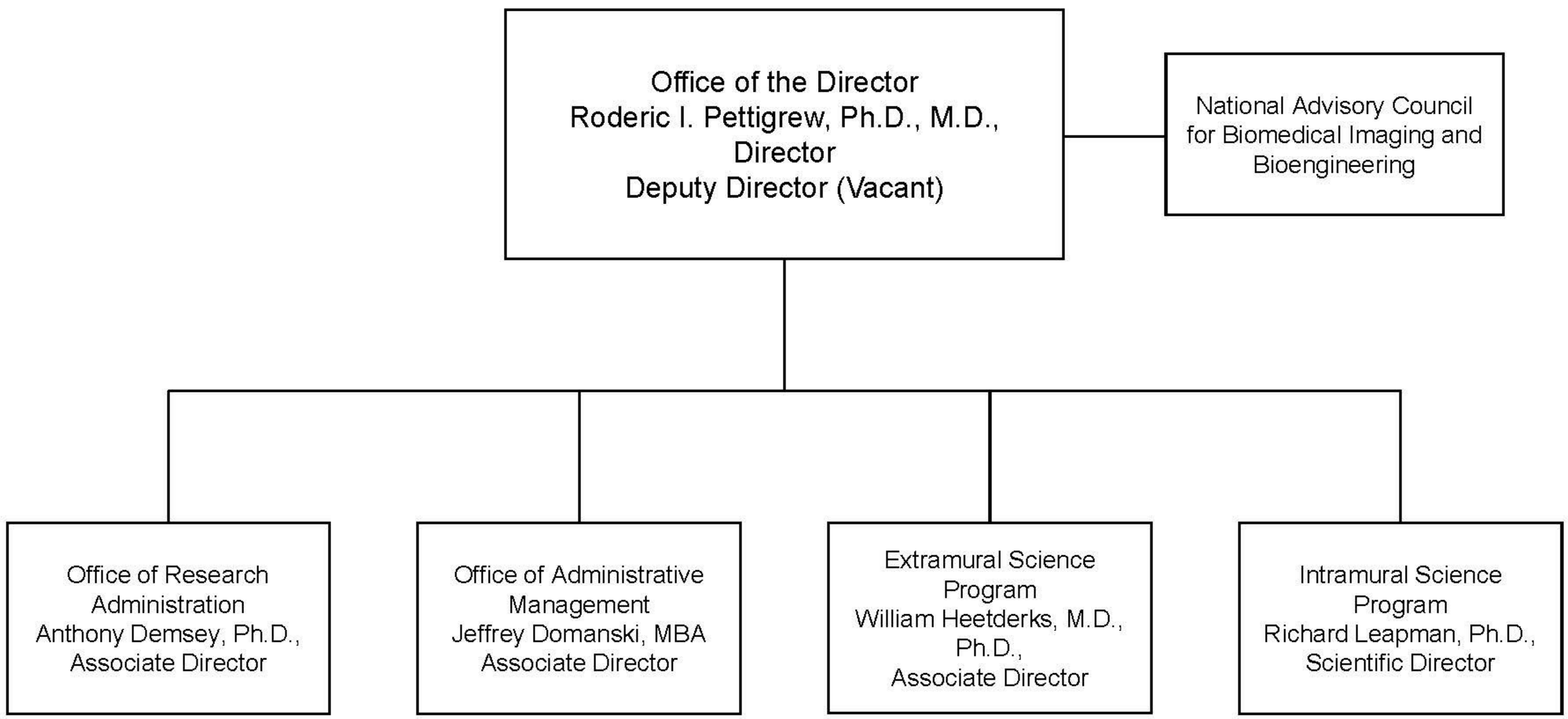
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

FY 2015 Budget | Page No.

NIBIB ORGANIZATIONAL CHART



For carrying out section 301 and title IV of the PHS Act with respect to biomedical imaging and bioengineering research, **[**$329,172,000**]***$328,532,000*.

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Amounts Available for Obligation[1]

(Dollars in Thousands)

Source of Funding	FY 2013 Actual	FY 2014 Enacted	FY 2015 President's Budget
Appropriation	$338,357	$329,172	$328,532
Rescission	-677	0	0
Sequestration	-16,983	0	0
Subtotal, adjusted appropriation	$320,697	$329,172	$328,532
FY 2013 Secretary's Transfer	-1,871	0	0
OAR HIV/AIDS Transfers	0	-2,360	0
Comparative transfers to NLM for NCBI and Public Access	-379	-453	0
National Children's Study Transfers	272	0	0
Subtotal, adjusted budget authority	$318,719	$326,359	$328,532
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	$318,719	$326,359	$328,532
Unobligated balance lapsing	-36	0	0
Total obligations	$318,683	$326,359	$328,532

[1] Excludes the following amounts for reimbursable activities carried out by this account: FY 2013 - $2,351 FY 2014 - $5,100 FY 2015 - $5,100

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Budget Mechanism - Total[1]
(Dollars in Thousands)

MECHANISM	FY 2013 Actual		FY 2014 Enacted[2]		FY 2015 President's Budget		FY 2015 +/- FY 2014	
Research Projects:	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Noncompeting	378	$144,877	373	$150,297	345	$137,821	-28	-$12,476
Administrative Supplements	*(4)*	910	*(4)*	910	*(4)*	910	*(0)*	0
Competing:								
Renewal	25	12,348	21	10,304	30	10,282	9	-22
New	157	50,184	140	45,000	185	63,739	45	18,739
Supplements	0	0	0	0	0	0	0	0
Subtotal, Competing	182	$62,532	161	$55,304	215	$74,021	54	$18,717
Subtotal, RPGs	560	$208,318	534	$206,511	560	$212,752	26	$6,241
SBIR/STTR	33	8,700	36	9,373	37	9,729	1	356
Research Project Grants	593	$217,018	570	$215,884	597	$222,481	27	$6,597
Research Centers:								
Specialized/Comprehensive	4	$6,608	4	$6,752	4	$6,752	0	$0
Clinical Research	0	0	0	0	0	0	0	0
Biotechnology	28	36,008	28	36,703	28	36,703	0	0
Comparative Medicine	0	0	0	0	0	0	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Research Centers	32	$42,617	32	$43,455	32	$43,455	0	$0
Other Research:								
Research Careers	28	$4,043	28	$4,121	28	$4,121	0	$0
Cancer Education	0	0	0	0	0	0	0	0
Cooperative Clinical Research	0	0	0	0	0	0	0	0
Biomedical Research Sup p ort	0	0	0	0	0	0	0	0
Minority Biomedical Research	0	0	0	0	0	0	0	0
Other	37	1,391	37	1,418	37	1,418	0	0
Other Research	65	$5,434	65	$5,539	65	$5,539	0	$0
Total Research Grants	690	$265,069	667	$264,878	694	$271,475	27	$6,597
Ruth L Kirchstein Training Awards:	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	13	$657	13	$669	13	$682	0	$13
Institutional Awards	203	8,698	209	8,865	213	9,042	4	177
Total Research Training	216	$9,354	222	$9,534	226	$9,724	4	$190
Research & Develop. Contracts	10	$14,092	11	$20,432	10	$16,337	-1	-$4,095
(SBIR/STTR) (non-add)	*(1)*	*(57)*	*(1)*	*(57)*	*(1)*	*(57)*	*(0)*	*(0)*
Intramural Research	27	11,093	27	11,315	27	11,428	0	113
Res. Management & Support	79	19,112	79	19,374	79	19,568	0	194
Res. Management & Support (SBIR Admin) (non-add)	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*	*(0)*
Total, NIBIB	106	$318,720	106	$326,359	106	$328,532	0	$2,173

[1] All items in italics and brackets are non-add entries. FY 2013 and FY 2014 levels are shown on a comparable basis to FY 2015.

