversheet to imes_rfp@mit@mit.edu AND to ecor@partners.org.

The email subject should read "MIT-MGH Challenge 3" and should include a single pdf file with the following name convention: the PI(s) last name separated by "_" and followed by "_LOI_GC3".
Example: "Smith_Clark_LOI_GC3".

Selected LOI will receive an email inviting a full proposal and detailed submission instructions.

Full Proposal Submission Date: March 15, 2015

Project Start Date: June 1, 2015

Submission Information: Letters of intent and applications should be submitted electronically to: imes_rfp@mit@mit.edu AND ecor@partners.org

Goal of the MGH-MIT Strategic Partnership Grand Challenge 3 Projects

The MGH-MIT Strategic Partnership aims to bring together approaches from engineering and basic science with clinical medicine to translate rapidly clinical problems from bedside to bench and to return to the bedside with improved diagnostic and therapeutic strategies. A summary of the MGH-MIT Strategic Partnership is in the Appendix of this RFA.

Both MIT and MGH have extraordinary programs in neuroscience research. MIT is the leading engineering school and the best university-based neuroscience program in the world. MGH is the number one hospital in the United States with the country's top clinical, training and research programs in clinical neuroscience (neurology, psychiatry, neurosurgery and anesthesiology). There is a limited number of neuroscience collaborations between MIT and MGH. In addition to research collaborations, investigators at both institutions jointly mentor junior clinicians and scientists for fellowship and career awards. All of these contacts have been established on individual bases rather than through any specific institutional or thematic mechanism.

Examples of the types of collaborative research projects include but are not limited to the following areas:

- Methods for diagnosis of neurodegenerative disorders, such as Alzheimer's disease, and Parkinson's disease, in advance of symptom onset and neural and functional changes.
- Strategies to help maintain/enhance memory and cognitive function in order to promote successful aging and to restore cognitive function following traumatic brain injuries and the onset of neurodegenerative disorders have had only limited success.
- Approaches to foster natural sleep.
- Methods to accurately monitor sleep.
- Methods to accurately monitor brain function of patients receiving general anesthesia and sedation in the operating room and the intensive care unit.
- Novel strategies to track and maintain sedation in the intensive care unit.
- Approaches for robustly detecting and classifying altered brain states in patients with neuropsychiatric disorders.
- Approaches to enhancing brain function in patients with neuropsychiatric disorders.
- Novel strategies for fostering coma recovery.
- New approaches to the analyses of important neuroscience data such as functional imaging (PET, EEG, MEG, fMRI, NIRS), large scale neurophysiological data and behavioral measurements.
- Novel applications of functional imaging to study basic or clinical neuroscience problems.

All applications must be from a team composed of at least one faculty member of the MGH and one faculty member of MIT. Faculty members may be Assistant, Associate or full Professors or those with principal investigator status at MIT or MGH. Teams with more than two principal investigators are welcomed, but each investigator must participate meaningfully in the project.

Preference will be given to teams that are employing unique and highly innovative approaches with a path to further funding at the end of the seed grant clearly described. Project benchmarks should be realistically achievable in the time frame proposed (i.e. one or two years depending on grant type).

Proposal Submission Information

1. Format

- The research proposal may not exceed three pages including figures and tables. Cover page, biosketches, budgets, and one page of literature citations do not count toward the page limit.

- Please use 12 point Cambria or 11 point Arial font and margins of 0.5 inches or greater.

- The following are required components:
    - Cover Page. Include the title of the project, principal investigators' names and project abstract
    - NIH biosketches for each principal investigator, one from MIT and one from Harvard in the new NIH format. Include Part A (Personal Statement)
    - Budgets and Budget Justifications. Using PHS 398 form pages, submit one per institution per year with additional overall budget for the project
    - Research Plan: Include Background and Significance, Specific Aims, Research Plan and (for "large" projects) Benchmarks for year 1 and year 2
    - Literature Citations

- The research proposal should clearly articulate the following:

- What is the primary unmet medical need you are addressing?
- What approaches do you intend to use and why are they novel?
- What are the anticipated experimental challenges?
- What are the short- and longer-term goals of the research?
- What can be reasonably accomplished within the funding period?
- What clinically translatable applications might emerge from this work now or in the future?
- What are your plans to obtain further funding?

2. Resources and Budget

- Funding for the project must be allocated in equal amounts to the MIT and MGH components.

- Budget requests and justifications must be submitted using PHS 398 form pages for each institution as well as an overall project budget for the full project period. ***Please use PHS 398 form pages 4 & 5 only.***

- Each award amount ($50,000 or $150,000) represents total award, inclusive of IDC/fund fees. The indirect cost rate at MGH is 15%. While there is no indirect cost rate at MIT, a 10% fund fee is added on to every transaction. Each institution pays their respective IDC/fee against the Total Direct Cost.

- Your budget requests for each institution should not exceed the Direct Cost for the grant type outlined in the tables below.

"Small" Grants - $50,000 (total costs) per team per year for 1 year

Institution	Direct Cost	Indirect Cost/Fee	Total Direct Cost
MGH	$21,739.13	$3,260.87	$25,000
MIT	$22,727.27	$2,272.73	$25,000

"Large" Grants - $150,000 (total costs) per team per year for up to 2 years

Institution	Direct Cost	Indirect Cost/Fee	Total Direct Cost
MGH	$65,217.39	$9,782.61	$75,000
MIT	$68,181.82	$6,818.18	$75,000

- Funds may be used for research expenses, which may include salary and benefits for PIs and other research staff, supplies and equipment.

