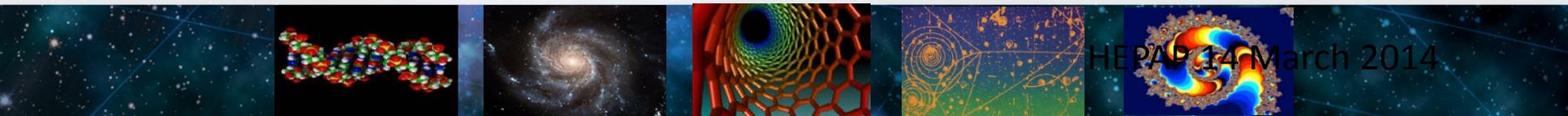




NSF Mathematical and Physical Sciences Update

Denise Caldwell

Division Director
Division of Physics

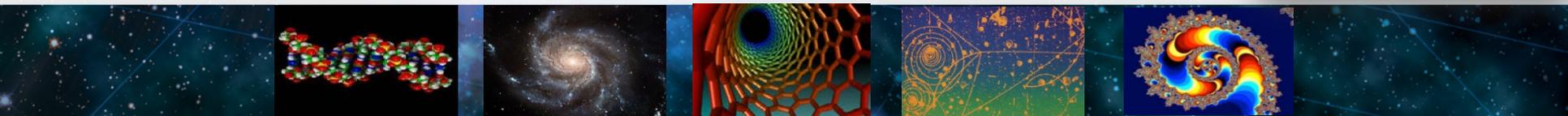
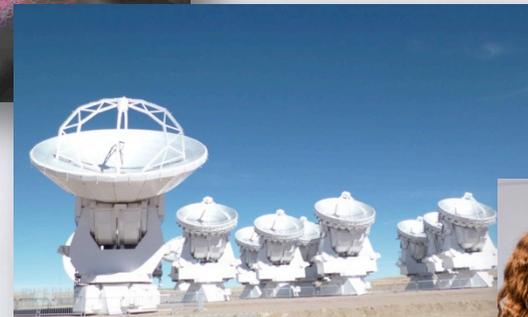
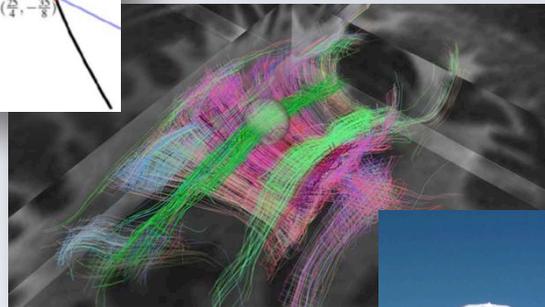
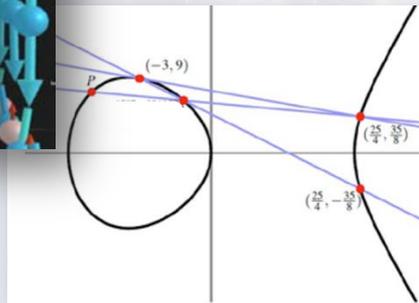
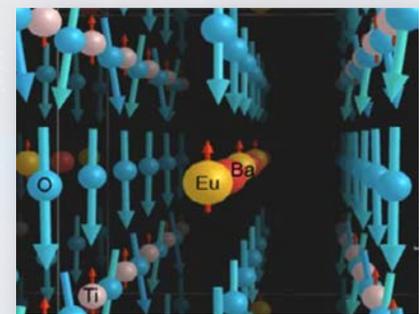


Fundamental Research in the Mathematical and Physical Sciences

Advancing Discovery
Building Blocks for Innovation

Forefront Facilities

Inspiring the Next Generation



The Excitement of Advancing Discovery



Chemistry Nobel Laureates



Warshel



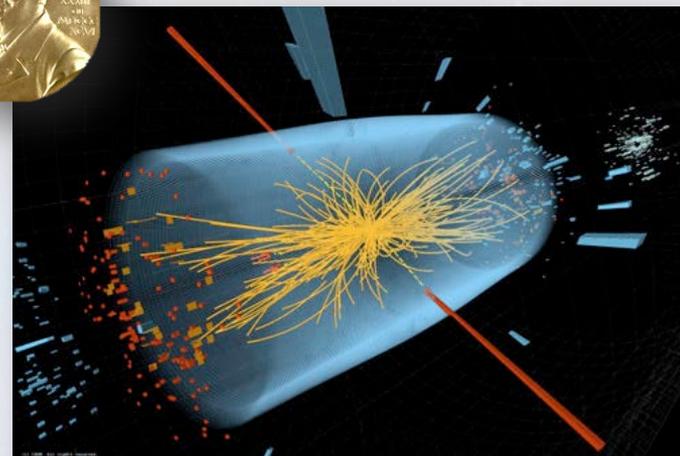
Karplus



Levitt



Higgs Particle LHC



MPS-Supported MacArthur Fellows

Baran
(CHE)

Fennie
(DMR)

Katabi
(AST)

Murphy
(DMS)

Rey
(PHY)

Seager
(AST)



Katabi

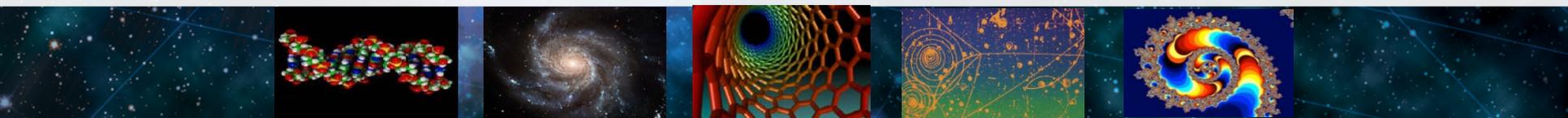


Rey



Fennie

Physics World
“Discovery of the Year”
2012



The Excitement of Advancing Discovery



Chemistry Nobel Laureates



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MPS-Supported MacArthur Fellows