[2] The amounts in the FY 2014 column take into account funding reallocations, and therefore may not add to the total budget authority reflected herein.

Major Changes in the Fiscal Year 2015 President's Budget Request

The FY 2015 President's Budget request for NIBIB is $2.173 million more than the FY 2014 Enacted level, for a total of $328.532 million. Note that there may be overlap between budget mechanisms and activity detail and these highlights will not sum to the total change for the FY 2015 President's Budget.

In FY 2014, NIH will invest a total of $40 million to launch its part of the BRAIN Initiative, but this ambitious effort will need a substantial ramp up in FY 2015 to ensure the Initiative's success. NIH is requesting a total of $100 million in FY 2015 to advance the high priority research areas of the BRAIN Initiative, as outlined in its interim strategic plan. As one of the leaders of the BRAIN Initiative at NIH, NIBIB is requesting an increase of $2.0 million in its budget to support these research priorities.

Research Project Grants (RPGs) (+$6.597 million; total $222.481 million):
NIBIB will continue to fund a substantial number of RPGs, 597 awards in FY 2015, an increase of 27 awards and $6.597 million from FY 2014. This includes 215 competing RPGs (an increase of 54 awards and $18.717 million from FY 2014) and 345 non-competing awards (a decrease of 28 awards and $12.476 million from FY 2014).

Training (+$0.190 million; total $9.724 million):
NIH will provide 2% increases in FY 2015 for stipend levels under the Ruth L. Kirschstein National Research Service Award (NRSA) training program.

Research and Development Contracts (-$4.095 million; total $16.337 million):
NIBIB will decrease funding for R&D Contracts from the FY 2014 level. This decrease is the result of a $5.3 million contract that is funded in alternate years and will not receive FY 2015 funds.

Applied Science and Technology (+$2.262 million; total $155.826 million):
NIBIB will increase funding for AST from the FY 2014 level. This increase is mostly due to a requested $2.0 million increase in funding for the President's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative.

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Summary of Changes[1]
(Dollars in Thousands)

FY 2014 Enacted				$326,359
FY 2015 President's Budget				$328,532
Net change				$2,173
	FY 2015 President's Budget		**Change from FY 2014**	
CHANGES	**FTEs**	**Budget**	**FTEs**	**Budget**
A. Built-in:				
1. Intramural Research:				
a. Annualization of January 2014 pay increase & benefits		$4,043		$10
b. January FY 2015 pay increase & benefits		4,043		30
c. Zero more days of pay (n/a for 2015)		4,043		0
d. Differences attributable to change in FTE		4,043		0
e. Payment for centrally furnished services		1,595		27
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		5,790		122
Subtotal				$188
2. Research Management and Support:				
a. Annualization of January 2014 pay increase & benefits		$10,706		$26
b. January FY 2015 pay increase & benefits		10,706		79
c. Zero more days of pay (n/a for 2015)		10,706		0
d. Differences attributable to change in FTE		10,706		0
e. Payment for centrally furnished services		493		8
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		8,369		201
Subtotal				$314
Subtotal, Built-in				$503

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

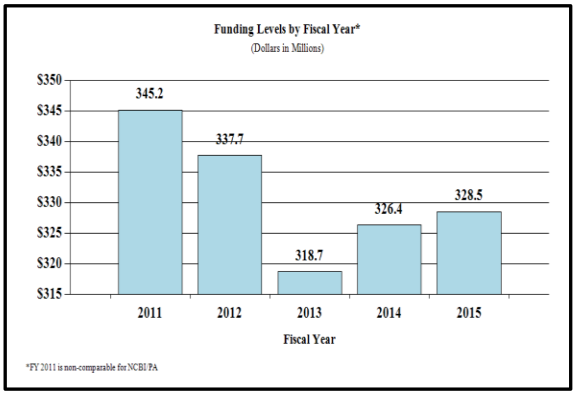
Summary of Changes - Continued[1]
(Dollars in Thousands)

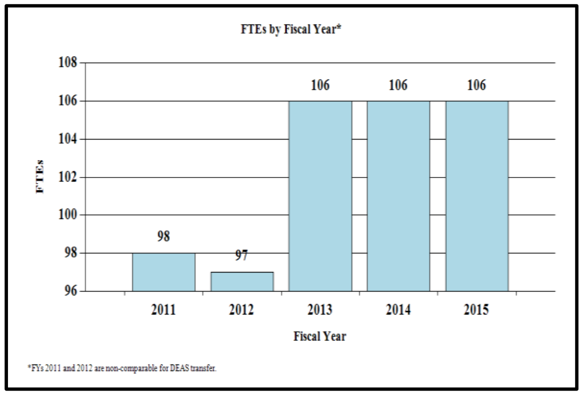
CHANGES	FY 2015 President's Budget		Change from FY 2014	
	No.	Amount	No.	Amount
B. Program:				
1. Research Project Grants:				
a. Noncompeting	345	$138,731	-28	-$12,476
b. Competing	215	74,021	54	18,717
c. SBIR/STTR	37	9,729	1	356
Subtotal, RPGs	597	$222,481	27	$6,597
2. Research Centers	32	$43,455	0	$0
3. Other Research	65	5,539	0	0
4. Research Training	226	9,724	4	190
5. Research and development contracts	10	16,337	-1	-4,095
Subtotal, Extramural		$297,536		$2,692
	FTEs		FTEs	
6. Intramural Research	27	$11,428	0	-$75
7. Research Management and Support	79	19,568	0	-120
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, Program	106	$328,532	0	$2,496
Total changes				$2,173

[1] The amounts in the Change from FY 2014 column take into account funding reallocations, and therefore may not add to the net change reflected herein.

