Institute for the Neurosciences: Current Status

- The initial draft of the strategy document was developed in Q4/2009 and reviewed with BWH, BRI, and Institute for the Neurosciences leadership. This document presented a fully articulated vision for the translational research and Translational clinical programs of the Institute and required approximately $4 million in incremental funding.

- Underway is an analysis of local, other US and European Neuroscience research and cross-disciplinary clinical programs. While not yet complete, it is clear we have defined a unique program, distinctive in its translational focus and cross-disciplinary working model.

- We are further refining the requirements for each cross-disciplinary clinical program we will be offering. This includes the physical and talent requirements.

- The completion of the above will enable detailed 2010 and 2011 operating budgets.

- The completion of the strategy document, full summary of resource requirements, and finalization of 2010 resource commitments is targeted for early May, 2010. “Start-up” sources anticipated includes directed donations, BWH institutional contribution, and re-designated research funds.

- With completion of the strategy document and approval of the 2010 and 2011 budgets we will also be initiating novel collaboration discussions with leading life sciences companies and venture funds with strong interests in the neurosciences.
Outline

- BWH Institute for the Neurosciences: Overview
- Institute for the Neurosciences: Translational Clinical Programs
- Institute for the Neurosciences: Enabling Infrastructure
- Next Steps
- Background documents
  - Organizational set-up
  - Brief Biographies

Institute for the Neurosciences: Objectives

- Reduce the burden of brain-mind disease through the development of targeted, transdisciplinary collaborations at the interface of fields where patient's needs are great and largely unmet, where scientific breakthroughs are most likely, and where the next generation of leaders need to be trained to foster innovation

- Develop a cross-cutting, translational, interdisciplinary/interdepartmental Neurosciences Institute integrating Brigham and Women’s Hospital (BWH) neuroscience investigators, clinicians and educators in neurology, neurosurgery, (neuro)psychiatry, (neuro)radiology, (neuro)pathology, allied fields (sleep/pain medicine), and molecular diagnostics (biomarkers)/genetics.

- Establish the enabling infrastructure for the Institute: cross-disciplinary translational clinic, translational research resource core, education program, information technology core and administrative support and grant submissions

- Identify and launch joint projects demonstrating the ability to accelerate clinically-relevant scientific progress, catalyzing broader external funding support from donors, disease foundations, life sciences companies, venture partners, and government entities
Institute for the Neurosciences: Cross-disciplinary Translation to the Clinic

**Institute for the Neurosciences: Key Elements of Approach**

- Launch cross-disciplinary translational clinic with advanced Proof-of-Concept clinical trials capacity
- Formalize enabling Research cores in neuro-genetics/genomics, biomarkers, neuro-imaging, and bio-analysis
- Implement clinical informatics supporting cross-disciplinary clinic, “personalized” approach, and ongoing comparative effectiveness and outcomes analyses
- Accelerated commercialization of translational insights
- Develop/expand unique cross-cutting educational programs and conferences
- Develop ‘signature’ donor(s)
- Pursue ‘focused’ government and foundation grants; broader industry collaborations
BWH Institute for the Neurosciences:
Cross-Disciplinary & Cross Technology

Translational Core/Research Groups

Clinical Services

Clinic

Lab

Molecular Diagnostics, Biomarkers & Imaging

Clinical & Research Information Technology

BWH Institute for the Neurosciences:
Distinctive Characteristics

Areas of Clinical Focus

- Head Trauma and Injury (TBI)
- Movement Disorders (Parkinson's Disease)
- Mood Disorders (Depression)
- Epilepsy
- Stroke/Rehab
- Psychosis
- Delirium
- Brain Tumors
- Brain/Mind: Neuropsych, Dementia/AD
- Multiple Sclerosis
- Headache
- Neuroendocrine Disorders, Metabolic Syndromes
- Sleep
- Pain
- Addiction

Institute for the Neurosciences Distinctiveness

- Transformative, Cross-discipline approaches to patient care
  - Experience:
    - Comprehensive, definitive one-stop-shopping, clearinghouse
  - Service delivery, outcome tracking
  - Cross-cutting mechanism:
    - e.g. Neuroinflammation

- Targeted Therapeutics
  - Neuromodulation/brain stimulation
  - Neuroprotection
  - Neuro-repair

- Novel, Combined Diagnostics
  - Imaging, Genetics, Biomarkers
BWH Institute for the Neurosciences: A Unique Cross Disciplinary Clinic

An integrated clinic for neuro “one-stop-shopping.” A setting and pipeline mechanism for interdisciplinary research, care and teaching. Patient sample repository and information clearinghouse to determine optimal care, at BWH or elsewhere, for individual patients.

Facilitating interactions between physicians, scientists and patients to develop clinically-relevant, translational projects to improve upon diagnosis and treatment in brain care.
BWH Institute for the Neurosciences: Example of one Cross-Disciplinary Clinic

The Deep Brain Stimulation (DBS) Clinic – A novel, high quality, inter-disciplinary, 1-stop shopping model of care offers patient evaluation, management, surgical intervention, and follow-up treatments for patients with movement disorders (such as Parkinson’s Disease, Tremor and Dystonia) and other neurologic and psychiatric disorders aimed at enhancing patient’s medical outcomes and improving their quality of life.

Guiding Principles of the DBS Clinic:
• Become the most highly specialized, highly integrated, reputable DBS clinic locally and nationally by optimizing our internal clinical talents, team approach, innovation, and organizational capabilities
• Facilitate ease of appropriate access and patient and referring physician communication in a coordinated fashion to enhance the patient experience through the process
• Foster inter-disciplinary clinician collaboration to determine the optimal course of treatment and follow-up care customizable for that specific patient
• Provide an academic environment for developing new techniques and treatments using DBS and measuring the longitudinal effects of the procedure and its impact on disease outcomes
• Create an opportunity for Resident, Fellow, and other trainee education through participation in the clinic, OR exposure, case presentation, and other DBS educational conferences

BWH Institute for the Neurosciences: A Unique Cross Disciplinary Clinic

Inter-disciplinary DBS Clinic care team provides patient evaluation and management, psychological testing, surgical intervention, DBS device programming, research participation, and imaging

Cross-Disciplinary DBS Clinic Team

Referrals from:
1. Neurology
2. Neurosurgery
3. Psychiatry

Psychiatry/Neuro-Psychiatry
Gabriel De Erausquin, MD
Dan Herrera, MD
Ottavio Vitolo, MD

Neurology
Michael Hayes, MD
Allan Ropper, MD

Neuropsychology
Aaron Nelson, PhD
Maryellen Meadows, PhD

Neuroradiology
Srini Munkundan
**BWH Institute for the Neurosciences: DBS Cross-Disciplinary Clinic**