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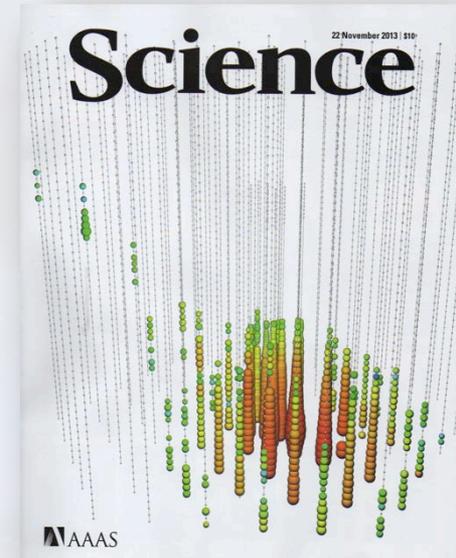


Rey

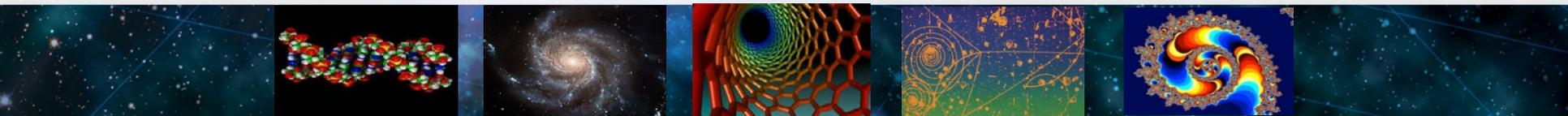


Fennie

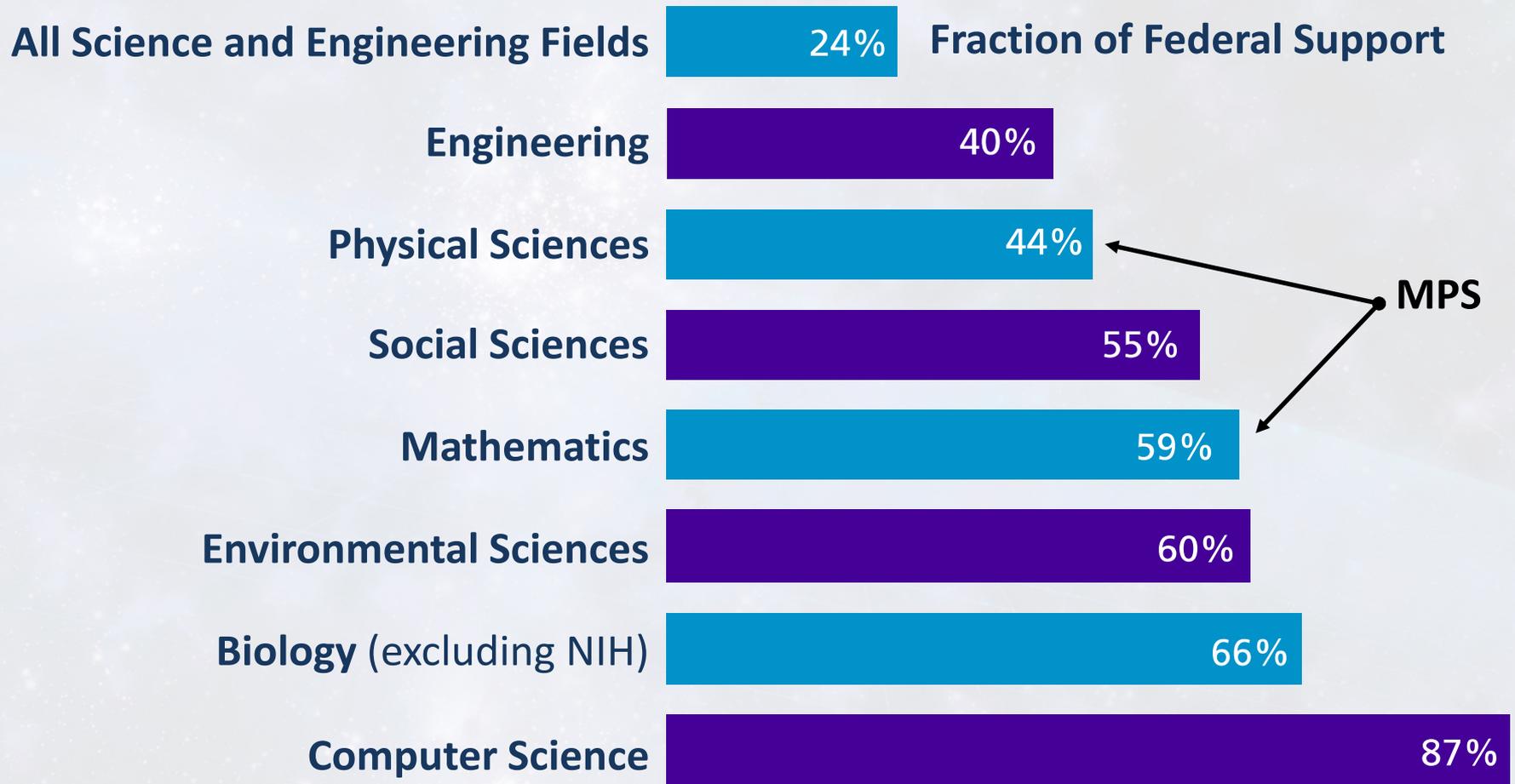
High Energy Neutrinos Ice Cube



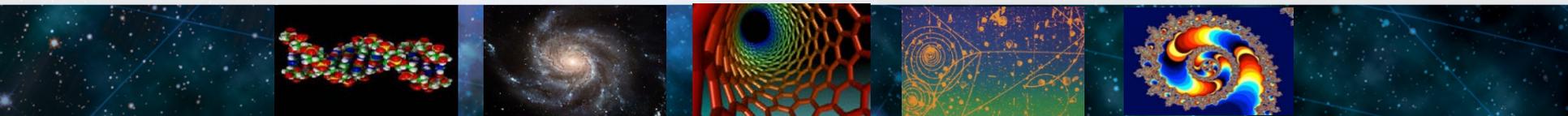
Physics World
"Discovery of the Year"
2013



