

Congratulations to our newly elected ECOR Representatives!



Stephanie Seminara, MD, FACP
Associate Professor of Medicine
Reproductive Endocrine Unit



Sylvie Breton, PhD
Professor of Medicine
Nephrology/Program in Membrane Biology

Annual Conversation with the MGH Research Community

**Peter L. Slavin, MD
MGH President**

*MGH Research Council
December 1, 2014*

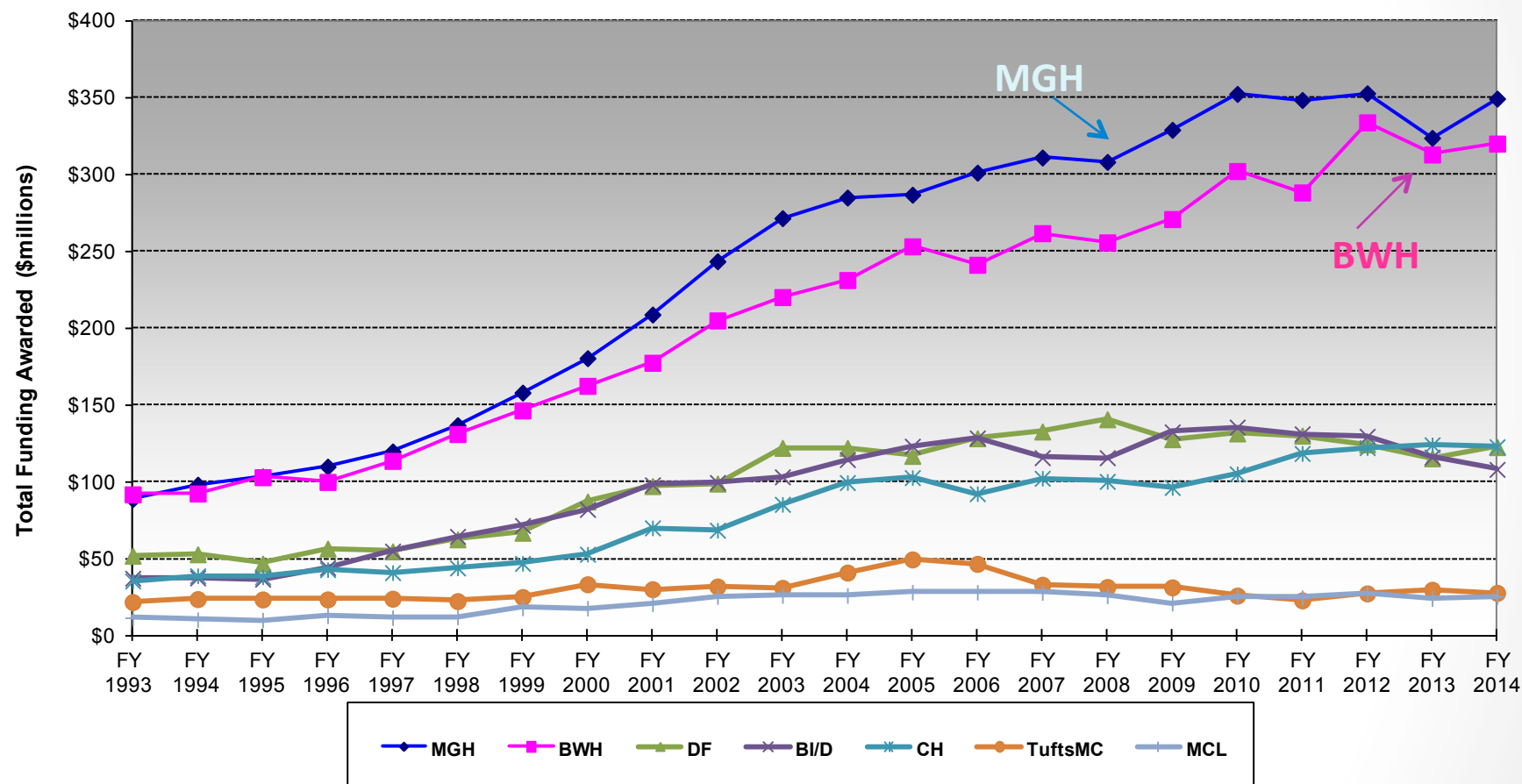
Agenda

- Awards and Honors
- Research Funding
- Support for Researchers
- Challenges
- Looking Ahead

Awards and Honors

- **Institute of Medicine**
Bradley T. Hyman, M.D., Ph.D. (Neurology)
- **NIH Director's New Innovator Award**
Robert Anthony, Ph.D. (Medicine/CIID)
- **NIH Director's Early Independence Award**
Yakeel T. Quiroz, Ph.D. (Neurology/Psychiatry)
- **American Society of Human Genetics Curt Stern Award**
Mark Daly, Ph.D. (Analytic and Translational Genetics)
- **Breakthrough Prize and Gruber Prize in Genetics**
Gary Ruvkun, Ph.D. (Molecular Biology/CCIB)
- **International Society of Psychiatric Genetics' 2014 Theodore Reich Young Investigator Award**
Ben Neale, Ph.D. (CHGR/PNGU)