### Cross-Disciplinary DBS Clinic Process

- Patient referred to Neurology
- Patient referred to Neurosurgery
- Patient referred to Psychiatry

**Patient referred to DBS MD**
- Case referred to DBS MD team for candidacy
- Case reviewed to determine candidacy
- Patient participates in cross-disciplinary DBS clinic
- Psychiatry
- Neurology
- Neurosurgery
- Neurology

**Integrated Outpatient Clinical Services**

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrated</strong></td>
<td><strong>Depression</strong></td>
<td><strong>Pain</strong></td>
<td><strong>Epilepsy</strong></td>
<td><strong>Movement Disorders</strong></td>
</tr>
<tr>
<td><strong>Outpatient</strong></td>
<td><strong>Brain</strong></td>
<td><strong>Brain</strong></td>
<td><strong>Women's</strong></td>
<td><strong>Brain</strong></td>
</tr>
<tr>
<td><strong>Clinical</strong></td>
<td><strong>Stimulation:</strong></td>
<td><strong>Mind</strong></td>
<td><strong>Neuropsych</strong></td>
<td><strong>Tumors</strong></td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td>DBS**</td>
<td><strong>Medicine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brain</strong></td>
<td>Stimulation:</td>
<td><strong>Epilepsy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TMS</strong></td>
<td></td>
<td><strong>Brain</strong></td>
<td><strong>Neuropsych</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TBI</strong></td>
<td></td>
<td><strong>TBI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brain/Mind</strong></td>
<td></td>
<td><strong>Brain</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clinical Processes also integrated with other Clinical Services**

- BWH Inpatient: Delirium
- Faulkner: Psychosis, Addictions, Headache
Institute Studies Ready for Implementation: Examples

1. Clinical trials of FDA-approved agents to protect neurogenesis in the hippocampus in the setting of cancer chemotherapy, and of alcohol abuse

2. Image-targeted deep brain stimulation for refractory major depression

3. In vivo imaging detection and localization of possible neuroinflammation in epilepsy, Alzheimer's disease and psychosis, followed by trials of centrally-acting anti-inflammatory medications, coupled with neuroimmune biomarker validation

4. Sub-typing of above conditions with multi-modal biomarker measures (molecular, fluid, imaging) combined with multi-variate computational analyses, for treatment selection, early intervention and outcome prediction
Institute for the Neurosciences: Educational Initiatives

- Innovative, integrated training programs
  - Clinical
    - Neurology-Psychiatry Combined Residency Training Program
    - Neuroradiology-Neurology Fellowship
  - Research
    - Joint, interdisciplinary research fellowships with mentors and projects across disciplines
- Cross-discipline clinical rounds and conferences
- Cross-discipline courses and seminars
- Hosting local, regional, national, international conferences at the interface of academic brain-mind medicine

Outline

- BWH Institute for the Neurosciences: Overview
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BWH Institute for the Neurosciences:
Establish Enabling Infrastructure

- **Cross-disciplinary translational clinic** - To establish an integrated clinic for neuro “one-stop-shopping” and optimal patient/family experience. Offering comprehensive, integrated evaluations, and the latest treatments. Will serve as a setting and mechanism for interdisciplinary research, care and teaching. Will provide a source of well-characterized patient populations for participation in diagnostic and therapeutic studies. Will facilitate interactions between physicians and scientists to develop clinically-relevant, translational projects to improve upon diagnosis and treatment in brain care.

- **Translational Research Resource Cores** - To develop a resource for the identification and evaluation of novel diagnostic biomarkers coupled with mechanistically-targeted therapeutics. With the clinic, will allow the rapid launching of bench-to-bedside treatments.
  a. **Clinical/Imaging**: Functional and Structural MRI, Neuro-PET-cyclotron facility. Will provide methodological expertise and tools for study design, image acquisition and statistical analysis.
  b. **Molecular Diagnostics & Biomarkers**: To facilitate the development and integration of neurogenetics/genomics, neurometabolomics and neuroproteomics.

- **Clinical Information technology** - To develop the infrastructure to provide database and computational capabilities, spanning the clinical (electronic medical record) and research realms, in an internally open source fashion, for a large number of neuroscience clinicians and investigators performing translational work.

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BWH Institute for the Neurosciences:
Initial Clinical and Institute Requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Neuroscience Clinical Service</th>
<th>Institute for Neurosciences Core Administrative Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staffing</td>
<td>1. Faculty FTE for Brain/Mind Clinical Interface</td>
<td>1. Define, build, and oversee cross-disciplinary Neuroscience Clinic</td>
</tr>
<tr>
<td></td>
<td>3. Research Nurse</td>
<td>2. Align key research programs and core activities in support of clinical translation</td>
</tr>
<tr>
<td></td>
<td>5. Physician Assistant, “Neuro” Nurse</td>
<td>3. Define and pursue new areas of research and industry support</td>
</tr>
<tr>
<td></td>
<td>6. 0.25 FTE Clinical Services/Outcomes Investigator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Marketing/Communications</td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>1. Five-day operation as a full time cross-discipline Neuroscience Clinic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Integration of current services and schedules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Single point of patient contact</td>
<td></td>
</tr>
<tr>
<td>Staffing</td>
<td>1. Full-Time MD/PhD Director</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. 2-3 Part-Time FTE’s: MD/PhD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Administrator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Secretary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Grant Writer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Consultant/Industry Relations</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Space &amp; Equipment</th>
<th>Neuroscience Clinical Service</th>
<th>Institute for Neurosciences Core Administrative Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Clinical Suite</td>
<td>1. Conference Room</td>
</tr>
<tr>
<td></td>
<td>2. TMS</td>
<td>2. Administrative Space</td>
</tr>
</tbody>
</table>
### BWH Institute for the Neurosciences: Core Functions for Neurosciences Clinic

<table>
<thead>
<tr>
<th>Core Functions</th>
<th>Clinical Information Technology</th>
<th>Molecular Diagnostics &amp; Biomarkers</th>
<th>Translational Therapeutic Development</th>
</tr>
</thead>
</table>
| Key Capabilities | 1. Database integrating Clinical and Research  
2. Computers and Network Infrastructure  
3. Web-Site (Intranet, External) | 1. Fluid (Genetics/Genomics, Metabolomics, Proteomics) (Immune Profiling)  
2. Imaging (Structural and Functional MRI, PET) | 1. Cross-Cutting Methods  
Development and Implementation: Neuroprotection, Neuromodulation, Omics, Imaging, Neurinflammation  
2. Disorder Specific Pilot/Demonstration Projects |

| Talent/Staffing | 1. Programmer (DB, clinical)  
2. Web site developer  
3. Database Manager | 1. Incremental 'Omics' Scientists and Core Support  
2. Imaging Scientists and Core Support | 1. Neuroprotection Scientist, RA and Core Support  
2. Neurostimulation Scientist, RA and Core Support  
3. Incremental wet/dry lab space |

| Space & Resources | 1. Computer Cluster | 1. Incremental 'Omics' and imaging wet/dry lab space  
2. Research dedicated 3T MRI Scanner | 1. Incremental wet/dry lab space |