NSF Supports Academic Basic Research

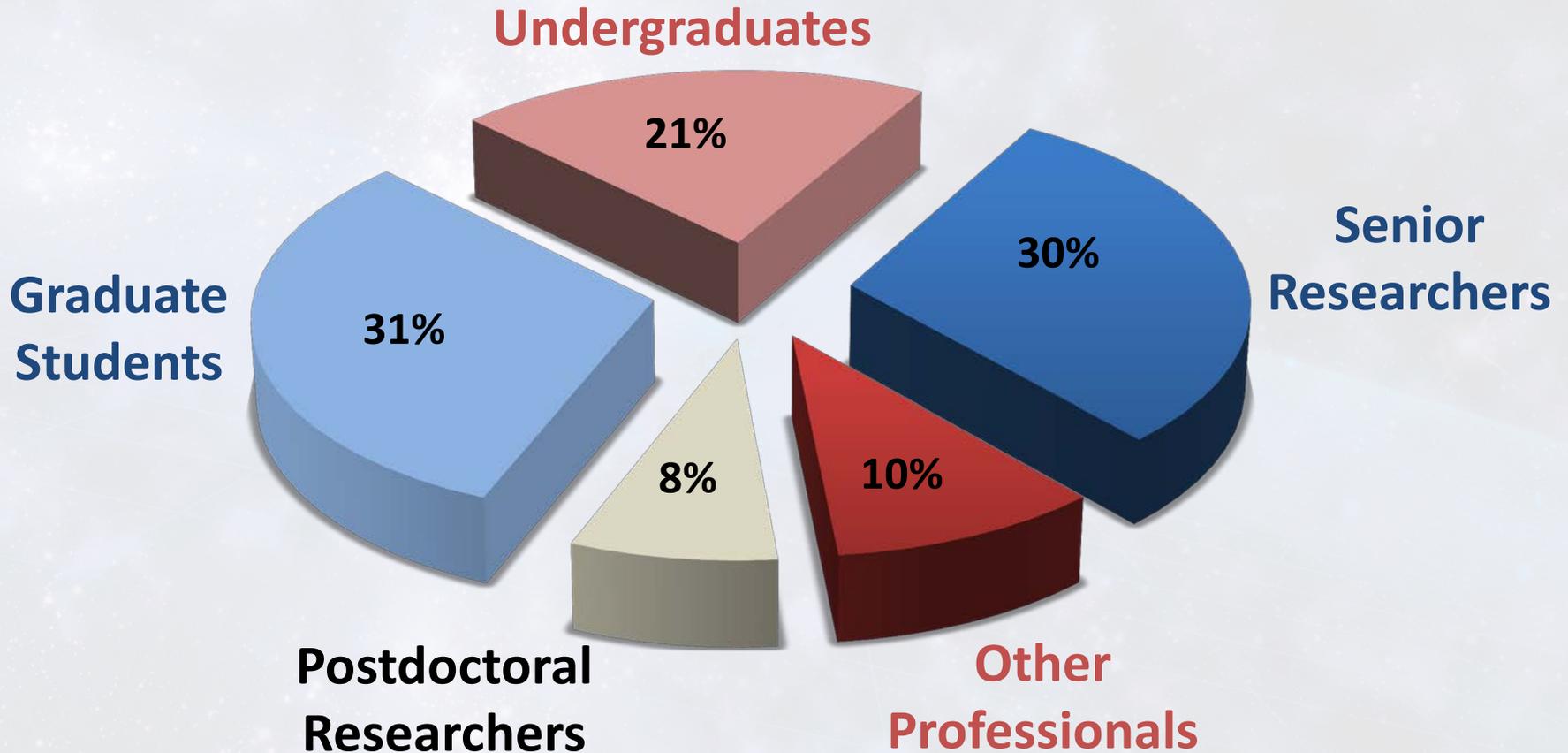


Source: NSF/ Center for National Science and Engineering Statistics, FY 2011