FY1993 – FY2014 NIH Extramural Awards to Top Local Independent Hospitals

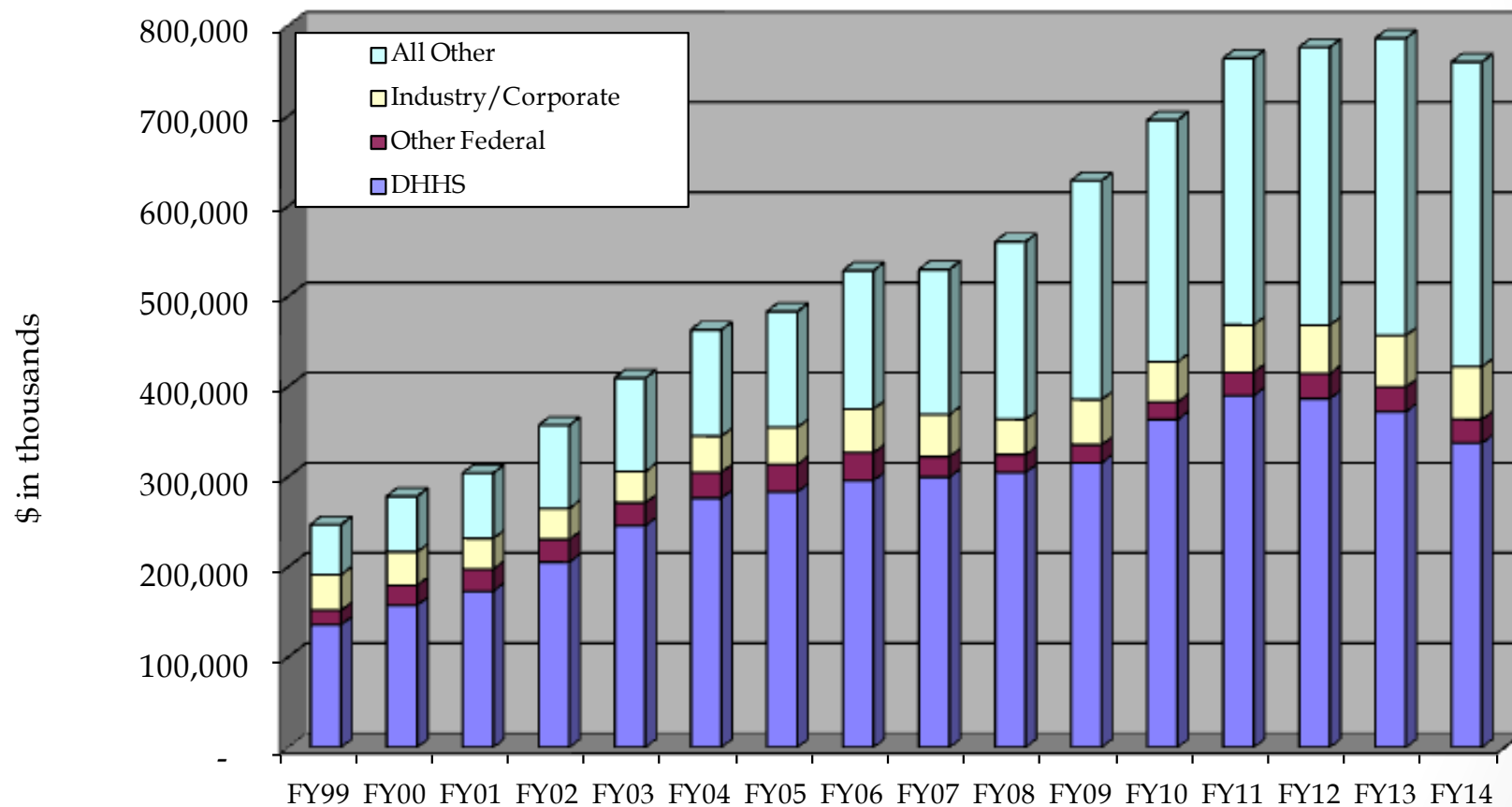


Notes: FY14 R&D contracts data is being finalized by NIH; When complete, rankings and growth rates may change.

MGH Total Research Revenue Trend

(Including Other Science)

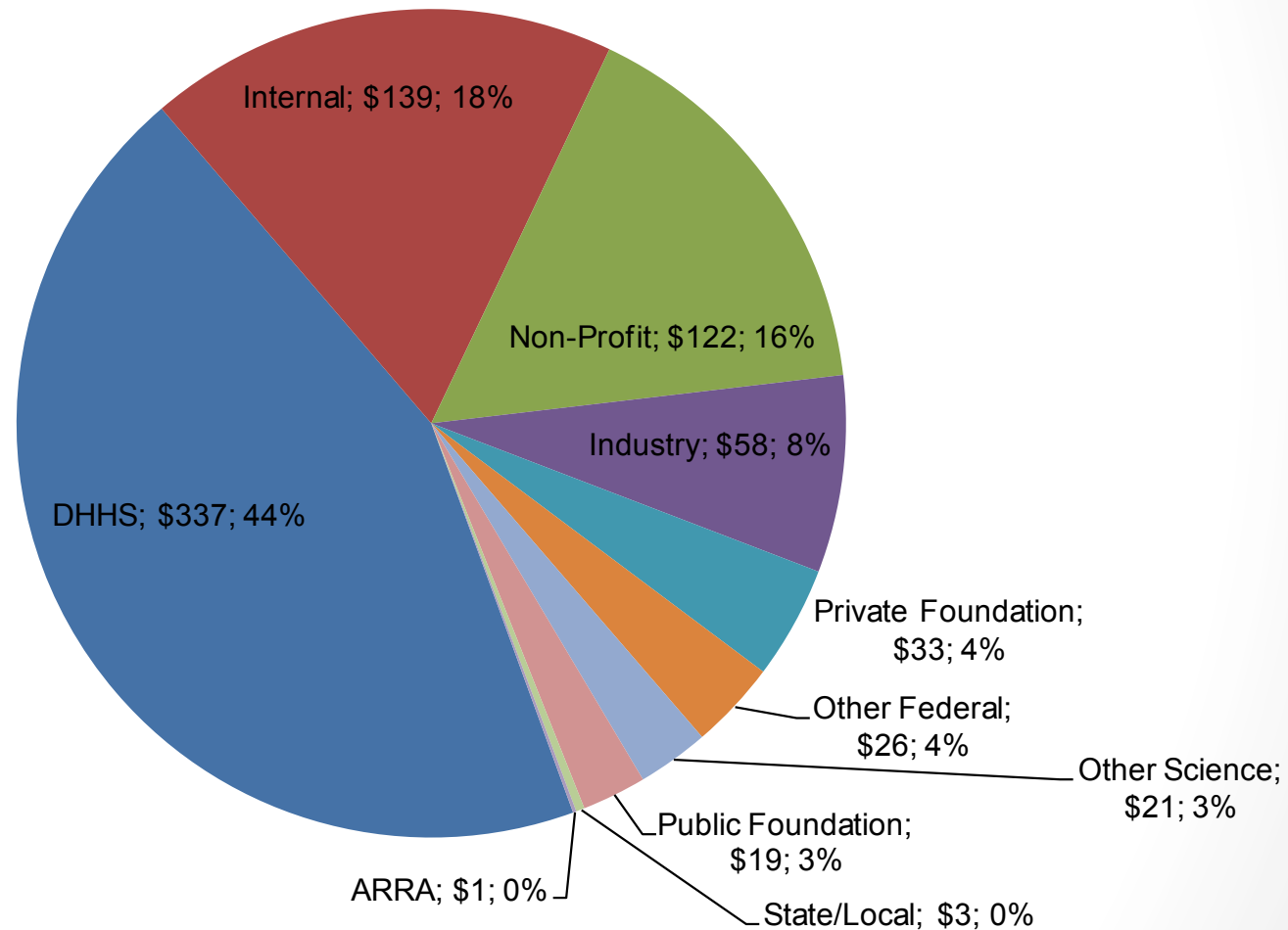
MGH total (Direct + Indirect) research revenue has grown 208% since FY99 to \$760M in FY14.