- Funding for the $150K projects may be requested for up to a two-year period, but the renewal at the end of year one is subject to performance review.

3. Due Dates

An e-mailed letter of intent (see above) is required by February 6, 2015 if you plan on submitting a proposal. **The final application is due** March 15, 2015**.**

Progress Reports

Grantees for "large" grants must submit two progress reports per year, one after 6 months of funding and one at the end of the first year of funding. Second-year funding will be dependent on a satisfactory review of the Progress Report. An 18-month report and a final progress report are also expected. Progress will be measured against stated benchmarks and timelines. "Small" grants must submit a final project report at the end of the project. The project report will be used to determine continuation "Small" grants for an additional year.

Other Requirements

- Members of the winning teams will/may be asked to attend/present at several other MGH-MIT Strategic Partnership-related occasions (e.g., donor events) as well as participate in the next review cycle (2015).
- MGH-MIT Strategic Partnership funding must be acknowledged in publications, presentations and invention disclosures.

Contact Information

Please direct questions to:
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Appendix

EXECUTIVE SUMMARY OF THE MIT-MGH (M^2) STRATEGIC PARTNERSHIP

Rationale for Strategic Partnership

Neurological disorders, infectious diseases, cardiovascular diseases, and autoimmune diseases are just a few examples of the daunting challenges to human health that we face today. How can cost-effective diagnostic tools, therapies, and vaccines that can overcome these challenges be developed? We believe that this can be achieved by bringing together approaches from engineering and basic science with clinical medicine. Toward this end, MIT and MGH aim to create a strategic partnership that brings together their uniquely synergistic and complementary strengths. MGH's clinical and scientific missions and MIT's focus on engineering, science, innovation, and entrepreneurship will focus the research agenda on rapid translation from bedside to bench and back to bedside. Combining deep knowledge derived from patient care and research in human disease with cutting-edge approaches in engineering and basic science promises to be transformative. The Ragon Institute is proof of concept of this paradigm of collaboration between MGH and MIT.

Grand Challenges to be Confronted and Overcome

Clinicians, engineers, and scientists from MIT and MGH (list appended) have worked over several months to define three grand challenges that could be addressed by a strategic partnership between the two institutions.

Grand Challenge 1: Make diagnosis cost-effective and accurate, and guide individual clinical decisions based on real-time monitoring and statistical models of massive patient data sets.

Grand Challenge 2: Enable systematic design of **vaccines and therapies for existing and emerging infectious and autoimmune diseases**.

Grand Challenge 3: Enhance human cognitive function by developing more accurate diagnostic and therapeutic approaches for neurodegenerative and neuropsychiatric disorders. Devise novel approaches for controlling the brain's arousal states (sleep, pain, sedation, general anesthesia and coma recovery).

Why a MIT-MGH strategic partnership is uniquely positioned to address these challenges in revolutionary ways, and how this will be accomplished by bringing together different branches of engineering, clinical medicine, and science is described in detail in another document. In short, challenge 1 involves bringing together electrical engineers, computer scientists, mechanical engineers, and systems engineers from MIT with pathologists, radiologists, clinicians and scientists at MGH. Challenge 2 involves bringing together immunologists and clinicians at MGH with biologists, chemical engineers, materials scientists, biological engineers, and physicists at MIT. Challenge 3 involves bringing together psychiatrists, neurosurgeons, anesthesiologists, and neurologists at MGH with neuroengineers and neuroscientists at MIT.

Implementation of the Strategic Plan

Bringing together the world's leading research hospital (MGH) and the world's leading institute for engineering, science, and innovation (MIT) is expected to be transformative for medical research and health care. Therefore, we also expect that the MIT-MGH strategic partnership proposed above will be a magnet for philanthropic fund-raising, government, and industrial support.

It is important, however, to have some concrete examples of novel collaborations that have resulted from the creation of a strategic partnership. Toward this end, three widely-advertised workshops will be held to further explore possible synergies between MIT and MGH researchers and clinicians. These workshops will be supported by MIT's Institute for Medical Engineering & Science (IMES). Each workshop will focus on one grand challenge, and will include both MIT investigators who are knowledgeable about the topic, and importantly, those who have never worked on issues pertinent to the grand challenge. To expose MIT investigators to key issues in the field, and to expose MGH clinician/scientists to innovative new technologies, a series of talks and/or posters will be the agenda. This will enable exploration of whether a novel technology, device, or approach may be able to address a facet of the grand challenge.

The MIT and MGH administrations have provided up to $3M as seed moneys to allow such projects to be supported by "innovation grants". Innovation grants would fund projects focused on the grand challenges, and must involve collaboration between MGH and MIT investigators with equal funding and each organization funding its own investigators.

Two workshops focused on Grand Challenge 1 were held on the MIT campus, which many investigators from MIT and MGH attended. For example, the second such workshop held on December 13 (2013) was attended by 21 MIT faculty members, 19 MGH faculty members, and 2 others who hold dual appointments at both institutions. Based on discussions at this workshop, a RFA has been crafted to seek proposals from the MIT and MGH communities. This RFA is attached.

A workshop focused on Grand Challenge 3 has also been held. Additional workshops focused on Grand Challenges 1 and 3 are being planned.