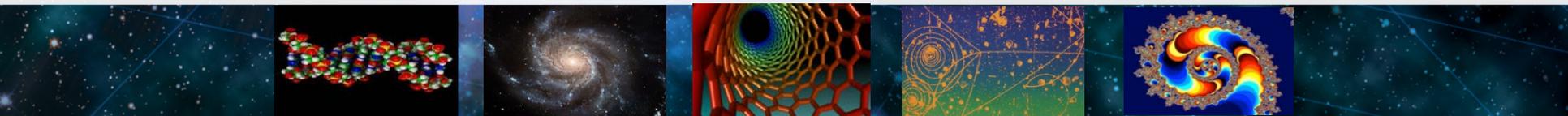


People Do Science

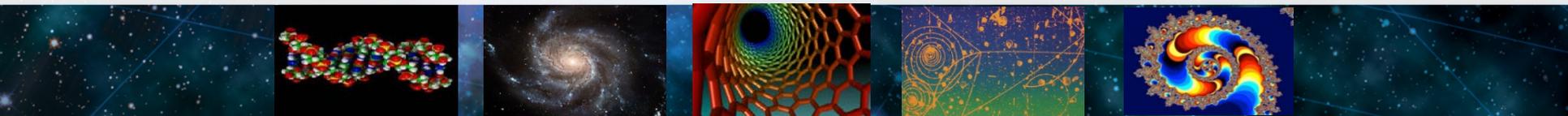
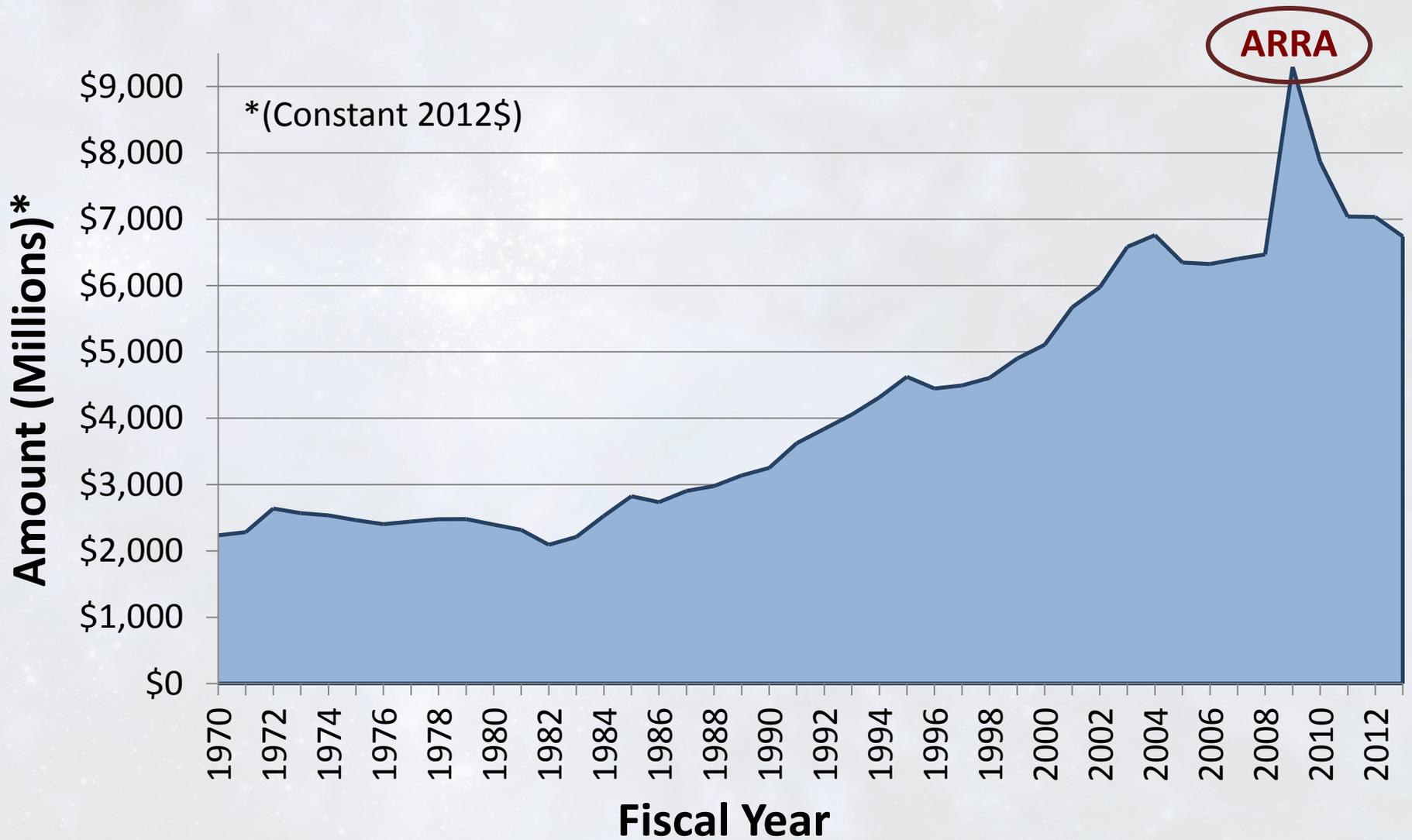
29,000 People in MPS Activities*