MGH Research by Sponsor

FY14 Direct and Indirect Revenues \$760M

(Shown in \$Millions)

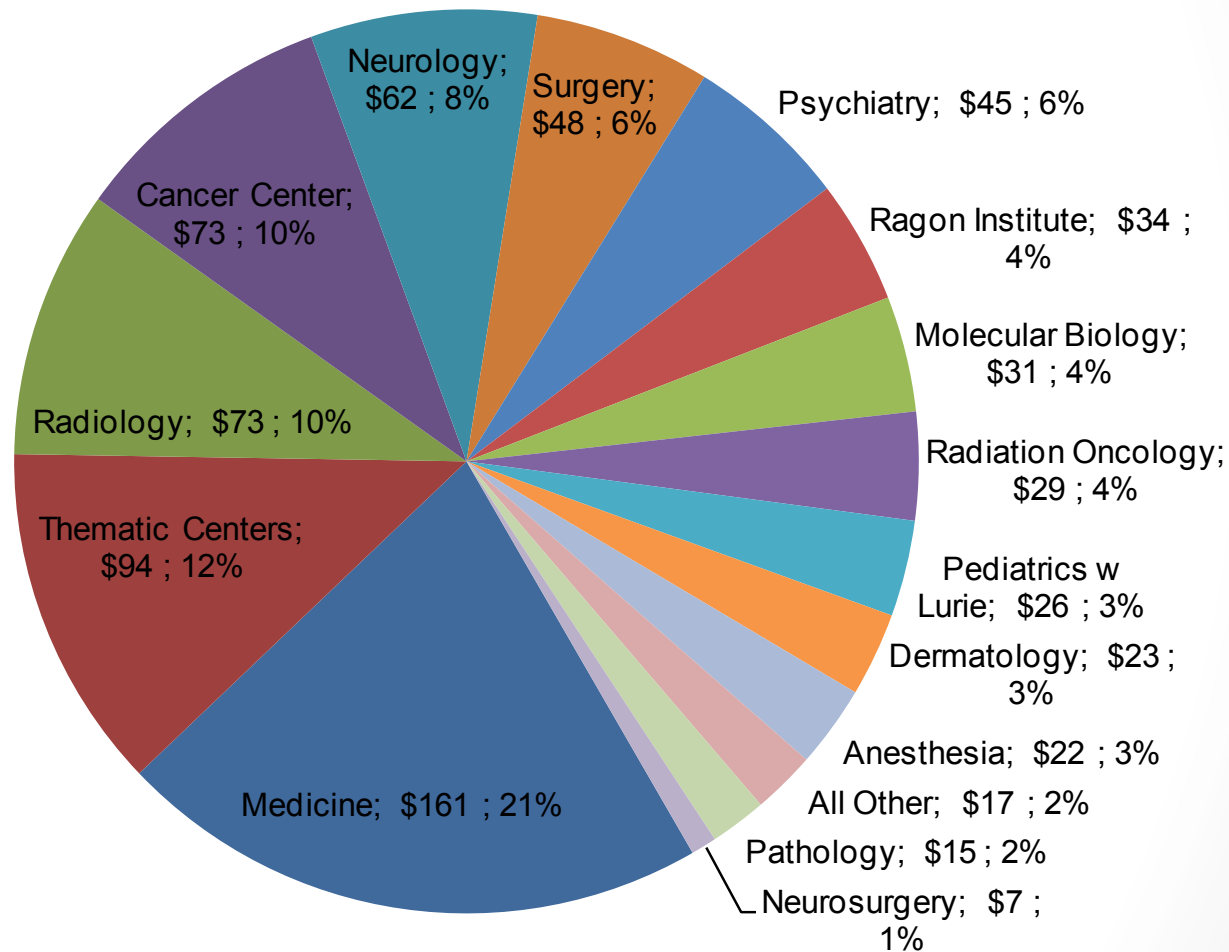


** Includes cores and all other science and excludes Accruals and P&L Adjustments.*

MGH Research by Department

FY14 Direct and Indirect Revenues \$760M

(Shown in \$Millions)



** Includes cores and all other science and excludes Accruals and P&L Adjustments.*

Proposals FY14 vs. FY13

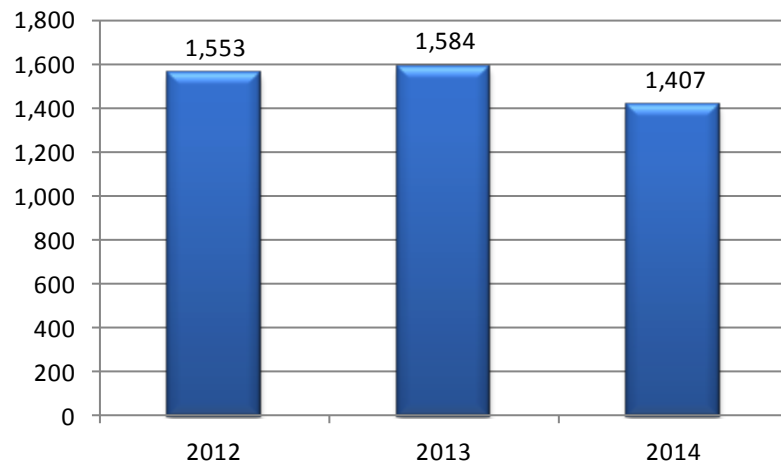
- 3,978 proposals submitted in FY14, No Change versus FY13

Year	DHHS	Industry/ Corporate	Non-Profit	Other Federal	Foundations	All Other Sponsors	Total
2013	1,007	456	1,336	145	697	356	3,997
2014	1,021	443	1,269	174	660	411	3,978
Difference	14	(13)	(67)	29	(37)	55	(19)
% Change	1%	-3%	-5%	20%	-5%	15%	0%

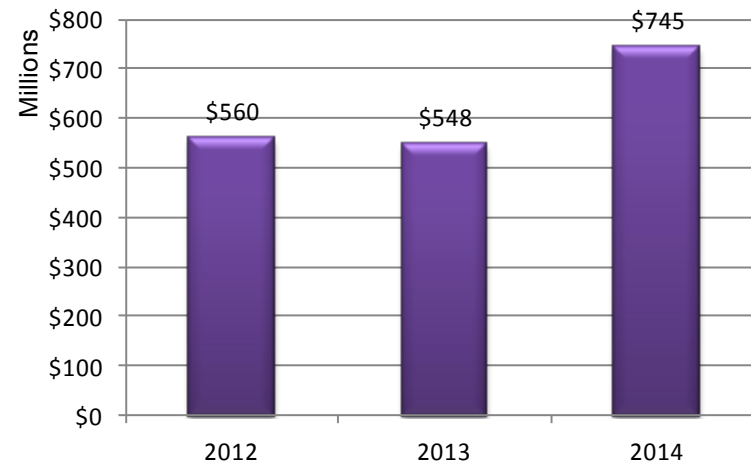
New Award Trends

- MGH has the highest number and amount of new awards of any institution in Partners.
- 1,407 new awards in FY14 (final FY14 awards should increase through February 2015)
- New award amounts increased 36% to \$745M in FY14 due to a large increase in the dollar value of DHHS awards .