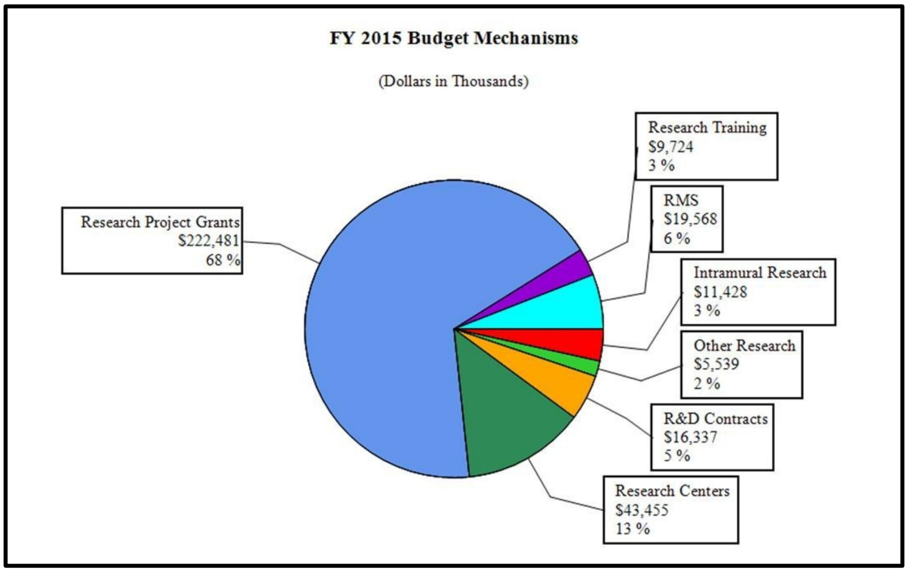
Fiscal Year 2015 Budget Graphs

History of Budget Authority and FTEs

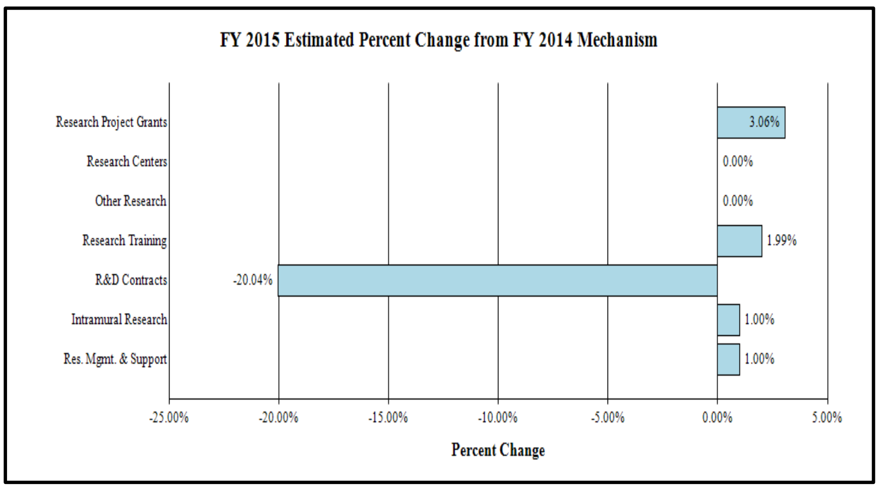




Distribution by Mechanism:



Change by Selected Mechanisms:



NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Budget Authority by Activity[1]
(Dollars in Thousands)

	FY 2013 Actual		FY 2014 Enacted [2]		FY 2015 President's Budget		FY 2015 +/- FY 2014	
Extramural Research	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**	**FTE**	**Amount**
Detail								
Applied Science and Technology		$152,643		$153,564		$155,826		$2,262
Discovery Science and Technology		88,766		88,721		88,872		151
Health Informatics Technology		26,693		31,977		32,031		54
Technological Competitiveness - Bridging the Sciences		20,413		20,582		20,807		225
Subtotal, Extramural		**$288,515**		**$294,844**		**$297,536**		**$2,692**
Intramural Research	**27**	**$11,093**	**27**	**$11,315**	**27**	**$11,428**	**0**	**$113**
Research Management & Support	**79**	**$19,112**	**79**	**$19,374**	**79**	**$19,568**	**0**	**$194**
TOTAL	**106**	**$318,720**	**106**	**$326,359**	**106**	**$328,532**	**0**	**$2,173**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

[2] The amounts in the FY 2014 column take into account funding reallocations, and therefore may not add to the total budget authority reflected herein.

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2014 Amount Authorized	FY 2014 Enacted	2015 Amount Authorized	FY 2015 President's Budget
Research and Investigation	Section 301	42§241	Indefinite		Indefinite	
				$326,359,000		$328,532,000
National Institute of Biomedical Imaging and Bioengineering	Section 401(a)	42§281	Indefinite		Indefinite	
Total, Budget Authority				$326,359,000		$328,532,000

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2005	$297,647,000	$297,647,000	$300,800,000	$300,647,000
Rescission				($2,438,000)
2006	$299,808,000	$299,808,000	$309,091,000	$299,808,000
Rescission				($2,998,000)
2007	$296,810,000	$294,850,000	$297,606,000	$296,887,000
Rescission				$0
2008	$300,463,000	$303,318,000	$304,319,000	$303,955,000
Rescission				($5,310,000)
Supplemental				$1,588,000
2009	$300,254,000	$310,513,000	$307,254,000	$308,208,000
Rescission				$0
2010	$312,687,000	$319,217,000	$313,496,000	$316,852,000
Rescission				$0
2011	$325,925,000		$325,415,000	$316,852,000
Rescission				($2,779,778)
2012	$322,106,000	$322,106,000	$333,671,000	$338,998,000
Rescission				($640,706)
2013	$336,896,000		$337,917,000	$338,357,294
Rescission				($676,715)
Sequestration				($16,983,210)
2014	$338,892,000		$337,728,000	$329,172,000
Rescission				$0
2015	$328,532,000			

Justification of Budget Request

National Institute of Biomedical Imaging and Bioengineering

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.

Budget Authority (BA):

	FY2013 Actual	FY2014 Enacted	FY2015 President's Budget	FY2015 +/- FY2014
BA	318,719,759	$326,359,000	$328,532,000	$2,173,000
FTE	106	106	106	0

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Director's Overview

The mission of the National Institute of Biomedical Imaging and Bioengineering is to improve health by leading the development and accelerating the application of biomedical technologies. The Institute is committed to integrating the physical and engineering sciences with the life sciences to advance basic research and medical care. NIBIB carries out its mission by developing tools and technologies that can see inside the body without being invasive, make diagnoses at the time of examination, help precisely guide and monitor the delivery of therapies, and improve our understanding of disease. With this new knowledge we are able to develop the next generation of innovative and transformative approaches that heal and cure disease.

Theme 1: Today's Basic Science for Tomorrow's Breakthroughs. Imagine being able to redirect powerful immune cells to fight cancer, or reprogram a diabetic's skin cell into a cell that could manufacture the insulin their pancreas no longer produces. These medical challenges may one day be achievable with a new technology that can transfer large molecules, nanoparticles, and other agents into living cells, providing new avenues for disease research and treatment. The method being developed by NIBIB-funded researchers uses controlled mechanical force (relatively gentle squeezing) that does not damage cells. As cells move through channels on a specialized device (like an inner tube along a water slide) the channel width narrows until a cell is forced to fit through a space that is narrower than the cell. As the cell changes shape to fit through the channel, temporary holes in the cell membrane are created so other molecules can pass through and enter the cell. As the cell rebounds to its normal shape, the holes in the membrane close and the molecules are trapped inside the cell. The speedy transfer of therapeutic molecules into cells with minimal cell damage and death allows millions of cells to be treated in a very short period of time. Cells carrying these "transferred molecules" can be used in many ways, including delivering known therapeutic and diagnostic interventions in patients, and delivering experimental therapies in animal models of disease.