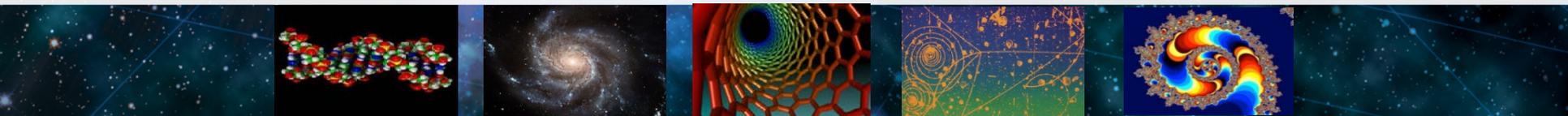
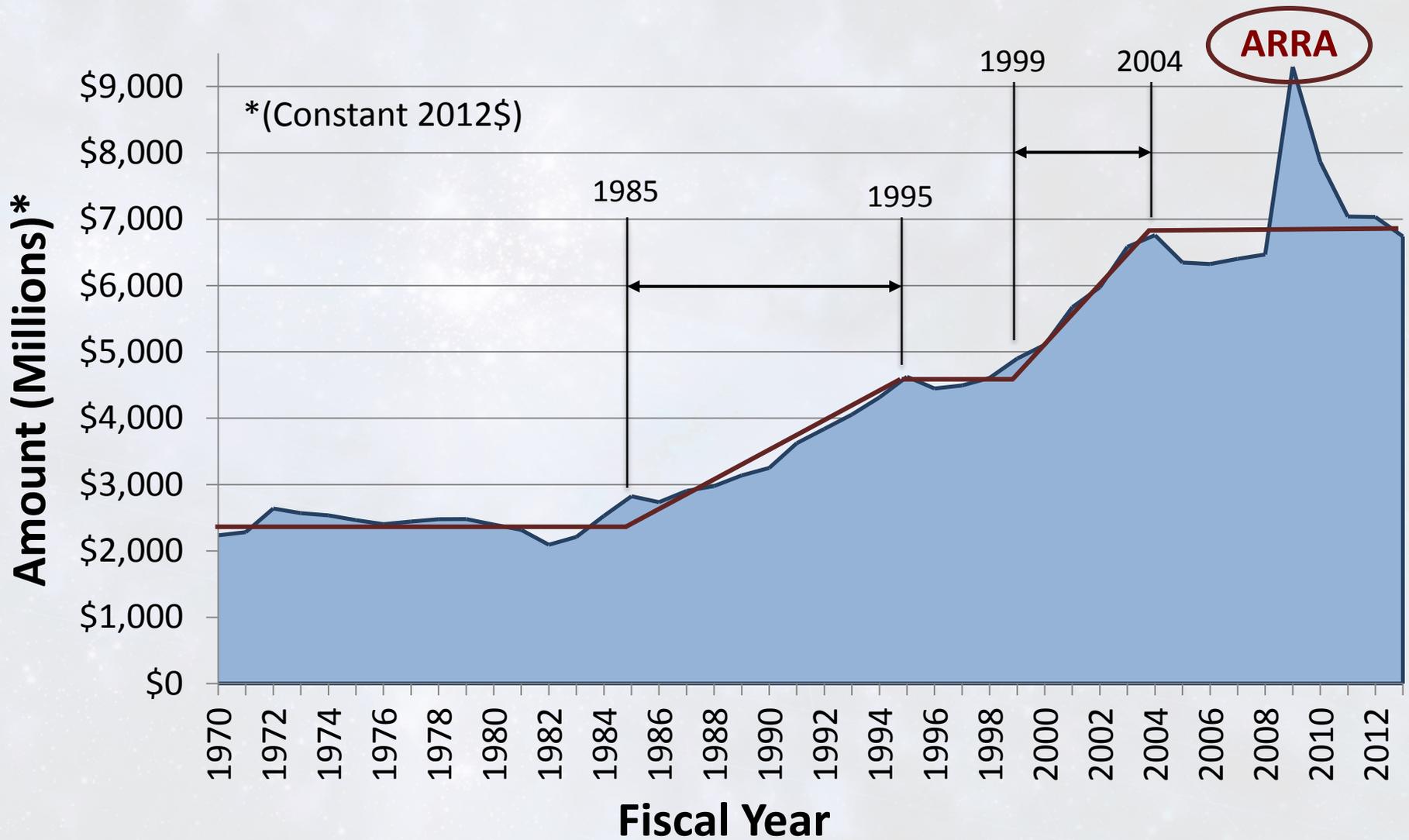
*Estimated for FY 2015



NSF Funding History



NSF Funding History



UNITED STATES
National Science Foundation

FY 2015

BUDGET REQUEST TO CONGRESS

UNITED STATES
National Science Foundation



FY 2015

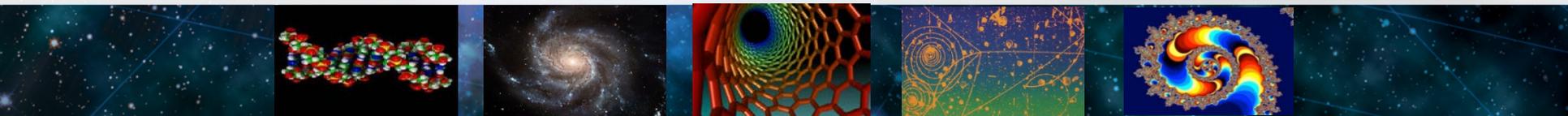
BUDGET REQUEST TO CONGRESS

MISSION: To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

—From the National Science Foundation (NSF) Act of 1950

VISION: A Nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education.

—From Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018



UNITED STATES
National Science Foundation

FY 2015 Budget Request

NSF Budget by Appropriation

(\$ in millions)

UNITED STATES
National Science Foundation

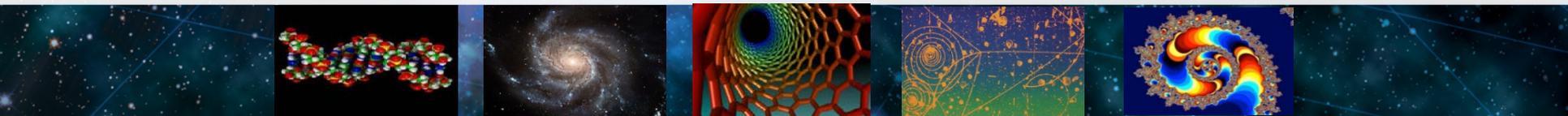
	FY 2015 Request	Change from FY 2014	
Research & Related Activities	\$ 5,807	\$ -1	-0.03%
Education & Human Resources	890	43	5.1%
Major Research Equipment & Facilities Construction	201	1	0.4%
Agency Operations & Award Management	338	40	13.5%
National Science Board	4	*	1.6%
Office of Inspector General	14	*	1.6%
Total NSF	\$ 7,255	\$ 83	1.2%

BUDGET REQUEST TO CONGRESS

VISION: A Nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education.