MGH - Number of New Awards



MGH - New Award Amounts



NIH Funding Market Share Trends

MGH accounts for 1.6% of the NIH Budget

BWH accounts for 1.5% of the NIH Budget

Partners overall accounts for 3.2% of the NIH Budget

This share is increasing: FY07, MGH 1.3%; FY12 MGH 1.5%

FY10 – FY14 NIH Extramural Awards Ranking: All Institutions

FY 2010 - FY 2014 NIH RANKING OF INSTITUTION & ACTIVITY

BASED ON NIH TOTAL FUNDING TO ALL ACTIVITIES

Rank					INSTITUTION	Total Funding					Percent Change				CAGR
FY10	FY11	FY12	FY13	FY14		FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	10-11	11-12	12-13	13-14	10-14
1	1	1	1	1	JOHNS HOPKINS UNIVERSITY	\$626,869,636	\$645,342,385	\$606,763,376	\$552,624,436	\$573,859,735	2.9%	-6.0%	-8.9%	3.8%	-2.2%
3	2	2	2	2	UNIVERSITY OF CALIFORNIA SAN FRANCISCO	\$488,374,355	\$532,762,757	\$500,437,073	\$487,012,070	\$537,257,705	9.1%	-6.1%	-2.7%	10.3%	2.4%
4	3	4	3	3	UNIVERSITY OF PENNSYLVANIA	\$485,210,014	\$471,544,919	\$454,975,727	\$434,609,877	\$478,169,721	-2.8%	-3.5%	-4.5%	10.0%	-0.4%
2	5	5	4	4	UNIVERSITY OF WASHINGTON	\$501,942,746	\$455,853,028	\$442,509,710	\$422,731,094	\$423,671,871	-9.2%	-2.9%	-4.5%	0.2%	-4.1%
6	6	6	6	5	UNIVERSITY OF PITTSBURGH AT PITTSBURGH	\$444,411,538	\$428,161,452	\$419,497,679	\$394,579,413	\$419,236,398	-3.7%	-2.0%	-5.9%	6.2%	-1.4%
5	4	3	5	6	UNIVERSITY OF MICHIGAN AT ANN ARBOR	\$476,279,328	\$467,398,435	\$456,305,212	\$396,727,311	\$412,933,811	-1.9%	-2.4%	-13.1%	4.1%	-3.5%
13	12	10	7	7	UNIVERSITY OF NORTH CAROLINA CHAPEL HILL	\$362,781,180	\$349,607,896	\$367,798,748	\$367,252,487	\$392,740,918	-3.6%	5.2%	-0.1%	6.9%	2.0%
15	14	14	9	8	STANFORD UNIVERSITY	\$347,434,188	\$339,750,030	\$334,539,989	\$338,757,645	\$384,029,203	-2.2%	-1.5%	1.3%	13.4%	2.5%
9	7	7	8	9	UNIVERSITY OF CALIFORNIA SAN DIEGO	\$393,281,182	\$398,014,066	\$394,982,560	\$358,014,070	\$382,148,517	1.2%	-0.8%	-9.4%	6.7%	-0.7%
8	9	8	14	10	WASHINGTON UNIVERSITY	\$408,739,076	\$372,457,600	\$381,158,684	\$318,396,985	\$372,123,938	-8.9%	2.3%	-16.5%	16.9%	-2.3%
11	8	9	10	11	YALE UNIVERSITY	\$385,450,569	\$380,664,380	\$370,284,870	\$333,160,740	\$360,022,831	-1.2%	-2.7%	-10.0%	8.1%	-1.7%
10	10	11	11	12	UNIVERSITY OF CALIFORNIA LOS ANGELES	\$386,506,020	\$367,730,733	\$360,699,034	\$330,544,193	\$357,983,245	-4.9%	-1.9%	-8.4%	8.3%	-1.9%
14	13	12	13	13	MASSACHUSETTS GENERAL HOSPITAL	\$352,589,184	\$348,620,848	\$352,991,454	\$339,490,000	\$349,524,060	-1.1%	1.3%	-3.8%	3.0%	-0.2%
12	11	13	12	14	DUKE UNIVERSITY	\$375,107,411	\$355,134,387	\$342,675,382	\$326,166,532	\$342,155,642	-5.3%	-3.5%	-4.8%	4.9%	-2.3%
18	18	15	15	15	BRIGHAM AND WOMEN'S HOSPITAL	\$302,360,077	\$288,436,449	\$334,072,073	\$315,920,000	\$320,245,161	-4.6%	15.8%	-5.4%	1.4%	1.4%
17	16	17	16	16	COLUMBIA UNIVERSITY HEALTH SCIENCES	\$304,727,615	\$312,275,684	\$315,357,565	\$300,254,124	\$306,159,165	2.5%	1.0%	-4.8%	2.0%	0.1%
16	15	16	17	17	VANDERBILT UNIVERSITY	\$325,116,545	\$328,581,723	\$319,977,234	\$298,329,760	\$302,666,577	1.1%	-2.6%	-6.8%	1.5%	-1.8%
19	17	18	19	18	EMORY UNIVERSITY	\$268,883,676	\$292,757,546	\$263,600,497	\$250,085,940	\$265,282,296	8.9%	-10.0%	-5.1%	6.1%	-0.3%
21	21	20	20	19	UNIVERSITY OF WISCONSIN MADISON	\$252,046,183	\$262,919,634	\$229,863,895	\$236,078,135	\$254,296,731	4.3%	-12.6%	2.7%	7.7%	0.2%
20	20	19	18	20	UNIVERSITY OF MINNESOTA TWIN CITIES	\$263,304,019	\$264,416,953	\$243,472,794	\$254,360,341	\$246,801,355	0.4%	-7.9%	4.5%	-3.0%	-1.6%
1	1	1	1	1	PARTNERS HEALTHCARE	\$682,097,866	\$663,437,177	\$716,693,528	\$682,699,000	\$698,162,405	-2.7%	8.0%	-4.7%	2.3%	0.6%