### BWH Institute for the Neurosciences: Initial Clinical and Institute Requirements

<table>
<thead>
<tr>
<th>Educational Programs</th>
</tr>
</thead>
</table>
| **Capabilities** | 1. Sponsoring cross-disciplinary clinical and research training programs  
2. Hosting internal and external interdisciplinary conferences |
| **Staffing** | 1. 0.25 FTE MD/PhD educational director  
2. 0.33 FTE education program coordinator |
| **Space & Resources** | 1. 2 conference rooms  
2. Access to large conference venues  
3. Funding for hosting conferences |
BWH Institute for the Neurosciences: Summary of Infrastructure Development

<table>
<thead>
<tr>
<th>Annual Goals for Infrastructure Development</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch Clinic &amp; Build enabling translational Clinic IT infrastructure</td>
<td>Hire Associate Director &amp; continue translational clinical IT build</td>
<td>Hire core of translational research team</td>
<td>Limited incremental IT build-out + continuation of translational research</td>
<td></td>
</tr>
</tbody>
</table>

Incremental FTEs

- FY10: 2 FTEs
- FY11: 1 FTE
- FY12: 13 FTEs
- FY13+: 1 FTE

Total 2010 – 2013+: 17 FTEs

BWH Institute for the Neurosciences:
A Positive Contribution in 2010 & 2011

2010

- Core Infrastructure: ($146K)
- Surgical Direct Margin: $381K

2011

- Core Infrastructure: $530K
- Surgical Direct Margin: $690K

BWH Operating Funds 2010, 2011
**BWH Institute for the Neurosciences: Infrastructure Development Budget, 2010 – 2013 (preliminary)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Development</td>
<td>$10,000,000</td>
<td>$10,000,000</td>
<td>$10,000,000</td>
<td>$10,000,000</td>
</tr>
</tbody>
</table>

**Notes:**
1. The BWH Institute for the Neurosciences is committed to providing a world-class research and clinical environment.
2. The budget includes funding for personnel, equipment, and facilities.
3. The budget is subject to annual review and approval by the Institute’s governing board.
4. The budget is designed to support the Institute’s mission and strategic initiatives.
BWH Institute for the Neurosciences: 2011 Proposed Budget (preliminary)

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>FY10 Volume Goal</th>
<th>BWPO Clinic</th>
<th>Total Collections</th>
<th>NPSR Collection</th>
<th>Direct Margin/Case</th>
<th>Total Direct Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Brain Stimulation</td>
<td>New, Comprehensive patient evaluation for DBS surgery for Parkinson’s Disease, Tremor, and Dystonia</td>
<td>24 cases</td>
<td>$53,562</td>
<td>$64,080</td>
<td>$117,643</td>
<td>$5,827</td>
<td>$139,848</td>
</tr>
<tr>
<td>Neurocritical Trauma</td>
<td>New, Composed for the injured patient in a critical care setting and focusing on the functional, emotional, and social recovery</td>
<td>3 cases</td>
<td>$87,780</td>
<td>$135,195</td>
<td>$223,000</td>
<td>$3,000</td>
<td>$256,000</td>
</tr>
<tr>
<td>Acute Trauma</td>
<td>Surgical trauma for patients with neurological and neurosurgical conditions</td>
<td>55 cases</td>
<td>$68,758</td>
<td>$251,178</td>
<td>$318,930</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>All Ad Hoc Clinics</td>
<td>New, Interdisciplinary clinics</td>
<td>123 cases</td>
<td>$61,334</td>
<td>$123,308</td>
<td>$186,642</td>
<td>$36,388</td>
<td>$223,030</td>
</tr>
<tr>
<td>FY11-12 Programmatic Initiatives</td>
<td>New, TMS, Depression, Pain</td>
<td>0 cases</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Brain/Mind Medicine</td>
<td>Existing, Comprehensive cognitive assessment and treatment for patients with Alzheimer’s Disease and Dementia</td>
<td>0 cases</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Women’s Neuropsychiatry</td>
<td>New, Neuropsychiatry, Neuropsychology</td>
<td>0 cases</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Movement Disorders</td>
<td>Existing, Neurology, Psychiatry</td>
<td>0 cases</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Brain Tumors</td>
<td>Existing, Comprehensive patient evaluation and treatment for malignant brain tumors</td>
<td>0 cases</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>130 cases</td>
<td>$231,407</td>
<td>$536,891</td>
<td>$768,297</td>
<td>$42,493</td>
<td>$689,838</td>
</tr>
</tbody>
</table>

Footnotes:
1. Revenues represent outpatient BWPO and BWH clinic revenue only; surgical revenue is excluded.
2. Volume and revenue represent new programs initiated starting in April 2010.
3. NPSR (collection rates) based on actual BWPO and BWH modeled collections for existing BWH or MGH services.

Outline

- BWH Institute for the Neurosciences: Overview
- Institute for the Neurosciences: Translational Clinical Programs
- Institute for the Neurosciences: Enabling Infrastructure

Next Steps

- Background documents
  - Organizational set-up
  - Brief Biographies
### Institute for the Neurosciences: Next Steps in Strategy Process

- Complete definition of research and clinical priorities; finalize 2010 and 2011 budgets and sources of support (immediate to Q2)
- Complete review of local, other US, and European Neurosciences Centers (Q1)
- Initiate detailed design for cross-disciplinary clinical space; seek co-location of other Neuroscience office and collaborative space (Immediate to Q3)
- Design and build clinical research and trials capabilities across translational cores and cross-disciplinary clinic (Q2+)
- Design and coordinate Institute web and other marketing programs with BWH (Q2+)
- Broaden fundraising program to individuals and foundations (Q1+)
- Initiate "road show" of potential industry and venture collaboration partners (late Q1 and Q2)

### Outline

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Institute for the Neurosciences: Organizational Structure
Institute for the Neurosciences
Brigham and Women’s Hospital

Executive Committee
David Silbersweig, MD, (Chair, Department of Psychiatry; Institute Chairman)
Srinivasan Mukundan, MD, PhD, (Section Chief, Neuroanatomy)
A John Popp, MD, (Chair, Department of Neurosurgery, Education)
Allan Ropper, MD, (Executive Vice Chair, Neurology, Clinical)
Martin Samuels, MD, (Chair, Department of Neurology)
Dennis Selkoe, MD, (Co-Director, Center for Neurologic Diseases, Research)