Theme 2: Precision Medicine/Translational Science. The major path for cancer spread is circulating tumor cells (CTCs) that can seed the growth of new tumors at remote sites in the body. What if we could find these cells in the blood, identify their evolving sensitivity to treatment, and adjust a therapy to the cancer's evolving vulnerabilities? A third generation microfluidic device for finding CTCs takes a new approach to find these elusive cells. Once the CTCs are isolated they can be analyzed to see how cells change as they metastasize. This knowledge may enable doctors to identify a tumor's genetic mutations to choose the most appropriate targeted therapy and to quickly determine if a particular cancer treatment is working.

Theme 3: Big Opportunities in Big Data. In the last decade we have moved from talking in terms of mega- to tera- to exabytes (one billion gigabytes) of information —commonly referred to as Big Data. NIBIB is contributing to developing a critical component of the NIH-wide Big Data to Knowledge (BD2K) Initiative, the Centers of Excellence for Big Data Computing in the Biomedical Sciences. The Centers will form a BD2K Center Consortium that will establish a data eco-system in which methods and tools will be developed and shared to mine diverse data for new biomedical knowledge that will improve health. The BD2K initiative also includes establishing data and software catalogues to help investigators find and access datasets and software tools and the establishment of community-generated data standards; organizing, managing, and processing biomedical data sets; and training data science researchers to design tools for more effective and robust use of diverse data sets.

Theme 4: Nurturing Talent and Innovation. NIBIB held its Design by Undergraduate Teams (DEBUT) Challenge for the second time in 2013. Student teams entering the challenge addressed unmet clinical needs in the areas of diagnostic devices, therapeutic devices, and technologies to aid underserved populations and individuals with disabilities. While some of the winning projects stood out with their sophistication others impressed with their simplicity and ability to bring a low-cost, sustainable solution to a common problem such as the precise control of fluids to be administered by an intravenous drip. All winners are currently continuing with their projects by working on the next generation of their design, publishing the work, or working on translation through companies they have started, or in collaboration with existing biomedical device companies.

Program Descriptions and Accomplishments

Applied Science and Technology (AST)

Applied Science and Technology promotes, establishes, and manages biomedical imaging research programs. Programs in this area include: image-guided interventions; magnetic, biomagnetic, and bioelectric devices; magnetic resonance imaging (MRI) and spectroscopy; molecular imaging; nuclear medicine; ultrasound; and x-ray, electron, and ion beam modalities. The program also supports trans-NIH activities in single cell analysis and the Human Connectome Project, which is an effort that uses cutting edge imaging technologies to map the circuitry of the human brain.

In FY 2015, the program plans to support a range of imaging technologies for diagnostic and therapeutic uses. For example, although ultrasound is thought of as primarily a diagnostic tool, researchers are developing the use of this technology for treating chronic wounds. They have created a new ultrasound applicator that can be worn like a Band-Aid. In a small study it was found to significantly accelerate healing in patients with venous ulcers, a common complication of diabetes. The wearable device is battery-powered so it is portable and can be used in the home.

Another focus for NIBIB will be the challenge of locating tumors and removing them in areas of the brain that are difficult to see and reach with traditional surgical tools. NIBIB plans to continue to support research on the development of a tiny robot to remove damaged brain tissue. The Minimally Invasive Neurosurgical Intracranial Robot is worm-shaped, about one half inch wide, and is designed to crawl into hard to reach places in the brain to remove tumors. The device can be used with magnetic resonance imaging (MRI) and is controlled remotely so that surgeons can see in real time exactly where the tumor is and direct the robot to it. The goal is to be less invasive and more precise, sparing healthy tissue while more completely removing the tumor.

Not only is finding tumors in the brain a challenge, but distinguishing healthy tissue from cancerous tissue can be a surgical challenge as well. A new tool that can tell the difference at the microscopic level during an operation would vastly improve surgery and help doctors make sure that no tumor cells are left behind. The technique, called Stimulated Raman Scattering microscopy, uses the diffusion of light to form detailed images of tissue. Since cancerous tissue has different properties than healthy tissue, the advanced technique is able to clearly show where a tumor starts and ends.

Other therapeutic advances in cancer research are transforming photodynamic therapy which is regularly used for treating acne and macular degeneration into a treatment for larger solid tumors. This minimally invasive technique uses compounds that when exposed to selective light become toxic and can destroy cancer cells. Also, a new family of compounds, photoacid generators, which promise to effectively treat colon carcinoma with lower toxicity to healthy cells than existing treatments are being developed.

Other researchers are focusing on developing better ways to measure how much radiation is absorbed by tumors for more precise and effective treatment. In FY 2015, NIBIB plans to support research on radioimmunotherapy, a technique that combines a radioactive substance with an antibody that targets specific cancer cells. After being injected into the blood stream, the radiolabeled antibodies bind to tumors, where the radioactive agent helps kill the cancer cells. This type of targeted treatment also helps limit radiation exposure to healthy tissue.

Radiation exposure is an ongoing area of research support by NIBIB and in FY 2015 imaging researchers will be developing new ways to reduce radiation exposure associated with clinically essential computed tomography (CT) scans. Recently NIBIB research has developed and tested an approach to reconstruct images that can better distinguish structural details while maintaining a low radiation dose.

NIBIB also focuses on improving existing technology. Optical Coherence Tomography (OCT) is a technique that can be described as “optical ultrasound” and is used to image light reflections (rather than sound reflections). NIBIB is supporting development of an intraoperative OCT system that has been miniaturized into a handheld imaging device that provides microscopy imaging at the tip of a needle-sized probe that can be inserted into tissue. This new system will help breast cancer surgeons to diagnosis axillary (underarm) lymph nodes that may hold cancer cells. This new technique being tested in patients could eliminate the need for biopsy, and if cancer is detected, the cancerous node could be removed immediately instead of during an additional procedure. The 3D OCT system also has the potential to be used with radiology-based biopsies such as ultrasound, computed tomography (CT), or x-ray guided procedures, providing immediate feedback on the quality of the biopsied tissue.

NIBIB's approach to improving health is to bring together knowledge of the physical and life sciences. Hyperpolarized carbon 13 ($_{13}C$) has potential for highly sensitive, noninvasive, and rapid imaging. Hyperpolarization is a process that increases the magnetic residence signal by as much as 10,000 and allows for much more sensitive imaging. Cells in breast, prostate, and glioblastoma (brain) cancer have metabolic properties that differ from healthy tissue. By measuring metabolic changes, doctors can identify tumor cells in minutes and also monitor if cancer treatments are working, days before the size of the tumor shrinks. This process can also be beneficial by increasing imaging resolution so that tissue can be precisely located for biopsies and treatment can be targeted with precision.

NIBIB will also invest in efforts to develop tools and technologies that will allow us to see connections in the brain like never before. The President's Brain Research through Advancing Innovative Neurotechnologies initiative (BRAIN) announced in the FY 2014 Budget, aims to revolutionize our understanding of the human brain so that we can prevent, diagnose, treat, and cure neurological and psychiatric disorders. Achieving this goal is becoming possible through advances in our ability to map, measure, and ultimately understand brain function. This interdisciplinary effort includes public and private section support. As one of several NIH Institutes supporting the BRAIN initiative, NIBIB's leadership in advanced engineering and technology development is critical for advances that will enable this understanding.