FY10– FY14 NIH Ranking: Independent Hospitals

FY 2010 - FY 2014 NIH RANKING OF INSTITUTION & ACTIVITY
BASED ON NIH TOTAL FUNDING TO ALL ACTIVITIES

Rank					INSTITUTION	Total Funding					Percent Change				CAGR
FY10	FY11	FY12	FY13	FY14		FY2010	FY 2011	FY 2012	FY 2013	FY 2014	10-11	11-12	12-13	13-14	10-14
1	1	1	1	1	MASSACHUSETTS GENERAL HOSPITAL	\$352,589,184	\$348,620,848	\$352,991,454	\$339,490,000	\$349,524,060	-1.1%	1.3%	-3.8%	3.0%	-0.2%
2	2	2	2	2	BRIGHAM AND WOMEN'S HOSPITAL	\$302,360,077	\$288,436,449	\$334,072,073	\$315,920,000	\$320,245,161	-4.6%	15.8%	-5.4%	1.4%	1.4%
5	5	5	3	3	CHILDREN'S HOSPITAL BOSTON	\$105,213,019	\$118,512,044	\$122,338,322	\$124,160,864	\$122,897,976	12.6%	3.2%	1.5%	-1.0%	4.0%
4	4	4	5	4	DANA-FARBER CANCER INSTITUTE	\$131,577,199	\$130,136,550	\$124,380,684	\$115,379,421	\$122,652,215	-1.1%	-4.4%	-7.2%	6.3%	-1.7%
7	6	#N/A	6	5	CHILDRENS HOSPITAL OF PHILADELPHIA	\$78,231,980	\$95,840,930	#N/A	\$105,248,052	\$112,146,779	22.5%	#N/A	#N/A	6.6%	9.4%
3	3	3	4	6	BETH ISRAEL DEACONESS MEDICAL CENTER	\$135,681,119	\$131,304,171	\$129,691,590	\$116,122,449	\$108,156,442	-3.2%	-1.2%	-10.5%	-6.9%	-5.5%
6	7	6	7	7	CHILDREN'S HOSPITAL MEDICAL CENTER CINCI	\$90,777,012	\$95,554,493	\$101,839,995	\$96,824,494	\$98,187,760	5.3%	6.6%	-4.9%	1.4%	2.0%
8	8	7	8	8	ST. JUDE CHILDREN'S RESEARCH HOSPITAL	\$64,842,049	\$70,907,302	\$55,097,329	\$49,039,532	\$48,650,426	9.4%	-22.3%	-11.0%	-0.8%	-6.9%
10	9	8	9	9	NEW YORK STATE PSYCHIATRIC INSTITUTE	\$48,653,891	\$50,408,846	\$49,807,571	\$43,606,668	\$46,903,956	3.6%	-1.2%	-12.4%	7.6%	-0.9%
15	13	11	12	10	SEATTLE CHILDREN'S HOSPITAL	\$26,494,980	\$29,829,378	\$33,334,078	\$30,652,212	\$39,068,563	12.6%	11.7%	-8.0%	27.5%	10.2%
12	11	9	10	11	BOSTON MEDICAL CENTER	\$35,092,153	\$38,370,313	\$37,309,152	\$34,306,306	\$38,130,340	9.3%	-2.8%	-8.0%	11.1%	2.1%
14	15	14	15	12	CEDARS-SINAI MEDICAL CENTER	\$29,796,573	\$28,145,289	\$27,425,416	\$27,956,249	\$34,423,826	-5.5%	-2.6%	1.9%	23.1%	3.7%
16	17	15	14	13	TUFTS MEDICAL CENTER	\$25,969,675	\$22,879,894	\$27,396,798	\$29,764,857	\$27,737,457	-11.9%	19.7%	8.6%	-6.8%	1.7%
17	16	13	17	14	MC LEAN HOSPITAL (BELMONT, MA)	\$25,473,370	\$24,623,860	\$27,450,842	\$24,628,000	\$25,413,803	-3.3%	11.5%	-10.3%	3.2%	-0.1%
11	10	10	11	15	ROSWELL PARK CANCER INSTITUTE CORP	\$38,405,129	\$40,585,531	\$34,734,432	\$34,034,861	\$25,220,309	5.7%	-14.4%	-2.0%	-25.9%	-10.0%
9	14	16	16	16	NATIONAL JEWISH HEALTH	\$64,732,491	\$29,006,839	\$24,678,905	\$25,551,400	\$25,154,637	-55.2%	-14.9%	3.5%	-1.6%	-21.0%
13	12	12	13	17	RHODE ISLAND HOSPITAL	\$31,632,739	\$32,051,030	\$28,628,016	\$30,461,209	\$24,335,750	1.3%	-10.7%	6.4%	-20.1%	-6.3%
21	19	19	20	18	CHILDREN'S HOSPITAL OF LOS ANGELES	\$16,098,289	\$17,084,496	\$16,555,073	\$17,149,123	\$22,880,063	6.1%	-3.1%	3.6%	33.4%	9.2%
19	18	17	18	19	MASSACHUSETTS EYE AND EAR INFIRMARY	\$17,194,010	\$19,828,336	\$21,950,002	\$20,413,920	\$22,398,211	15.3%	10.7%	-7.0%	9.7%	6.8%
50	47	48	41	43	SPAULDING REHABILITATION HOSPITAL	\$1,675,235	\$1,602,020	\$1,388,159	\$1,911,000	\$1,514,347	-4.4%	-13.3%	37.7%	-20.8%	-2.5%

Support for Researchers

Faculty Support

- **Special Grants Program for Faculty**
 - Goodman Award: 1 @ 300K
 - Martin Prizes (basic/clinical): 2 @ 100K
 - Claflin Awards: 4 @ \$100K
 - Multicultural Grants: 2 @120K
- **Postdoctoral Fellowships**
 - Tosteson and Fund for Medical Discovery (FMD) Awards
 - 22 Awards @ 40K each
 - Clinical Research FMD – 4 awards @ \$40K
- **ECOR Institutional Support**
 - For Shared Instrumentation Grant (SIG) applications
 - FY15 budget – \$500,000

Support for Research Programs

- **Interim Support Fund (ISF)**
 - Provides funding to bridge programs with grant scores that are good but are not fundable
 - The number of worthy applications has increased as the pay line at NIH has decreased
 - **NIH now commonly does not fund the first competing submission (the 'A') but funds the second ('A1') creating a situation where funding gaps are becoming the norm**
- **Sequestration Relief Fund**
 - Covers shortfalls that result from year to year budget cuts on existing grants