Steering Committee
David Silbersweig, MD
Barbara Siever, MD (Senior Vice President, Research, Department of Medicine)
Rebecca Folkert, MD (Vice Chair, Neuroanatomy Division)
Joseph Martin, MD, PhD, (Professor of Neurology and Former Dean, Harvard Medical School)
A John Popp, MD
Scott Rauch, MD (President, Psychiatry and Mental Health)
Allan Ropper, MD
Martin Samuels, MD
Dennis Selkoe, MD
Steven Seltzer, MD, (Chair, Department of Radiology)
Anthony Whittemore, MD, (Chief Medical Officer)

Operations Group
David Silbersweig, MD
Nathalie Agar, PhD
Gabriel deRoussosquin, MD, PhD
Philip DeJaeger, MD, PhD
Kristin Garnity
Alyson Greene
Alexandra Golby, MD
Alexandra Grossman
Daniel Herrera, MD, PhD
Tim Lynch
Craig Nesta
Allan Ropper, MD
Martin Samuels, MD
Emily Stern, MD

Neurosciences Leadership Council
Steven Haley
Martha Crowshie
Caroline Mortimer
Daniel Ponton
John Remondi
Jeffrey Swartz
J. David Wimberly

Clinical Workgroup
Allan Ropper, MD
Stan Anderson, MD, PhD
Ori Avni-Barron, MD
Guy Buckle, MD
Kirk Daffner, MD
Barbara Dworetzky, MD
Jane Erb, MD
David Gillin, MD
Alexandra Golby, MD
William Gormley, MD
Srinivasan Mukundan, MD, PhD
Lewis Sudarsky, MD
Tim Lynch

Educational Workgroup
A John Popp, MD
Jane Epstein, MD
Steven Feske, MD
Rebecca Folkert, MD
William Gormley, MD
Tracey Miligan, MD
Srinivasan Mukundan, MD, PhD
David Perez, MD
Emily Stern, MD
Urvashi Upadhyay, MD
Lindsay Flaherty
Mark Johnson, MD

Research Workgroup
Robert Friedlander, MD
Ron Kikinis, MD
Dennis Selkoe, MD
Nathalie Agar, PhD
Arthur Banks, MD
Peter Black, MD, PhD
Charles Czeisler, MD, PhD
Umberto De Girolami, MD
Philip De Jaeger, MD, PhD
Alexandra Golby, MD
Jill Goldman, PhD
Charles Gutman, PhD
Ru-Rong Ji, PhD
Ferenc Jolesz, MD
Bruce Kristal, PhD
Amir Lahav, ScD, PhD
Peter Laxer, PhD
Matthew Lavoie, PhD
Edward Laws, MD
Sarah Minden, MD
Srinivasan Mukundan, MD, PhD

Admin Workgroup
Erin Edwards
Alyson Greene
Tim Lynch
Craig Nesta
Ad Hoc:
Kristin Garnity
Jessica Fay
Joyce Morin
Anu Swaminathan

Institute for the Neurosciences - Workgroups

4/13/10
Productivity Comparison of Pharmaceutical and Biotechnology Companies

$ Millions (2004)

<table>
<thead>
<tr>
<th>Biotech</th>
<th>Pharma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative R&amp;D Spend Per NME (not including line extensions, new indications)</td>
<td></td>
</tr>
</tbody>
</table>


BWH Institute for the Neurosciences:
Key Talent

David Silbersweig, M.D.

Dr. David Silbersweig graduated from Dartmouth College with high honors in philosophy. He studied medicine at Cornell University Medical College. He is a neurologist and psychiatrist, having trained in both psychiatry and neurology at The New York Presbyterian Hospital-Weill Cornell Medical Center. His research training was in the emerging field of functional brain imaging research at The Medical Research Council Cyclotron Unit, Hammersmith Hospital, London. Dr. Silbersweig returned to Cornell to found and direct the Functional Neuroimaging Laboratory with Dr. Emily Stern. Dr. Silbersweig was also the founding Director of the Division of Neuropsychiatry, as well as the founding Director of the Neurology-Psychiatry Combined Residency Program. At Cornell, Dr. Silbersweig was the Tobin-Cooper Professor of Psychiatry, Professor of Neurology and Neurosciences, and was Vice Chairman, for Research, in the Department of Psychiatry. Dr. Silbersweig is now the Chairman of the Department of Psychiatry at the Brigham and Women’s Hospital, and Chairman of the Brigham and Women’s Hospital Institute for the Neurosciences. He is Stanley Cobb Professor of Psychiatry at Harvard Medical School. He has an appointment in the Department of Neurology as well.

Dr. Silbersweig is one of the pioneers of functional neuroimaging research in psychiatry. He and his colleagues focus upon the development and application of new neuroimaging techniques to localize and characterize brain circuitry dysfunction underlying major psychiatric disorders. They have developed novel methods and paradigms for both PET and MRI imaging that are widely used, and have identified neural circuitry abnormalities associated with a number of major psychiatric disorders. Particular areas of focus are the characterization of fronto-limbic modulation abnormalities across the neuropsychiatric spectrum, and the identification of final common neural pathways underlying psychiatric clinical phenotypes. Studies combining neuroimaging with therapeutic and genetic studies, to test mechanistic hypotheses, are now underway. Dr. Silbersweig and his colleagues have published numerous scientific articles in leading journals, including first reports localizing brain abnormalities associated with hallucinations in schizophrenia, and with tics in Tourette syndrome. They have also made widely recognized contributions to neural circuit models of depression and borderline personality disorder. The aim of Dr. Silbersweig’s systems-level neuropsychopharmacology work is to help provide a foundation for the development of novel, targeted, biologically based diagnostic and therapeutic strategies to aid those suffering with mental illness. Dr. Silbersweig has significant involvement (including leadership roles) in national/international research consortia, and is Vice Chairman of the Governing Board of the National Network of Depression Centers. He has played a notable role in shaping the rapidly developing field of neuropsychiatry through his innovative educational activities, his invited presentations in the United States and abroad, and his work with scientific journals, NIH, conferences and organizations.
Nathalie Agar, Ph.D. is a Developmental Neuropathologist. She has a B.Sc. in Biochemistry, Ph.D. in Chemistry, Postdoctoral training in Neurosurgery Research from the McGill University and Postdoctoral training in Neurosurgery Research at the BWH, Harvard Medical School. Dr. Agar’s research interests are of translational nature in developing and deploying mass spectrometry imaging applications into the operating room for surgical guidance. She has played a leading role for the team assembled through the Brigham and Women’s Hospital Harvard Business School Executive Leadership program to contribute to the development of the Institute for the Neurosciences Chaired by Dr. Silbersweig, and will contribute to coordinating transdisciplinary activities, and to harvesting enabling technologies in the materialization of the Institute’s mission.