Budget Policy:
The FY 2015 budget estimate for the AST program is $155.826 million, a $2.262 million increase (1.5 percent) from the FY 2014 Enacted level. This increase includes a $2.0 million increase for the President's Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. High priority is given to new and early-career investigators and to research that bridges the physical and life sciences. AST will place a high priority on molecular and multimodal imaging and will continue to support research for image-guided interventions. High priority will also continue to be given to investigator-initiated research, including exploratory research grants and Bioengineering Research Partnerships.

Program Portrait: Development of Non-invasive Assessment of Traumatic Brain Injury

FY 2014 Level: $1.1 million
<u>FY 2015 Level: $1.1 million</u>
Change: $0.0 million

NIBIB supports research on developing and optimizing non-invasive imaging technologies for assessing traumatic brain injury (TBI). Research on new devices and techniques will improve portability and accessibility, leading to quicker assessment and earlier treatment, and potentially, better outcomes. NIBIB also supports research to improve long-term monitoring of TBI.

To make assessment more portable and accessible, researchers are developing a head-only MRI machine. The significant reduction in size and weight of a scanner designed specifically to image the brain will increase accessibility as well as provide greater patient comfort, improved image quality, and increased speed. Another project is using high-resolution diffusion tensor imaging (DTI), an MRI technique pioneered at NIH, to detect mild TBI. It measures the diffusion of water in tissue, revealing microstructural changes in neural fibers in the brain. It can successfully distinguish patients with TBI from control subjects, regardless of the severity of the injury and the time since the injury.

NIBIB's support of other methods for assessing TBI include a project that aims to "inverse localize" or find the locations where irregular electroencephalography (EEG) activity is occurring as a result of

TBI. Inverse localization is a method that uses the EEG signal and a highly detailed anatomical model obtained from CT and MRI scans to determine the specific region in the brain from which electrical activity is coming. Using this method may reveal insights into brain activity in people with acute TBI, monitor recovery after surgery, help determine treatment plans, and improve TBI outcomes.

In severe TBI cases, such as patients in a coma, detecting intracranial bleeding and monitoring brain pressure changes is critical to assess injury progression. Development is underway of a minimally-invasive alternative by means of real-time electrical impedance tomography (EIT). In EIT, a number of standard electrocardiography (ECG) electrodes are placed on the surface of the cranium and small, insensible currents are injected between specific electrode-pairs, while surface voltages are recorded at the remaining sites. These surface measurements of current and voltage are converted, via a computer algorithm, into an image of the distribution of internal electrical properties inside the cranium, and blood, tissue, and fluid displacement can be seen. Preliminary results in phantoms and large animal models show promise. The technique reliably detected microbleeds as small as 100 microliters or 0.1 milliliters and is expected to lead to further exploration of this technology for early detection of TBI-induced microbleeds and as a possible alternative to invasive forms of monitoring.

NIBIB is also co-funding a center for TBI research, launched in 2012 through the Federal Interagency TBI Research Consortium. This center provides free resources to researchers through an informatics system that shares data, methodologies, and associated tools to facilitate collaboration between laboratories, as well as interconnectivity with other informatics platforms.

Discovery Science and Technology (DST)

Discovery Science and Technology (DST) supports research in a broad range of areas including biomaterials; drug and gene delivery systems and devices; mathematical modeling, simulation, and analysis; medical devices and implant sciences; micro-biomechanics; nanotechnology; rehabilitation engineering; microsystems and devices for point-of-care technologies and high throughput screening; surgical tools, techniques, and systems; and tissue engineering and regenerative medicine.

In FY 2015, NIBIB will continue to focus on the development of new biomaterials. For example, researchers recently developed a microneedle that is easily inserted into skin or other tissues, and adheres to soft tissue. The prongs of the microneedle expand upon contact with water, creating an interlocking adhesion with the tissue it is placed on. A major advantage with this technology is that it can adhere to a wet tissue such as intestinal tissue or skin. The potential uses of this technology are broad, ranging from accelerating wound healing to replacing surgical sutures.

Also, DST plans to support research that offers potential regenerative therapy for people with damaged or diseased cartilage. Researchers developed two novel technologies to help the body generate new knee cartilage. This technology offers the promise of walking without pain or inhibition. In a very small study of patients using this new procedure, patients had far less pain and greater growth of new cartilage than patients who did not receive the procedure.

Biomaterials research has many potential applications. For instance, NIBIB supported researchers aim to treat brain aneurysms, which can be a fatal. Brain aneurysms are balloon like bulges in the walls of blood vessels that can rupture and cause bleeding, neurological damage, or death. One innovative treatment uses a biocompatible foam-like plastic to fill an aneurysm and promote healing. After positive results using a model of an aneurysm, the materials will soon move into testing in patients.

NIBIB's long history of supporting research on developing devices is ongoing and aims to overcome extremely challenging conditions. End stage renal disease is a debilitating condition for the patient and represents a major cost to the health care system. NIBIB researchers are developing a new implantable dialysis system. While many challenges remain before this can be deployed the ambitious approach is pushing the limits of technology to develop a radically new therapy for this disabling condition.

Yet another area of active research is leading to new molecular imaging and therapeutic tools that combine imaging and drug therapy of specific cancers at the cellular and molecular level. Investigators are studying a technique that bypasses a cell's defense mechanism by transporting drugs to a specific site inside the cell and then releasing the drug in response to a molecular signal. Because the drug is shielded and is only released at a specified target, this approach spares healthy tissue as the drugs pass through the body. Researchers are currently developing new ways to better maintain the stability of the drugs and the carrier as they travel through the body to the intended target.

In addition to drug delivery, NIBIB supports research on technologies to visualize the brain's neuronal connections, as well as to develop technologies for measuring and interpreting signals from the brain, spinal cord, and nerves throughout the body. The brain-computer interface is a growing area of research and is advancing rapidly toward practical applications to help those who are paralyzed to control devices such as robotic arms, wheel chairs, and other electronic devices. Research previously supported by NIBIB has led to the development of an electroencephalogram (EEG) cap. The device looks like a swimming cap and contains sensors that pick up electrical activity in the brain. The skull cap technology converts human thought into action on a computer, so that actions such as typing a letter on a computer screen can occur merely by thinking about it. Building on this technology, recent advances have led to the development of a wireless device that is implanted in the brain and can control robotic devices using thought commands. In addition, new approaches are leading to the development of a minimally-invasive brain-computer interface that uses thoughts to control movements of objects, such as a toy helicopter, in three-dimensional space.

Much of NIBIB's research is not specific to a particular disease or disorder, but may have applications for a range of illnesses and disabilities. For example, NIBIB supports research under the National Robotics Initiative (NRI), a commitment among multiple federal agencies to support the development of a new generation of robots that work cooperatively with people, known as co-robots. Recently-funded projects include development of a co-robotic cane that uses computer vision and can relay critical information about the environment to its user to help enhance mobility for the visually impaired. Another project is developing a MRI-guided co-robotic catheter that combines state-of-the art robotics with high-resolution, real-time imaging to increase the accuracy and repeatability of procedures to ablate atrial fibrillation.