Updates to the ISF Program

- *In FY14 \$6.8M to 82 investigators*
- *Increased interim support*
 - from \$50,000 to \$75,000
- *Additional ISF funds available*
 - ****under exceptionally difficult circumstances****
 - A maximum of \$150,000 in total extra funds
 - This extra support will be sourced 50:50 with Dept

\$150,000 (\$75K base + \$75K additional) from ECOR
\$ 75,000 sourced from Department
\$225,000 maximum total award

Return on Investment

$$\text{ROI} = \frac{\text{Gain from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}}$$

	Total ISF Awarded		Total NIH Received		ROI
Formulaic	219	\$ 13,000,000	129	\$ 213,000,000	15:1
Deliberative	305	\$ 19,700,000	101	\$ 163,600,000	7:1
Total	524	\$ 32,700,000	230	\$ 376,600,000	10:1

ISF Awards and NIH Funds Received from 2006 – September 2014

MGH Scholars Launched in 2011

Goal: support outstanding MGH investigators doing basic, translational and clinical research

- 28 Scholars named in last four years
 - 5 Scholars in May 2011
 - 8 Scholars in May 2012
 - 7 Scholars in March 2013 (3 more named, but moved)
 - 8 Scholars in March 2014
- Awards of \$100,000 per year for 5 years
- Multi-level selection process
- Future: Expect to continue with at least 5 per year in next several years

MGH Research Scholars: 2011 - 2013



Todd Allen, PhD



Galit Alter, PhD
Kristine and Bob Higgins
MGH Research Scholar



Brian Bacskaï, PhD
Phyllis and Jerome Lyle Rappaport
MGH Research Scholar



Sylvie Breton, PhD
Charles and Ann Sanders
MGH Research Scholar



Sydney Cash, MD, PhD
Elizabeth Riley and Dan Smith
MGH Research Scholar



Raymond Chung, MD, PhD



Nick Dyson, PhD
James and Shirley Curvey
MGH Research Scholar



Jose Florez, MD, PhD



Robert Gerszten, MD



Nir Hacohen, PhD



Keith Joung, MD, PhD
Jim and Ann Orr
MGH Research Scholar



Sekar Kathiresan, MD



Eng Lo, PhD
Phyllis and Jerome Lyle Rappaport
MGH Research Scholar



Andi McClatchey, PhD
Patricia and Scott Eston
MGH Research Scholar



Raul Mostoslavsky, MD, PhD
Kristine and Bob Higgins
MGH Research Scholar



Anders Naar, PhD



Randall Peterson, PhD
Charles and Ann Sanders
MGH Research Scholar



Susan Slaugenaupt, PhD



Gary Tearney, MD, PhD
Mike and Sue Hazard Family
MGH Research Scholar



Lee Zou, PhD
Jim and Ann Orr
MGH Research Scholar



2014 MGH Research Scholars



Leif Ellisen, MD, PhD

Associate Professor, Cancer Center

"The p53 family of transcription factors in development, cancer pathogenesis and therapy"



Katia Georgopoulos, PhD

Professor, Dermatology/CBRC

"Treatment study of B cell lymphoblastic leukemia"



Thorsten Mempel, MD, PhD

Associate Professor, Rheumatology, Allergy and Immunology

"Cell Migration and Cell-Cell Communication in the Immune System"

2014 MGH Research Scholars



Matthias Nahrendorf, MD, PhD
Associate Professor, Center for Systems Biology
"Systems Biology of cardiovascular disease"



Jayaraj Rajagopal, MD
Assistant Professor, Center for Regenerative Medicine
"Dissecting the basis of airway epithelial regeneration and human lung disease using stem cell biology"



Stephanie Seminara, MD
Associate Professor, Reproductive Medicine
"Role of Disordered Ubiquitination in Ataxia/Hypogonadism"

2014 MGH Research Scholars



Jordan Smoller, MD, ScD

Professor, Psychiatry

“Brain Genomics: The Neural and Genetic Architecture of Mental Illness”