Gabriel De Erausquin, M.D. is a Research Psychiatrist in the Department of Psychiatry, Brigham and Women’s Hospital. He is a Lecturer on Psychiatry at Harvard Medical School. Dr. de Erausquin graduated from the School of Medicine of the Universidad de Buenos Aires, in Argentina, in He received a Fellowship from the Council of Scientific and Technological Research of Argentina to complete graduate studies in Behavioral Pharmacology at the same university; and received a Ph.D. in 1990. After two years of post-doctoral training at the Fidia-Georgetown Institute for the Neurosciences in Washington, D.C., he moved to Yale University, where he completed a residency in Psychiatry and a fellowship in Biochemical Brain Imaging, funded by the Veterans Administration. He then completed a residency in Neurology, a fellowship in Deep Brain Stimulation for movement disorders, and a Masters of Science in Genetic Epidemiology at Washington University, where he joined the full time faculty in 2001 and reached the rank of Associate Professor of Psychiatry and Neurology. Dr. de Erausquin lead the implementation of a clinical program for the treatment of refractory depression with transcranial magnetic stimulation and vagus nerve stimulation therapies at Barnes-Jewish Hospital and has extensive experience in patient evaluation and selection, intraoperative targeting, and post operative programming of deep brain stimulation devices for the treatment of Parkinson’s disease and essential tremor. His research interest has focused on the relationship between genetically controlled susceptibility of dopaminergic neurons to environmental injury and adult pathology, more specifically Parkinson’s disease and parkinsonism in schizophrenia, as the foundation of strategies for brain protection and repair. Since moving to Brigham and Women’s Hospital as the Clinical Director of Neuromodulation within the Institute of Neurosciences, he is spearheading an effort to implement modern brain stimulation techniques for the treatment, recovery and eventually prevention of major neurologic and psychiatric disorders.

BWH Institute for the Neurosciences: Key Talent

Marcelo DiCarli, M.D. is Associate Professor of Radiology and Medicine at Harvard Medical School, the Chief of the Division of Nuclear Medicine and Molecular Imaging and Director of Noninvasive Cardiovascular Imaging Program at the Brigham and Women’s Hospital. Dr. DiCarli is the co-PI for the SPARC trial and the Director of the SPARC Coordinating Center. He has over 20 years of experience in various aspects of cardiovascular imaging research, and special expertise in budget justifications. He is the Principal Investigator/Program Director (first, middle), Silbersweig, David, Anuclear cardiology and PET imaging. Dr. DiCarli will be responsible for setting up the neurology PET Imaging Core and overseeing the PET projects. Howard L. Weiner, M.D. (0.24 calendar months effort) is the Director of the Partners Multiple Sclerosis Center. Dr. Weiner is a world expert on MS, and a pioneer in the pathophysiologic study and development of mechanistic immunological therapeutics for MS.

Barbara Dworetzky, M.D. is an Assistant Professor of Neurology at Harvard Medical School and acting chief of the division of epilepsy and EEG. She is a clinical epileptologist at Brigham and Women’s Hospital with experience in the evaluation, diagnosis and treatment of epilepsy. Dr. Dworetzky will be responsible for the identification and recruitment of potential subjects, and provide her clinical expertise on the project. Dr. Dworetzky has published in the area of epilepsy diagnosis, prevention, and treatment. She will assist with study design, preparation of manuscripts, and presentation of results.

Rebecca Folkerth, M.D. is an Associate Professor of Pathology at Harvard Medical School, and acting Senior Pathologist of the Neuropathology Department. She is a developmental neuropathologist, specializing in the diagnosis of brain abnormalities in deceased human fetuses and infants. She was a participant in the Volpe Program Project for the last 10 years, helping to establish a Human Perinatal Brain Tissue Bank, essential for the conduction of numerous studies directly in the human brain. Since 2003, she has been a Co-Investigator and Steering Committee member of a consortium funded by the NICHD and NIAAA that is analyzing the association between prenatal alcohol exposure and the risk of SIDS and stillbirth (PASS Study) in high-risk, economically disadvantaged populations in the Northern Plains of the United States and in Cape Town, South Africa. In addition, she participates in ongoing collaborations in the study of human developmental brain disease and provide expertise on human neuropathology (as well as supplying developmental brain samples) to many researchers in the Longwood research community, including Frances Jensen (Children’s Hospital Boston), Voleen Sheen (Beth Israel-Deaconess Medical Center), Christopher Walsh (Children’s Hospital Boston), and Jeffrey Macklis (Massachusetts General Hospital).
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Robert Friedlander, M.D. is a Professor of Neurosurgery at the Brigham and Women's Hospital/Children's Hospital at Harvard Medical School, and Vice Chairman of the Neurosurgery Department (Research). He directs the Neuroapoptosis Laboratory. Dr. Friedlander is an internationally renowned scientist, and is one of very few clinically active neurosurgeons around the country to hold two active RO1 grants. He is a member of the NINDS National Advisory Council. He is widely considered to be one of the top neurosurgeons performing state-of-the-art neurosciences. As an elected member of the American Society of Clinical Investigation (ASCI), Dr. Friedlander is familiar with the challenges and opportunities in clinical/translational investigation.

Alexandra Golby, M.D., D.P.M. Dr. Golby practices Clinical Neurosurgery at BWH with a focus on the treatment of brain tumors and epilepsy. Her particular clinical expertise is in the treatment of patients with lesions in eloquent cortex and the use of functional brain mapping techniques and image-guided surgery to improve neurologic outcomes. Dr. Golby's research focuses on the translation of functional brain mapping and advanced imaging techniques to the clinical realm. In particular, she is leading the BWH effort in image-guided neurosurgery. She works closely with scientists in radiology and computer science to translate image-guidance techniques, such as functional brain mapping, real-time intra-operative imaging, neuronavigation, tissue segmentation, and deformation modeling into the operating room. She is the neurosurgery core leader for the National Center for Image Guided Surgery as well as the clinical co-director of the BWH Advanced Multi-modality Image-Guided OR (AMIGOR).

Charles R.G. Guttmann, M.D. is the founding Director of the Center for Neurological Imaging at Brigham and Women's Hospital and an Assistant Professor of Radiology at Harvard Medical School. Dr. Guttmann has over 18 years of experience in MRI research, with particular emphasis on the quantitative assessment of disease progression in multiple sclerosis (MS) and age-related diseases affecting brain white matter using quantitative neuroimaging. Dr. Guttmann has also directed imaging and image analysis aspects of many clinical neuroscience research projects and clinical trials of experimental MS treatments. Dr. Guttmann will be responsible for all aspects of the project related to multiple sclerosis (MS) and will participate in data analysis and interpretation on all aspects of the project jointly with the other Co-Investigators.