Budget Policy:
The FY 2015 budget estimate for the DST program is $88.872 million, a $0.151 million increase (0.2 percent) from the FY 2014 Enacted level. DST will give high priority to supporting new and early-career investigators. Priority will be given to investigator-initiated research grants as this is the foundation on which future advances in new biomedical technologies and improved patient care will be developed. Large grants and Center programs will continue to receive support as will investment in other scientific opportunities and high priority areas.

Program Portrait: Engineering the Immune System to Fight Disease

FY 2014 Level: $3.1 million
FY 2015 Level: $3.1 million
Change: $0.0 million

Engineers, scientists, and clinicians are working together to discover and engineer new approaches to alter the immune system to fight disease. NIBIB-supported scientists have been developing ways to target toxic medications directly to tumors while sparing healthy tissue using nanoparticles. However, the immune system often attacks and destroys these nanoparticles before they make it to the tumor target. A new method is designed to sneak nanoparticles carrying tumor-fighting drugs past cells of the immune system. The technique takes advantage of the fact that all cells in the human body display a protein on their membranes that functions as a specific 'passport' in instructing immune cells not to attack them. By attaching a small piece of this protein to the nanoparticles, scientists were able to fool immune cells in mice into recognizing the particles as 'self' rather than foreign, thereby increasing the amount of medication delivered to tumors. The researchers speculate that this peptide could be similarly used to prevent immune clearance of viruses used to deliver genes for gene-therapy treatment or to enhance biocompatibility and durability of larger foreign objects such as pacemakers and implants, whose parts can degrade over time due to attacks by the immune system.

Another group of NIBIB-funded researchers are engineering the immune system to repress only the part of the system that causes autoimmune disorders while leaving the rest of the system intact. In autoimmune disease, the body's immune cells mistakenly attack and destroy healthy tissue. Current treatment for autoimmune disorders involves the use of immunosuppressant drugs which tamp down the overall activity of the immune system. Using a mouse model of multiple sclerosis (MS), NIBIB-supported researchers have developed innovative technology to selectively inhibit the part of the immune system responsible for attacking myelin–the insulating material that encases nerve fibers and facilitates electrical communication between brain cells. The approach uses nanoparticles to which they attach key segments of myelin—the protein that the immune cells are attacking in MS. The nanoparticles are carried to the spleen where they present these protein segments to immune cells called T-cells. This introduction in the spleen familiarizes the T-cells with the body's myelin protein, causing T- cells to no longer react to the myelin protein as foreign. These new nanoparticles stopped the course of a MS-like disease in mice, the researchers found. This approach has the potential be used to treat other autoimmune diseases, for example, key segments from proteins on the surface of insulin producing cells could be attached to nanoparticles as a way to introduce the T-cells to the these cells as a potential treatment for diabetes.

Bridging the Science for Technological Competitiveness

NIBIB supports interdisciplinary research to promote the advancement of cutting edge technology. Image guided robotic surgery is one example of medical procedures that integrate sophisticated robotic and imaging technologies, primarily to perform minimally invasive surgery. The use of robotics in surgery has several advantages, such as fitting into tiny incisions that are too small for a surgeon's hands and traditional surgical tools, and the ability to perform surgery remotely. Remote surgery may have life-saving potential for those in isolated areas, particularly when a complex operation requires a specially trained surgeon who is in a distant location. In FY 2015, NIBIB plans to support research in this growing field. Examples of ongoing research efforts include development of an ultrathin (1-2 mm diameter, about the depth of a penny) scanning fiber endoscope with simultaneous 2D and 3D imaging. Research to develop the new tiny cameras and tools will allow physicians to perform a broad range of minimally invasive procedures that were previously not possible, such as precise manipulation of delicate organs in the middle and inner ear, and the optic nerves.

Other interdisciplinary advances NIBIB plans to support include a new technology for breast tumor biopsies and removal of tumors. Researchers are exploring the use of a remotely operated MRI-compatible robotic arm to guide needle insertion for biopsy and removal of tumors. The device constantly sends high-sensitivity touch feedback to the surgeon operating the robotic arm, which allows precise needle insertion and reduced damage to surrounding healthy tissue. The improved system will use radiofrequency (RF) ablation to destroy tumors. The new system provides improved accuracy, less damage to surrounding healthy tissues, and reduced discomfort for the many women who must undergo these procedures.

Another common problem that investigators are working to solve involves ventricular assist devices (VAD), which are surgically implanted pumps that augment the pumping action of a weak heart. One problem associated with VADs is that they can cause thrombosis (formation of a blood clot). Similar to wind tunnel testing in aerospace engineering, researchers developed a device thrombogenecity emulator that combines advanced numerical simulations and experimental techniques to measure the formation of blood clots. Using this methodology, engineers have optimized an existing VAD pump to minimize the forces exacted on platelets by the pump, thereby decreasing their chances of sticking together and creating a clot. The goal of the optimized device is to prevent the need for patients with VADs to take blood thinners, which can increase a person's risk of hemorrhage.

Another area of priority at NIBIB is interdisciplinary training. For example, in partnership with the Howard Hughes Medical Institute (HHMI), NIBIB has supported projects that will help train the next generation of interdisciplinary researchers. NIBIB is also partnering with the Department of Energy (DOE) to increase the number of clinical and postdoctoral fellows trained in radiochemistry to develop improved, clinically relevant, radionuclide imaging radiotracers and to successfully translate these radiotracers into clinical use for human disease-specific applications.

Budget Policy:
The FY 2015 budget estimate for the Technological Competitiveness – Bridging the Sciences program is $20.807 million, a $0.225 million increase (1.1 percent) from the FY 2014 Enacted level. This increase includes funding for the implementation of NIH's 2% increase in stipend levels for trainees. Other high priorities include developing interdisciplinary training programs and supporting the Quantum Grants Program, which establishes interdisciplinary research teams to address major healthcare problems.

Program Portrait: Increasing Diversity in Engineering and the Physical Sciences

FY 2014 Level: $0.5 million
FY 2015 Level: $0.5 million
Change: $0.0 million

The Increasing Diversity in Engineering and the Physical Sciences project is a NIBIB initiative to increase the participation of underrepresented groups in biomedical research by supporting cohorts of diverse undergraduate students in the fields of science, technology, engineering, and math. This initiative aims to increase the recruitment, retention, and graduation rates of students, enhance post-graduate educational and career choices for the students, and evaluate the relative effectiveness of program elements in accomplishing these objectives. Awards have been made to the University of Maryland, Baltimore County (UMBC) and Savannah State University (SSU).

UMBC has a tradition of training students from diverse backgrounds in these fields of study, having prepared more than 1,200 diverse undergraduate students to go on to graduate and medical study in the biomedical sciences over the last two decades. Students who complete the Meyerhoff program at UMBC are over five times more likely to graduate from or be currently attending a PhD or MD-PhD program than comparable students who were accepted into the program and chose to attend another university. SSU, one of the historically black universities and colleges, modeled its program on the UMBC program. The National Institute on Drug Abuse is a co-funding partner for the UMBC program. In the current fiscal year, NIBIB and NIDA are co-hosting a meeting workshop on successfully navigating the undergraduate- to-graduate transition at the Annual Biomedical Research Conference for Minority Students. They also are developing, in collaboration with the NIH intramural research program, summer 2014 research experiences at the NIH main and NIH Bayview campuses.