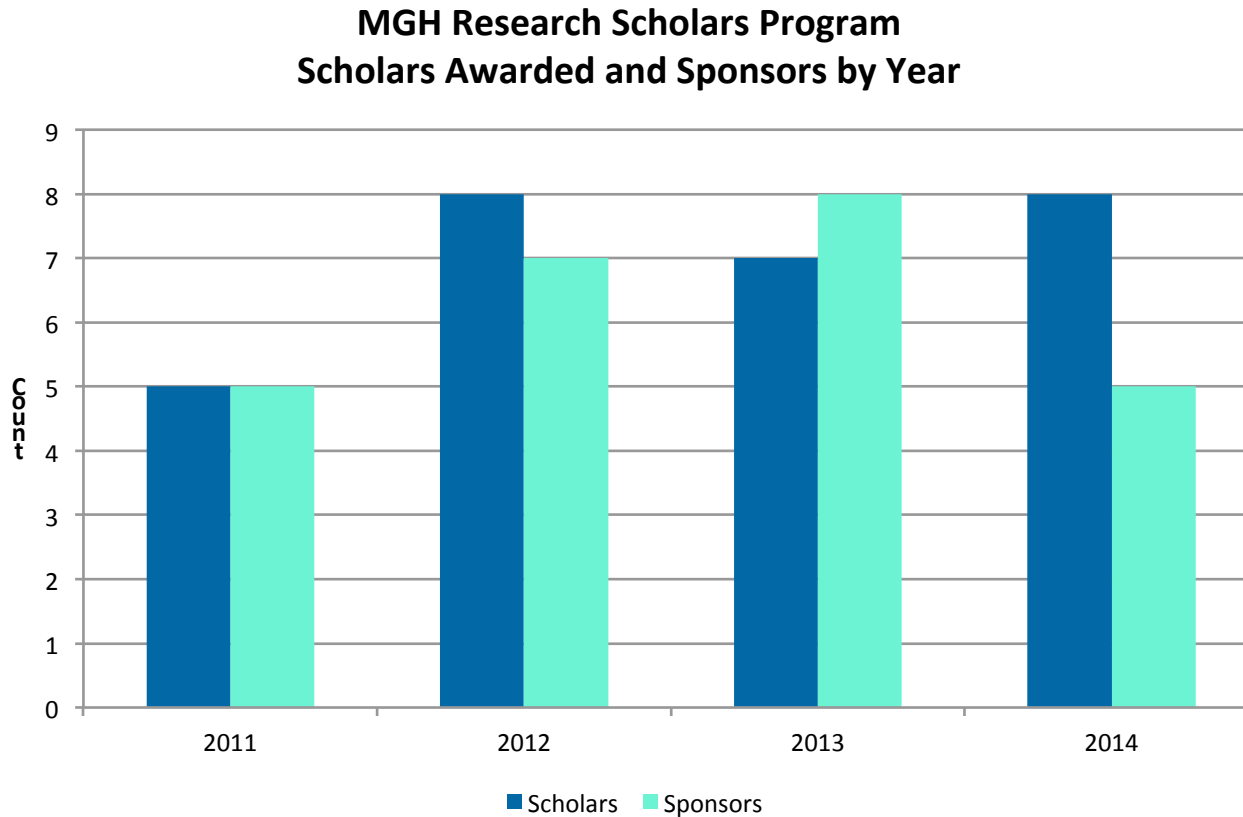


Johnathan Whetstine, PhD

Assistant Professor, Cancer Center

“Uncovering Epigenetic Factors Regulating Copy Number and Drug Resistance”

Donations received for Scholars (through 9/14)



\$6.25M in donations over the past four years

Challenges: Research Scholars Program

- **Sustainability:** Need to average at least \$2.5 million per year in donations long term
- **Diversity:** All Scholars publish in Cell, Nature, Science: they fit criteria for 'basic' excellence but are we serving clinical and outcomes areas well?

Overall Challenges

- **Reduction in NIH Funding and Sequestration**
 - Ongoing, MGH holding its own
- **Hospital Budget**
 - FY14 results: finished below budget and expect similar challenges in FY15
- **Potential Impact of the Affordable Care Act and Other Government Programs**

Looking Ahead

- **MGH-MIT Strategic Partnership**
- **Strategic Planning**
 - **Launching the MGH Research Institute!**

MGH-MIT Strategic Partnership: Challenge Grants

Rationale

- MGH and MIT aim to bring together approaches from engineering and basic science with clinical medicine
- The Ragon Institute is proof of concept of the this paradigm
- Magnet for philanthropic fund-raising and industrial support

Grand Challenge #1: Diagnostics

Goal: Make diagnosis cost-effective and accurate, and guide individual clinical decisions based on real-time monitoring and massive patient data sets.

- Received **44** Letters of Intent
- Received **33** Applications
- Awarded **6** Grants

Grants Awarded

Large Grant - \$150,000 for up to 2 years

- **Herbert Y. Lin, MD, PhD, FASN (Renal) & Michael J. Cima, PhD**

Development of Methods and Devices for Non-Invasive Determination of Volume Status

- **Anand Dighe, MD, PhD (Pathology) & Peter Szolovits, PhD**

Computational Identification of Complex Patterns and Temporal Trajectories within Sets of Clinical Laboratory Results

Grants Awarded

Small - \$50,000 for 1 year

- **Michael Filbin, MD (ED) & Thomas Heldt, PhD**

Next-generation acute care monitoring – Early warning system for septic shock in the Emergency Department

- **Raymond Chung, MD (GI) & Sangeeta Bhatia, MD, PhD**

Multiplexed nanosensors for noninvasive monitoring of liver fibrosis

- **Matt Bianchi, MD, PhD (Neurology) & Dina Katabi, PhD**

Big Data and Predictive Modeling in Sleep Medicine

- **Anthony Samir MD, MPH (Radiology) & Brian Anthony, PhD**

Optical Transducer Tracking to Enable Diagnostic Analysis of Large Ultrasound Data Sets

Grand challenge # 2

- Enable systematic design of vaccines and therapies for existing and emerging infectious and autoimmune diseases.

MGH

-Immunologists
-Clinicians

MIT

-Biologists
-Chemical Engineers
-Material Scientists
-Biological Engineers
-Physicists