Hiroto Hatabu, M.D., Ph.D. is an Associate Professor of Radiology, Harvard Medical School, and Director of Clinical MRI at Brigham and Women's Hospital. He is also the Medical Director of the Center for Pulmonary Functional Imaging. Dr. Hatabu has particular expertise in the field of MR imaging. Dr. Hatabu is a member of the BWH Leadership Course Project group. Dr. Hatabu also serves as a clinical liaison to MR Service for the Institute, and has significant leadership expertise at the interface of clinical and clinical research activities.

Galen V. Henderson, M.D. is Director of the Division of Neuroradiology and Director of the Neurosciences ICU at Brigham and Women's Hospital. Dr. Henderson has been a national awardee by the Department of Health and Human Services for his leadership in regards to quality initiatives. Dr. Henderson's research interests are quality improvement of neurocritical care delivery. He has lead Brigham and Women's Stroke Quality Initiative to national recognition for health care delivery.

Daniel Herrera, M.D., Ph.D. is Scientific Director of the Neuromodulation Program at Women's and Brigham Hospital at Harvard Medical School. He was an Associate Professor of Psychiatry at New York-Presbyterian Hospital/Weill Cornell until he moved in 2008 to Boston. Dr. Herrera received his medical degree from the University of Buenos Aires, Argentina. He completed a medical internship at Yale University and residency training in both Neurology and Psychiatry at New York-Presbyterian Hospital/Weill Cornell. Dr. Herrera also holds a M.Sc. from Dalhouse University and a PhD from McGill University, Canada. He completed his postdoctoral training at Rockefeller University. Dr. Herrera has received numerous awards for his research and scholarship. His research focuses on how to repair the brain. His main areas of research include the role of neural stem cells in the adult brain, prevention of neuronal damage with already available agents, and the use of deep brain stimulation to repair the brain. His clinical practice focuses on the differential diagnosis and treatment of inpatients with behavioral disorders involving possible neurologic contributants.

Philip De Jaeger, M.D., Ph.D. is an Assistant Professor of Neurology who heads the Laboratory of Neurogenetics and Computational Neurology at the Center for Neurologic Disease, Brigham & Women's Hospital. He is a board-certified neurologist with expertise in statistical genetics. He is leading data generation at the Broad Institute and the Analysis Team for two other collaborations with RUSH University: (1) A whole genome association scan to identify loci associated with cognitive decline in healthy, aging adults (R01 AG030146, PI: Evans) and (2) A whole genome association scan to identify loci associated with neuropathologic intermediate phenotype associated with Alzheimer’s disease (R01 AG15819, PI: Bennett). He has also led multiple projects exploring the genetic architecture of multiple sclerosis, including, most recently a meta-analysis of genome scans for MS susceptibility (De Jager et al. Nat Genet, in press). He therefore has experience with both the technology and analytic strategy for whole genome association scans. With his clinical experience, he also has a critical understanding of the cognitive phenotype being studied. Dr. De Jager will supervise the generation and quality control analysis of genome-wide genotype data using the Illumina tM.duo platform that is currently in use at the Broad Institute.
Mark D. Johnson, M.D., Ph.D., is an Assistant Professor of Neurosurgery at Brigham and Women’s Hospital, a practicing neurosurgeon in the Program in Neuro-Oncology at the Dana Farber/Brigham and Women’s Hospital Cancer Center and a member of the Brigham and Women’s Hospital/Harvard Business School Leadership Team that has been involved in the conceptualization and organization of the Brigham and Women’s Institute for Advanced Brain Science and Care. He also heads an NIH-funded research laboratory that is focused on the genomics and cellular biology of brain tumors. As a clinician-scientist, he will work to enlarge the scope of the tissue banking effort and to identify clinical variables for data collection, both of which are critical components of the diversified biomarker discovery program. Dr. Johnson was awarded in 2008 be the Harvard Medical School as one of the “Young Mentor Award” in recognition of his teaching and mentoring excellence, both in the clinical and research environments.

Ferenc Jolesz, M.D. is the B. Leonard Holman Professor of Radiology at Harvard Medical School. He is a well-known leader in radiological research in general and in MRI and IGT, in particular. As the Director of large clinical (MRI Division) and research National Center for Image Guided Therapy (NCIGT) programs and the current or former PI of several larger grants involved in translational research (Program Projects, P41, U41), Dr. Jolesz is one of the most experienced researchers and leaders in radiology. He is credited with developing, refining, and introducing into clinical practice the idea of direct, real-time MRI image-guided surgical interventions. Dr. Jolesz has driven the development of various image-guided therapy delivery systems in use at several sites around the world. Among these systems are those involved with interventional and intraoperative MRI, MRI-guided laser and cryoablation, MRI-guided Focused Ultrasound (MgFUS). Dr. Jolesz, both has the experience, background expertise, leadership qualities and skills to advise Dr. Agar in leading such a multidisciplinary team. As a co-PI of the NCIGT, Dr. Jolesz has had responsibility for the infrastructure and operation of the entire Advanced Multimodality Image Guided Operating (AMIGO) suite project from its inception, which will be used for validation in the proposed study. Supported by the NCIGT, combined with the funding from several other grants, he can advise on acquiring and setting up the specialized instrumentation in the clinical environment.

Ron Kikinis, M.D. is the founding Director of the Surgical Planning Laboratory in the Department of Radiology and a Professor of Radiology at Harvard Medical School. This laboratory was founded in 1990. Dr. Kikinis is the Principal Investigator of the National Alliance for Medical Image Computing (NA-MIC, a National Center for Biomedical Computing, an effort which is part of the NIH Roadmap Initiative), and of the Neuroimage Analysis Center (NAC a National Resource Center funded by NCRR). He is also the Research Director of the National Center for Image Guided Therapy (NCIGT), which is jointly sponsored by NCRR, NCI, and NIBIB and co-director of the IGT program at CIMIT. Dr. Kikinis has led and has participated in research in different areas of science. His activities include technological research (segmentation, registration, visualization, high performance computing), software system development (most recently the 3D Slicer software package), and biomedical research in a variety of biomedical specialties. He is the author and co-author of more than 260 peer-reviewed articles. Before joining Brigham & Women’s Hospital in 1988, he trained as a resident in radiology at the University Hospital in Zurich, and as a researcher in computer vision at the ETH in Zurich, Switzerland. Dr. Kikinis will be responsible for developing and implementing the information technology infrastructure for the Institute, integrating database systems for biomarkers, imaging, and clinical research information, as well as for the development of specialized analysis algorithms.