—From Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018

(* Denotes < \$ 0.5 M)



UNITED STATES
National Science Foundation

FY 2015 Budget Request

NSF Budget by Appropriation

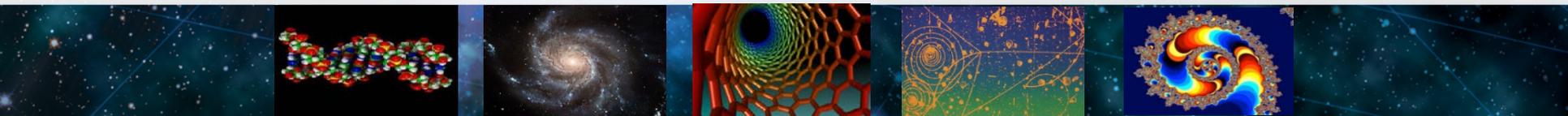
(\$ in millions)

UNITED STATES
National Science Foundation

	FY 2015 Request	Change from FY 2014	
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Total NSF	\$ 7,255	\$ 83	1.2%
Opportunity, Growth, and Security Initiative	\$ 552		

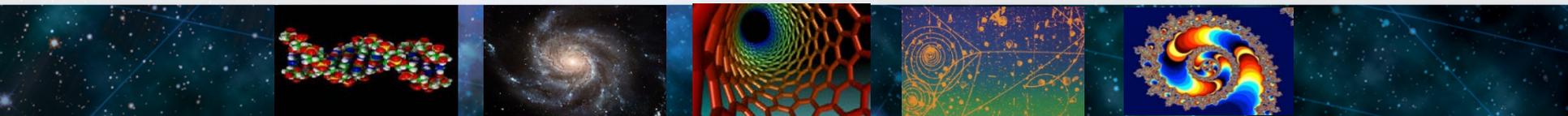
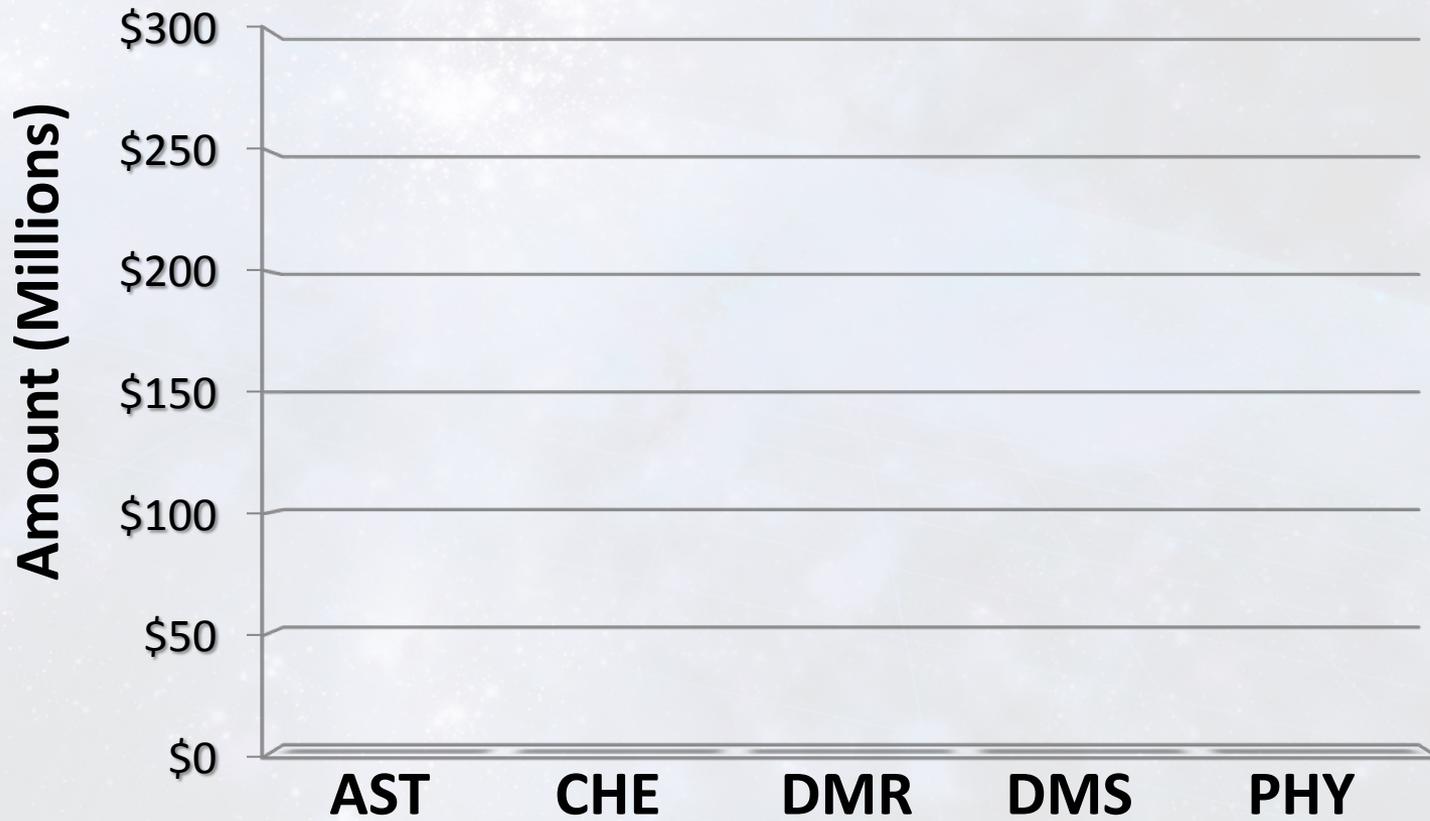
From Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018