Grand challenge # 3

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

MGH

- Psychiatrists
- Neurosurgeons
- Anesthesiologists
- Neurologists

MIT

- Neuroengineers
- Neuroscientists
- Electrical Engineers

Strategic Planning Implementation

Our Plan: Three Major Initiatives

MGH Research Institute

Externally: the “front door” to MGH Research

Internally: umbrella entity and structure encompassing all MGH research

Translational Research Center

Bridge to close the research / clinical gap

Means to more effectively engage industry

Biobank at MGH

Base to engage patients as partners in research

Platform for outcomes research and personalized medicine

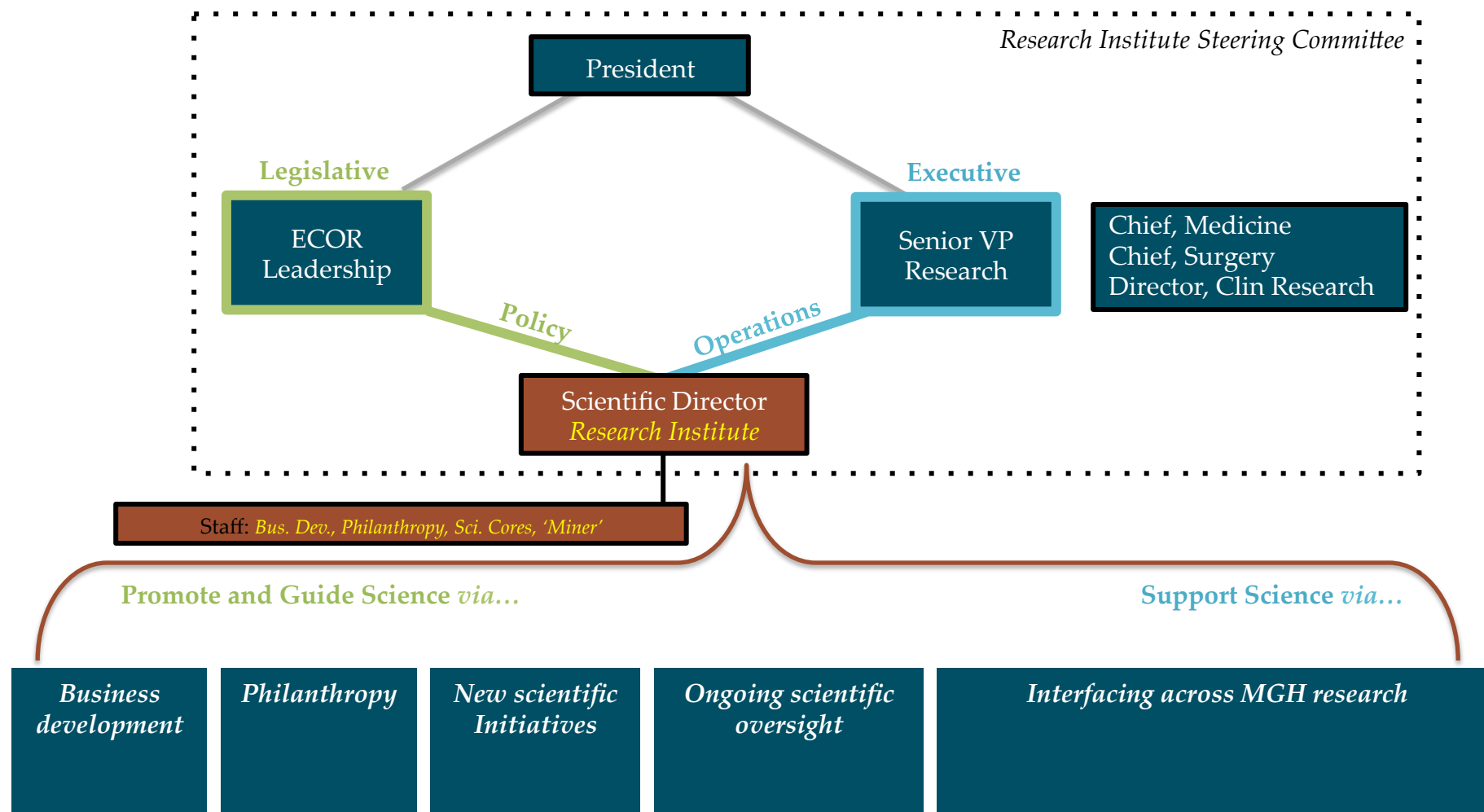
Update – Research Institute



The first Scientific Director of the MGH Research Institute

**Susan Slaughaupt, PhD
Center for Human Genetic Research (CHGR) and
Professor in the Department of Neurology**

What is the Research Institute?



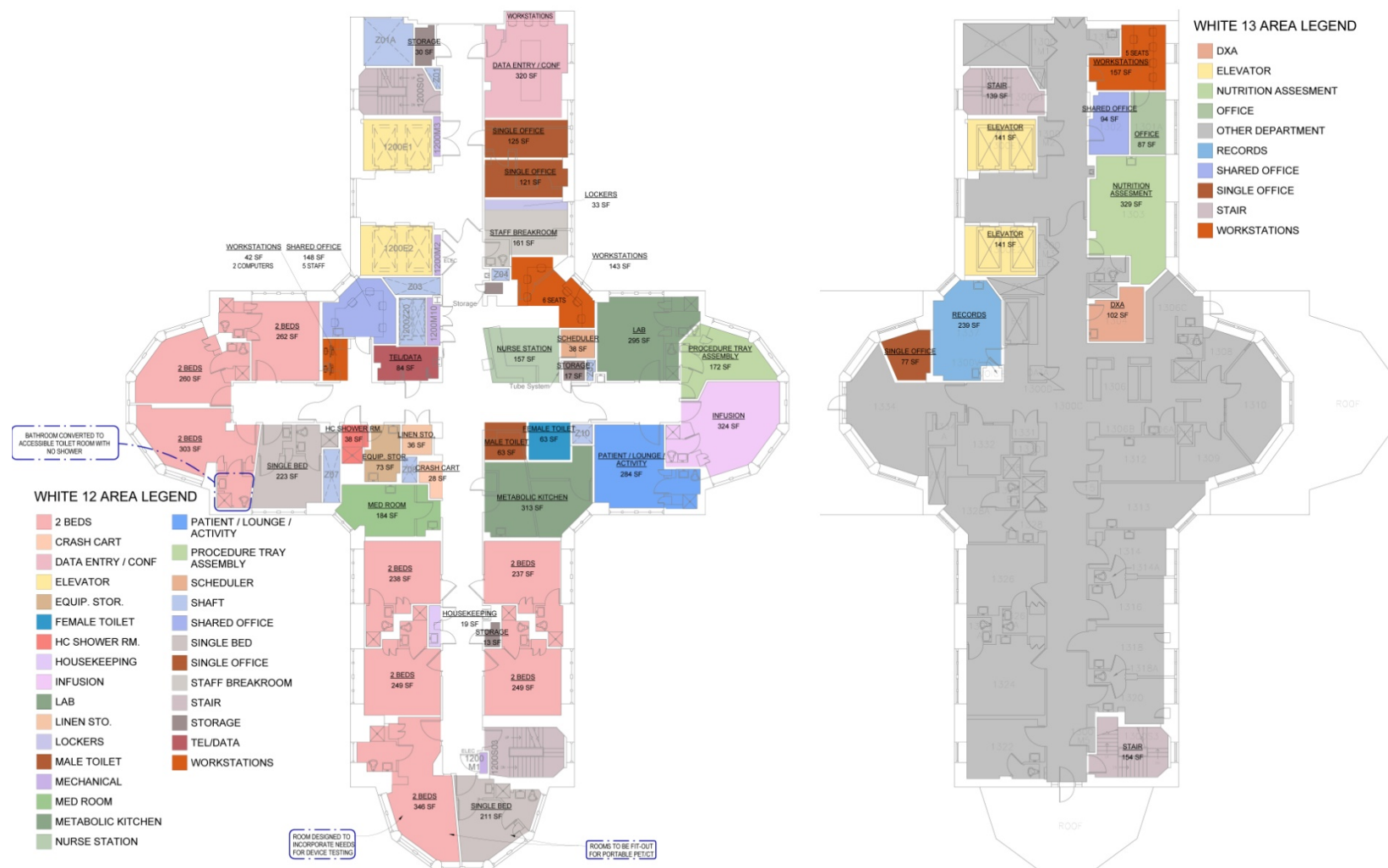
Update – Translational Research Center



Director of the MGH Translational Research Center

**Mason Freeman, MD
Chief of the Lipid Metabolism Unit and
Professor in the Department of Medicine**

Update – Translational Research Center



Translational Research Center White 12/13

Update - The Partners Biobank at MGH

- To date, over **17,200** patients have consented to participate in the Partners Biobank.
- Through face-to-face recruitment at MGH and BWH, collaborating studies, and electronic consent we are adding ~1000 consented patients per month.
- Genotyping of the first 25,000 samples will begin January 2015!



“Discovery Starts With You”

“Research Gems”



MASSACHUSETTS
GENERAL HOSPITAL

RESEARCH INSTITUTE

Challenges: Research Institute

Implementation of plan: hiring of people to work on industry interactions, marketing and further development

Funding: Major naming gift(s) to allow the Institute to have resources for flexibility and enough FTEs to support full mission

Questions?