Srinivasan Mukundan, M.D., Ph.D. is Chief of the Division of Neuroradiology at the Brigham and Women’s Hospital. He is both an inorganic chemist and a neuroradiologist. His basic research ranges from dissertation studies using homo- and heteronuclear multidimensional nuclear magnetic resonance spectroscopy of drug-DNA adducts to current efforts towards the development of nanoparticle agents for use as contrast agents for oncological preclinical imaging. He has published extensively in clinical magnetic resonance angiography and glioma imaging. He is also Co-Director of Clinical IMRI at the BWH with Alexandra Golby, MD. Dr. Mukundan will be crucial to the integration of imaging into the Institute.
### BWH Institute for the Neurosciences: Key Talent

**A. John Popp, M.D.** Dr. Popp is Chairman of the Department of Neurosurgery. Previously he was head of the Division of Neurosurgery, Director of the Neurosciences Institute, and Director of the Neurosurgery Residency Program at Albany Medical Center. He has extensive executive experience in managing institutional and national training programs in neurosurgery. He has been the president of the organization of neurosurgical chairs and program directors (The Society of Neurological Surgeons) and president of the largest neurosurgical society in the world The American Association of Neurological Surgeons that has as one of its missions the education of residents and attending neurosurgeons. He has received awards as an educator including being a finalist in the "Courage to Teach" award of the Accreditation Council for Graduate Medical Education. He has also served on the American Board of Neurological Surgeons and is currently a member of the Residency Review Committee for neurosurgery. Dr. Popp will direct the educational arm of the institute, which covers training concerning integrated research, and clinical research components.

**Allan Ropper, M.D.** is Executive Vice Chair for the Department of Neurology at Brigham and Women’s Hospital. His work has been mainly in the field of neurological intensive care and related disorders such as Guillain-Barré Syndrome. His present focus includes studies of gene therapy as a potential treatment for peripheral neuropathy and he is conducting an NIH sponsored study of vascular endothelial growth factor (VEGF) for the treatment of diabetic neuropathy. He has over 150 publications and is an author of the most widely consulted textbook of neurology, Principles of Neurology, which is in its ninth edition. He is a longtime contributor to several major textbooks of medicine including “Harrison’s Principles of Internal Medicine”. He has received numerous awards for teaching and service. Dr. Ropper is an associate editor of the New England Journal of Medicine and was recently elected a fellow of the Royal College of Physicians. Dr. Ropper will direct the clinical translational arm of the institute. This will entail the development of interdisciplinary research clinics where studies including translational therapeutics. This will be one of the sites where integrated training will occur.

**Martin Samuels, M.D.** received his BA from Williams College in 1967 and MD from the University of Cincinnati College of Medicine in 1971. He completed an internship, residency and chief residency in Internal Medicine at Boston City Hospital and Neurology Residency at the Massachusetts General Hospital. He was chief of the Neurology Service at the Brockton-West Roxbury VA Medical Center for eleven years before assuming the position as Chief of Neurology at the Brigham and Women’s Hospital and Director of the Harvard Longwood Neurology Training Program in 1988. He is Professor of Neurology at the Harvard Medical School and founding Chair of the Department of Neurology at the Brigham. Dr. Samuels is board certified in both Neurology and Internal Medicine, is a Fellow of the American Academy of Neurology and a Master of the American College of Physicians. He is a member of the American Neurological Association and the past-president of the Association of University Professors of Neurology. He is the creator and current co-editor of Samuels’s Manual of Neurologic Therapeutics, eight editions; editor of the neurology section of Stein’s Internal Medicine, 3rd, 4th and 5th editions; the editor of the medical neurology section of Noseworthy’s Neurological Therapeutics, two editions; co-editor of Office Practice of Neurology; editor of the medical neurology section in Schapira’s Neurology in Clinical Neuroscience; editor of Hospitalist Neurology; co-author of Shared Care in Neurology; author of the ten volume Video Textbook of Neurology for the Practicing Physician, author of the Martin A. Samuels Review Course in Neurology for Non-Neurologists; editor of the Comprehensive Update and Review of Neurology and co-author of Adams and Victor’s Principles of Neurology, ninth edition. He is the founding editor-in-chief of Journal Watch Neurology and is an ad hoc reviewer or editorial board member of several medical and neurological journals. He has won numerous prizes, including the first Harvard Medical School Faculty Prize for Excellence in Teaching, the 2006 A.B. Baker Award for Lifetime Achievement in Neurological Education and the 2007 H. Houston Merritt Award for Clinically Relevant Research. He received the Daniel Drake Medal and an honorary Doctor of Science degree from the University of Cincinnati. Dr. Samuels is the author of numerous articles, chapters, video and audio tapes and is the discussant of a record eleven Cabot Cases, published in the New England Journal of Medicine. He has acted as visiting professor at innumerable centers around the world and co-led a course on Neurological Medicine at the World Congress of Neurology in Sydney. His special interest is the interface between Internal Medicine and Neurology, an area in which he offered a legendary one-man full day course at the AAN annual meeting for many years. He is internationally known, both within internal medicine and neurology, as a premier diagnostician and teacher.
BWH Institute for the Neurosciences: Key Talent

Among his major fields of expertise are neurocardiology, neurohematology, neurogastroenterology, neuroepatology, neuropharmacology, the neurologic complications of organ transplantation and the neurologic aspects of acid-base and electrolyte disturbances. He has also written and lectured widely on common neurologic complaints such as dizziness, movement disorders, stroke, emergency neurology and headache. His creative work has focused on the mechanisms of neurovascular control and damage, beginning with his study of neurogenic electrocardiographic changes. His unifying hypothesis, aimed at explaining the mechanisms of neurogenic heart disease, has wide clinical application to the field of the nervous system in the causation of human disease.

Dennis Selkoe, M.D., is the Vincent and Stella Coates Professor of Neurologic Diseases at Harvard Medical School and Co-Director of the Center for Neurologic Diseases in the Department of Neurology at Brigham and Women’s Hospital. Dr. Selkoe’s work has focused on understanding the underlying causes and molecular mechanisms of Alzheimer’s and Parkinson’s diseases. His laboratory utilizes biochemical, molecular, cell biological, and animal modeling approaches to understand how mutations in genes linked to these diseases initiate pathogenesis. Dr. Selkoe is a leader in the formulation of the amyloid (or Aβ) hypothesis of AD causation, and he is an expert in the biology of APP and Presenilin and the analysis of normal and pathogenic species of Aβ. He also is an active clinician (neurologist) who sees Alzheimer’s disease patients, some of whom have early-onset forms of the disease due to rare genetic mutations. He has a special interest in correlating the earliest cognitive and biochemical changes in the prodromal period of the development of AD, a topic that is central to this PPG.