When complete, this initiative will support a cohort of undergraduate diversity students for four years, linking them with high-quality research experiences on the NIH campus. The initiative will also test the relative effectiveness of focused programs in driving student recruitment, retention, academic achievement, graduation, and post-graduation educational and career decisions. The programs at both schools include academic assistance, financial assistance, student mentoring (family, faculty, and peer-to- peer), professional and social development, and on-campus research experiences. The results from these two pilots will provide information on key elements of success and how the successful model can be implemented throughout the country. Based on the results of these evaluations, NIBIB will work with other Federal agencies and private foundations to disseminate best practices learned from this program to other mentoring programs at minority-serving and research-intensive institutions.

Health Informatics Technology (HIT)

The Health Informatics Technologies program supports activities to further research in health information technology, bioinformatics, mHealth, clinical decision support, image processing, data integration, and telehealth. This program also supports trans-NIH and government-wide activities in health informatics, a field that crosses computer and information science, and health care.

In FY 2015, NIBIB will continue to support this growing field with an initiative to solve critical challenges in health and health care using multi-disciplinary approaches that include social and economic science, engineering, clinical practice, and computational and information science. For example, the initiative Smart and Connected Health is a jointly-funded program between NIH and the National Science Foundation. Supported project areas include the development of tools for effective use of electronic health data by patient care teams; computational approaches that model biological processes, predict patient behavior, and accelerate optimization of treatments;

and developing intelligent systems that help health care professionals respond appropriately to patient information coming from medical devices. The initiative responds to calls from the President's Council of Advisors on Science and Technology, the National Research Council, and the Institute of Medicine for transformative health care research.

NIBIB is committed to a transformative approach using information technologies, bioinformatics, and computer science to find solutions to major health issues. Walking through a hospital ward or intensive care unit today one is greeted by a cacophony of beeps and chimes. Which are important, which are irrelevant? Unfortunately, this can be as difficult for the staff to know as for the casual observer. NIBIB is supporting the development of a plug and play standard for medical devices that will facilitate medical devices operating together in concert. This should reduce the number of false alarm beeps and more importantly provide critical alarms when systems of connected devices are functioning inappropriately such as providing an overdose of pain medication.

Another project supports the development of a decision support system to assist physicians with improved diagnosis and prognosis of epilepsy patients while reducing cost. The system processes images from multiple modalities (such as MRI and CT scans) with the aim of extracting high quality, detailed information about brain structures. These imaging results are combined with results of other clinical tests as well as patients' history to reduce the need for invasive and expensive intracranial tests, predict post-operative outcomes, and determine optimal treatment planning for each patient.

Also in FY 2015, NIBIB will continue to lead the NIH-supported Neuroimaging Tools and Resources Clearinghouse (NITRC). NITRC is a one-stop shop for software tools, data, and other resources for functional and structural neuroimaging analysis. Data available on NITRC include brain images from MRI, positron emission tomography (PET), magnetoencephalography (MEG), and other types of brain scan sets. Software tools are also available, such as the 3D Brain Atlas Reconstructor, which recreates 3D models of brain structures. Importantly, recognizing the need for rapid analysis of large image datasets, NITRC moved to the "cloud" to enable faster and cheaper analysis and hypothesis testing.

Budget Policy:
The FY 2015 budget estimate for the HIT program is $32.031 million, a $0.054 million increase (0.2 percent) from the FY 2014 Enacted level. HIT will focus on mobile health, clinical decision support, and big data in FY 2015. In collaboration with other Institutes, we will initiate new funding opportunity announcements in the areas of healthy independent living and connected health. The HIT will also give priority to new investigators. Investigator initiated research and Bioengineering Research Partnership applications will be encouraged and supported.

Intramural Research Program (IRP)
The NIBIB IRP plays a key role in fulfilling the Institute's mission, particularly to advance knowledge in imaging and bioengineering research using a combination of basic, translational, and clinical science and to develop effective training programs in related fields. The IRP supports a broad range of research areas. For example, the Laboratory of Molecular Imaging and Nanomedicine works to develop molecular imaging probes that pinpoint molecular pathways.

These probes have the potential for clinical translation, including radiolabeled peptide probes (markers that can be traced in the body) aimed at diagnosing cancer.

As in the development of probes, the IRP has a role in developing tools and technologies that can be used by the broader research community. For example, NIBIB's microscopy researchers recently developed two first-of-a-kind microscopes. One captures small, fast moving organisms at an unprecedented rate, allowing researchers to obtain images of cell division of all the cells in a small organism at double the spatial resolution of a conventional microscope. This provides a vastly clearer picture, enabling cell components that were once quite blurry to now become sharply defined. The difference is similar to that of a 1990's-era standard TV set versus today's high-definition TVs. The microscope is also up to 100 times faster than traditional technologies.

The second microscope displays large cell samples in three dimensions while decreasing the amount of harmful light exposure to the cells. The researchers used an existing technology called selective plane illumination microscopy (SPIM), which uses a thin beam of light to illuminate only the single plane that is currently being imaged so the biological sample is not damaged by overexposure to light. NIBIB researchers developed a dual-view SPIM (diSPIM) microscope with two separate detection cameras that can capture undistorted 3D images at very high speed. The increased speed at which the new dual microscope can image the cells allows for clearer images of even very fast moving particles, such as viruses.

Budget Policy:
The FY 2015 President's Budget estimate for the Intramural Research Program is $11.428 million, a $0.113 million increase (1.0%) from the FY 2014 Enacted level. High priority research includes molecular imaging and nanomedicine - for the early diagnosis of disease, monitoring of therapeutic response, and guiding drug discovery, and also research on novel technologies for fast, "super resolution" optical microscopy of live cells to accelerate biomedical research. This increase partially covers increased costs in FY 2015, including those for retirement contributions and Federal Employee Health Benefit premiums.

Research Management and Support (RMS)
NIBIB RMS activities provide administrative, budgetary, logistical, and scientific support in the review, award, and monitoring of research grants, training awards, and research and development contracts. RMS functions also encompass strategic planning, coordination, communication, and evaluation of the Institute's programs, regulatory compliance, international coordination, and liaison with other Federal agencies, Congress, and the public.

Budget Policy:
The FY 2015 President's Budget estimate for Research Management and Support is $19.568 million, a $0.194 million increase (1.0%) from the FY 2014 Enacted level. High priorities of RMS are the scientific support of NIBIB research programs and strategic planning. This increase partially covers increased costs in FY 2015, including those for retirement contributions and Federal Employee Health Benefit premiums.