(* Denotes < \$ 0.5 M)



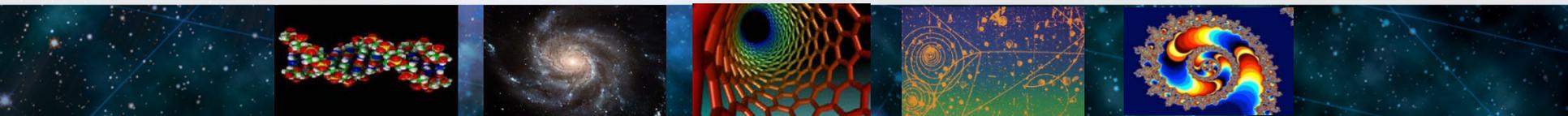
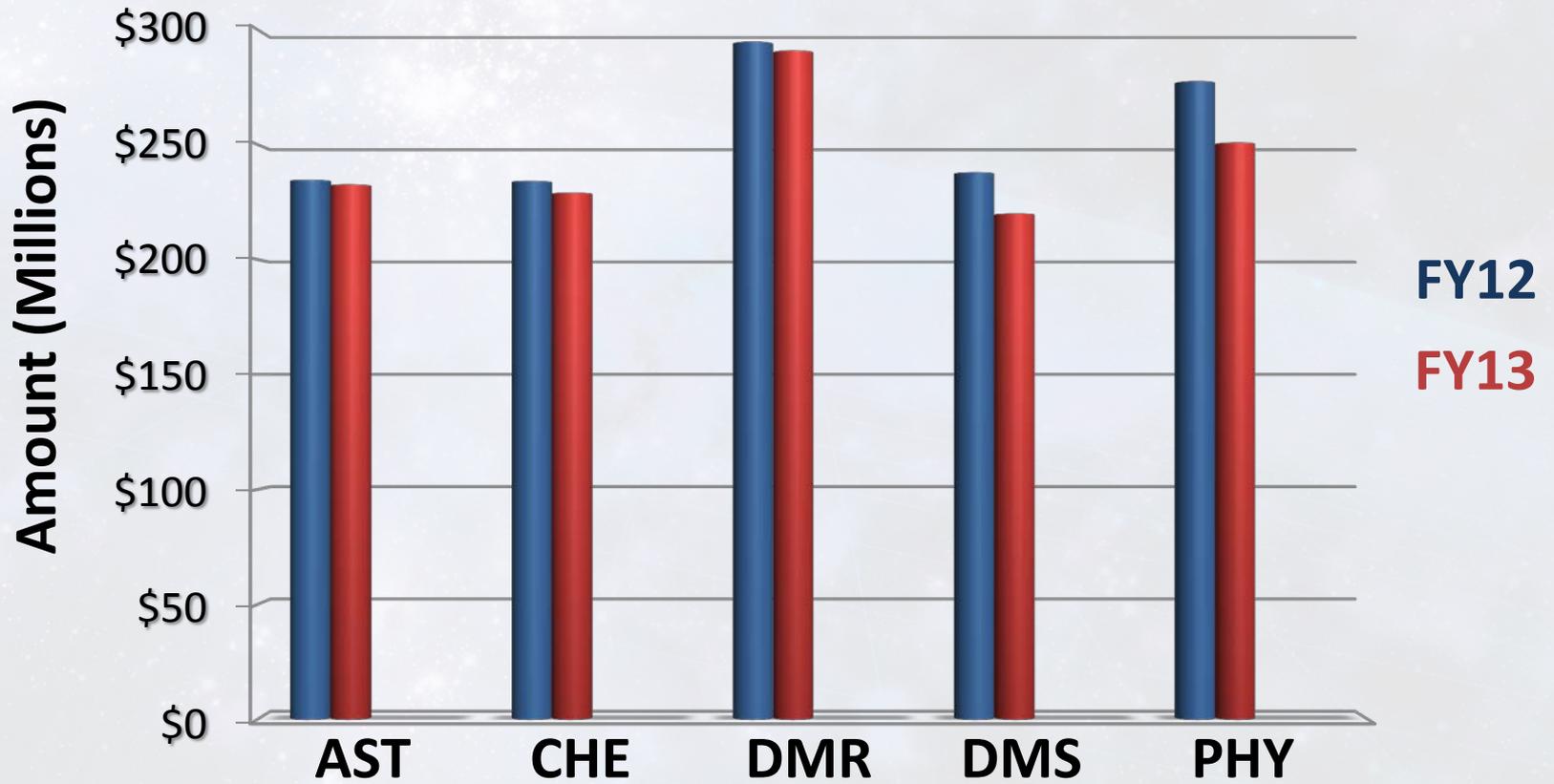
MPS Budgets