Steven Seltzer, M.D., Dr. Seltzer has been the Chairman of the Department of Radiology at Brigham and Women’s Hospital and the Philip H. Cook Professor of Radiology at Harvard Medical School since 1997. He is the immediate past-Chairman of the Board of Trustees of the Brigham and Women’s Physician Organization. Dr. Seltzer received his baccalaureate and medical degrees from the University of Pennsylvania. He did his Radiology Residency at the Peter Bent Brigham Hospital from 1976 to 1980, and joined the Brigham Faculty immediately afterwards. His clinical interests are in the field of abdominal imaging, particularly advanced applications of helical CT. His research interests are in the areas of percutaneous and psychophysics, focusing on improving our understanding of how radiologists detect, locate and classify abnormalities on diagnostic images. He has published well over 100 peer-reviewed research manuscripts on these topics. Active in many radiological organizations, Dr. Seltzer is a past President of the Association of University Radiologists and was awarded the AUR’s Gold Medal in 2004. He currently serves as Vice President of the Academy for Radiology Research and the President-elect of the Society of Chairs of Academic Radiology Departments.

Reisa Sperling, M.D., is an Associate Professor of Neurology at Harvard Medical School, the Director of Clinical Research in the Memory Disorders Unit at Brigham and Women’s Hospital, and the Director of the Neuroimaging Program of the Massachusetts Alzheimer’s Disease Research Center at Massachusetts General Hospital. Dr. Sperling has over 10 years of experience in neuroimaging research and clinical research in aging and Alzheimer’s disease, and has established track record of obtaining NIH funding and mentoring young investigators in patient-oriented imaging research. Dr. Sperling also serves as the PI on multiple NIH and pharmaceutical industry sponsored clinical trials in Alzheimer’s disease.

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Emily Stern, M.D., a radiologist and functional neuroimaging researcher with extensive experience in performing functional neuroimaging studies in psychiatric patient populations, co-directs the Functional Neuroimaging Laboratory (FNL) at the Brigham and Women’s Hospital, Harvard Medical School. She is also the Director of the MIRI Service at BWH and the Radiology Chairperson. Dr. Stern will be responsible for overseeing, developing, and integrating all of the molecular functional neuroimaging across the participating departments, as well as technologies and sites, and overseeing targeted methodologic development.

Howard Weiner, M.D., Howard L. Weiner is the Robert L. Kroc Professor of Neurology at the Harvard Medical School, Director and Founder of the Partners Multiple Sclerosis Center and Co-Director of the Center for Neurologic Diseases at the Brigham & Women’s Hospital. Dr. Weiner established the Partners Multiple Sclerosis Center at Brigham & Women’s Hospital in 2000 which combines clinical evaluation, MRI imaging and immune monitoring and is the first integrated MS center that brings these disciplines to the individual care of the MS patient. Dr. Weiner has pioneered the use of immunotherapy and the drug cyclophosphamide for the treatment of multiple sclerosis and has investigated immune abnormalities in the disease including the role of the innate immune system and regulatory T cells. He has also pioneered the use of the mucosal immune system for the treatment of autoimmune and other diseases. Based on his work vaccines are being tested in multiple sclerosis, diabetes, and most recently in Alzheimer’s disease. Dr. Weiner is the author of “Curing MS: How Science is Solving the Mystery of Multiple Sclerosis” that chronicles the history of MS, his 30+ years in the research and clinical treatment of MS, and details his “21 point hypothesis” on the etiology and treatment of multiple sclerosis. Dr. Weiner is the 2007 recipient of the John Dystel Prize for Multiple Sclerosis Research awarded by the American Academy of Neurology and in 2009 received the Betty and David Koeter Memorial Prize for Outstanding Research Achievement, Nature Biotechnology SciCafé, Nature Publications.

Fredrik Westin, Ph.D., Dr. Westin is an Associate Professor of Radiology, Department of Radiology, Harvard Medical School and Director, Laboratory of Mathematics in Imaging, Brigham and Women’s Hospital (BWH), Boston, MA. Additionally, he has a joint appointment with the MIT Artificial Intelligence Laboratory, Cambridge, MA. The Laboratory of Mathematics in Imaging (LMI) is focused on the application of mathematical theory, analysis, modeling, and signal processing tools to medical imaging. The Budget Justification Page 743 Principal Investigator/Program Director (Last, first, middle): Silbersweig, Mark, A medical imaging applications. Since 1999 his team has been focused on developing novel methods for analyzing MRI data for schizophrenia research in collaboration with the Department of Psychiatry of BWH. Dr. Westin will assist with his expertise as one of the leads in the field of MRI analysis. In particular, he will provide assistance in choosing and developing the right diffusion MRI analysis tools for the animal studies.
Productivity Comparison of Pharmaceutical and Biotechnology Companies


Institute for the Neurosciences: Supporting Exhibits

BWH Institute for the Neurosciences: Selected Inventory of Radiology & Imaging Capabilities, and Leveraging of External Resources

MRI-Related Facilities: Center for Clinical Spectroscopy, Neuroimaging and IMRI Services, the Center for Pulmonary Functioning Imaging/Hyperpolarized MRI, and the Focused Ultrasound Surgery (FUS) Laboratory

AMIGO—the Advanced Multimodality Image Guided Operating Suite (in development)

Optical Imaging Laboratory

Nuclear Medicine/PET cyclotron facility

Surgical Molecular Imaging Laboratory

Surgical Planning Laboratory (SPL)

Surgical Navigation and Robotics Laboratory

CT/Tumor Ablation Program Facilities

Conjugate and Medicinal Chemistry Laboratory

Laboratory for Experimental Nuclear Medicine

Physics Imaging Group

Core Imaging Laboratories: Center for Advanced Medical Imaging and Cardiac Imaging Core Lab

Pathology Laboratory (Assisting Radiology Department)

Neurogenetics and Computational Neurology

NeuroAptosis Laboratory Center for Neurologic Diseases

Laboratory for Neuroprotection, Neuron modulation and Neurorepair

Functional Neuroimaging Laboratory (Interdepartmental)

Harvard NeuroDiscovery Center

Harvard Medical School Department of Neurobiology

Harvard Catalyst Center for Clinical Investigation

BWH Biomedical Research Institute

Partners Research Computing, Informatics for Integrating Biology and the Bedside

Partners Research Ventures and Licensing

Partners Center for Integration of Medicine and Innovative Technology

Broad Institute at MIT and Harvard