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Budget Authority by Object Class[1]
(Dollars in Thousands)

	FY 2014 Enacted	FY 2015 President's Budget	FY 2015 +/- FY 2014
Total compensable workyears:			
Full-time employment	106	106	0
Full-time equivalent of overtime and holiday hours	0	0	0
Average ES salary	$0	$0	$0
Average GM/GS grade	12.1	12.1	0.0
Average GM/GS salary	$103	$105	$2
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	$0	$0	$0
Average salary of ungraded positions	$129	$131	$2
OBJECT CLASSES	**FY 2014 Enacted**	**FY 2015 President's Budget**	**FY 2015 +/- FY 2014**
Personnel Compensation			
11.1 Full-Time Permanent	$7,449	$7,523	$74
11.3 Other Than Full-Time Permanent	2,866	2,894	29
11.5 Other Personnel Compensation	94	95	1
11.7 Military Personnel	0	0	0
11.8 Special Personnel Services Payments	865	874	9
11.9 Subtotal Personnel Compensation	**$11,274**	**$11,387**	**$113**
12.1 Civilian Personnel Benefits	$3,248	$3,362	$114
12.2 Military Personnel Benefits	0	0	0
13.0 Benefits to Former Personnel	0	0	0
Subtotal Pay Costs	**$14,522**	**$14,749**	**$226**
21.0 Travel & Transportation of Persons	$272	$277	$5
22.0 Transportation of Things	37	37	1
23.1 Rental Payments to GSA	19	20	0
23.2 Rental Payments to Others	5	5	0
23.3 Communications, Utilities & Misc. Charges	191	194	3
24.0 Printing & Reproduction	1	1	0
25.1 Consulting Services	250	255	4
25.2 Other Services	9,084	3,191	-5,893
25.3 Purchase of goods and services from government accounts	22,016	22,951	936
25.4 Operation & Maintenance of Facilities	6	6	0
25.5 R&D Contracts	993	1,010	17
25.6 Medical Care	445	461	16
25.7 Operation & Maintenance of Equipment	1,873	1,905	32
25.8 Subsistence & Support of Persons	0	0	0
25.0 Subtotal Other Contractual Services	**$34,666**	**$29,779**	**-$4,887**
26.0 Supplies & Materials	$797	$811	$14
31.0 Equipment	1,435	1,460	24
32.0 Land and Structures	1	1	0
33.0 Investments & Loans	0	0	0
41.0 Grants, Subsidies & Contributions	274,412	281,199	6,787
42.0 Insurance Claims & Indemnities	0	0	0
43.0 Interest & Dividends	0	0	0
44.0 Refunds	0	0	0
Subtotal Non-Pay Costs	**$311,837**	**$313,783**	**$1,947**
Total Budget Authority by Object Class	**$326,359**	**$328,532**	**$2,173**

[1] Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

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Salaries and Expenses
(Dollars in Thousands)

OBJECT CLASSES	FY 2014 Enacted	FY 2015 President's Budget	FY 2015 +/- FY 2014
Personnel Compensation			
Full-Time Permanent (11.1)	$7,449	$7,523	$74
Other Than Full-Time Permanent (11.3)	2,866	2,894	29
Other Personnel Compensation (11.5)	94	95	1
Military Personnel (11.7)	0	0	0
Special Personnel Services Payments (11.8)	865	874	9
Subtotal Personnel Compensation (11.9)	**$11,274**	**$11,387**	**$113**
Civilian Personnel Benefits (12.1)	$3,248	$3,362	$114
Military Personnel Benefits (12.2)	0	0	0
Benefits to Former Personnel (13.0)	0	0	0
Subtotal Pay Costs	**$14,522**	**$14,749**	**$226**
Travel & Transportation of Persons (21.0)	$272	$277	$5
Transportation of Things (22.0)	37	37	1
Rental Payments to Others (23.2)	5	5	0
Communications, Utilities & Misc. Charges (23.3)	191	194	3
Printing & Reproduction (24.0)	1	1	0
Other Contractual Services:			
Consultant Services (25.1)	250	255	4
Other Services (25.2)	9,084	3,191	-5,893
Purchases from government accounts (25.3)	13,780	13,089	-691
Operation & Maintenance of Facilities (25.4)	6	6	0
Operation & Maintenance of Equipment (25.7)	1,873	1,905	32
Subsistence & Support of Persons (25.8)	0	0	0
Subtotal Other Contractual Services	**$24,992**	**$18,445**	**-$6,547**
Supplies & Materials (26.0)	$797	$811	$14
Subtotal Non-Pay Costs	**$26,295**	**$19,770**	**-$6,525**
Total Administrative Costs	**$40,818**	**$34,519**	**-$6,298**

NATIONAL INSTITUTES OF HEALTH
National Institute of Biomedical Imaging and Bioengineering

Detail of Full-Time Equivalent Employment (FTE)

OFFICE/DIVISION	FY 2013 Actual			FY 2014 Est.			FY 2015 Est.		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Office of the Director									
Direct :	5	-	5	5	-	5	5	-	5
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	5	-	5	5	-	5	5	-	5
Extramural Science Program									
Direct :	27	-	27	27	-	27	27	-	27
Reimbursable:	1	-	1	1	-	1	1	-	1
Total:	28	-	28	28	-	28	28	-	28
Office of Research Administration									
Direct :	20	-	20	20	-	20	20	-	20
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	20	-	20	20	-	20	20	-	20
Office of Administrative Management									
Direct :	25	-	25	25	-	25	25	-	25
Reimbursable:	1	-	1	1	-	1	1	-	1
Total:	26	-	26	26	-	26	26	-	26
Intramural Science Program									
Direct :	17	-	17	17	-	17	17	-	17
Reimbursable:	10		10	10		10	10		10
Total:	27	-	27	27	-	27	27	-	27
Total:	106	-	106	106	-	106	106	-	106
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreement s.	0	0	0	0	0	0	0	0	0

FISCAL YEAR	Average GS Grade
2011	12.5
2012	12.9
2013	12.1
2014	12.1
2015	12.1

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National Institute of Biomedical Imaging and Bioengineering

Detail of Positions

GRADE	FY 2013 Actual	FY 2014 Enacted	FY 2015 President's Budget
Total, ES Positions	0	0	0
Total, ES Salary	0	0	0
GM/GS-15	13	13	13
GM/GS-14	20	20	20
GM/GS-13	16	16	16
GS-12	7	7	7
GS-11	3	3	3
GS-10	1	1	1
GS-9	9	9	9
GS-8	1	1	1
GS-7	7	7	7
GS-6	2	2	2
GS-5	0	0	0
GS-4	0	0	0
GS-3	0	0	0
GS-2	0	0	0
GS-1	0	0	0
Subtotal	79	79	79
Grades established by Act of July 1, 1944 (42 U.S.C. 207)	0	0	0
Assistant Surgeon General	0	0	0
Director Grade	0	0	0
Senior Grade	0	0	0
Full Grade	0	0	0
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	0	0	0
Ungraded	35	35	35
Total permanent positions	79	79	79
Total positions, end of year	114	114	114
Total full-time equivalent (FTE) employment, end of year	106	106	106
Average ES salary	0	0	0
Average GM/GS grade	12.1	12.1	12.1
Average GM/GS salary	102,390	103,333	104,921

Includes FTEs whose payroll obligations are supported by the NIH Common Fund.