FY 2012 - 4.5% → FY 2013
\$ 1309 M → \$ 1250 M



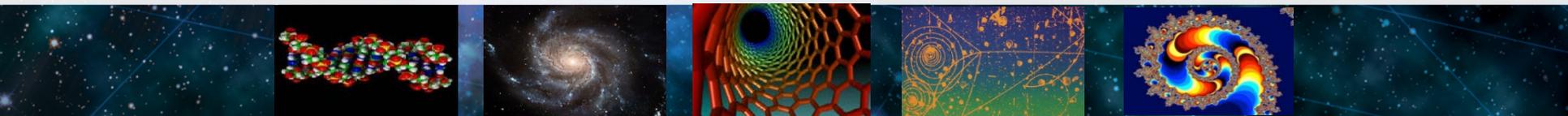
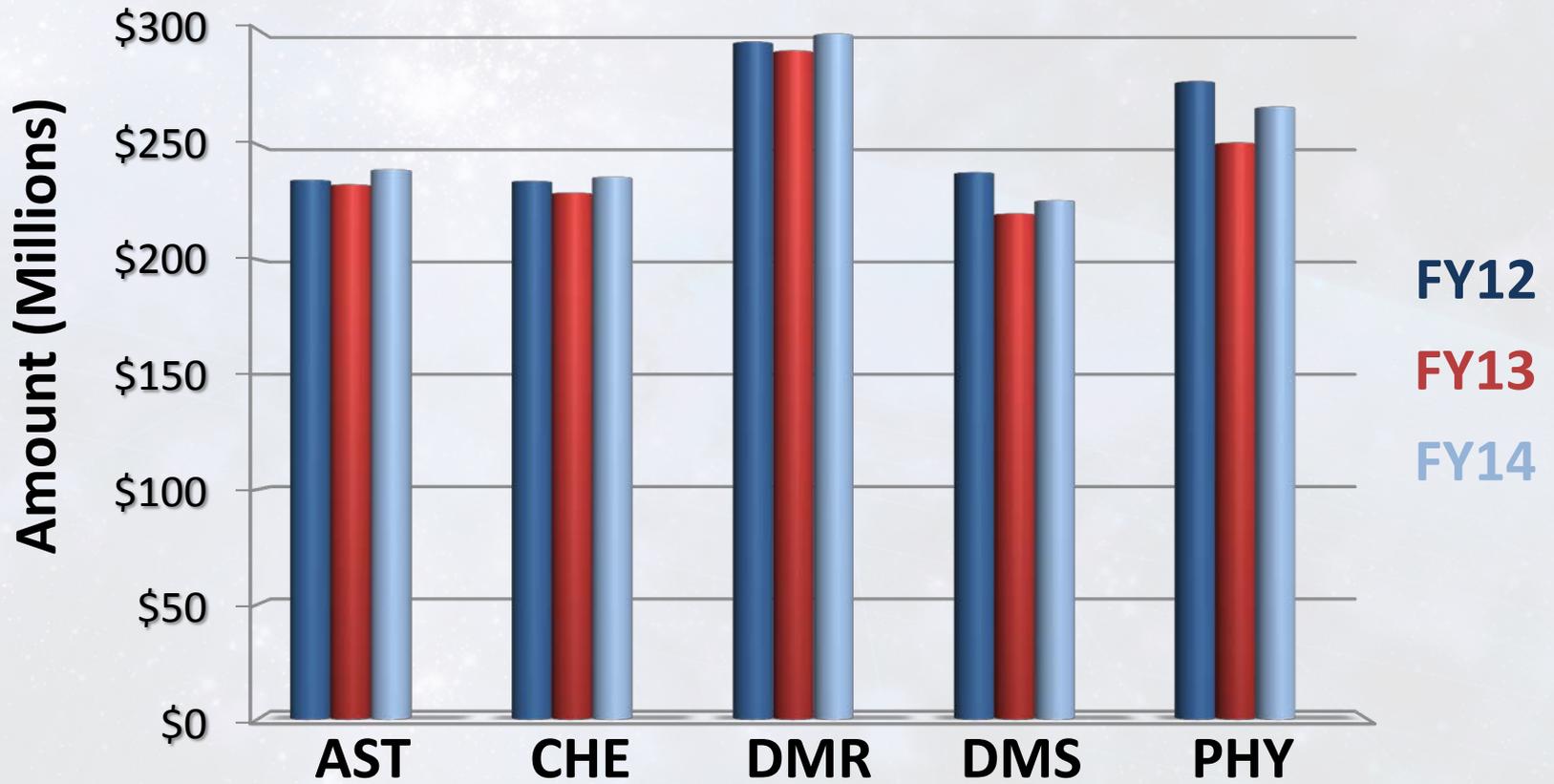
MPS Budgets

FY 2012 -4.5% FY 2013
\$ 1309 M \rightarrow \$ 1250 M



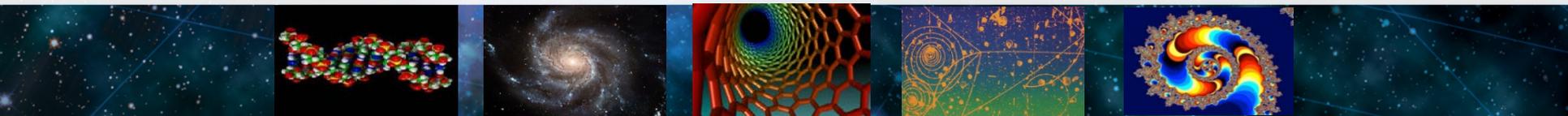
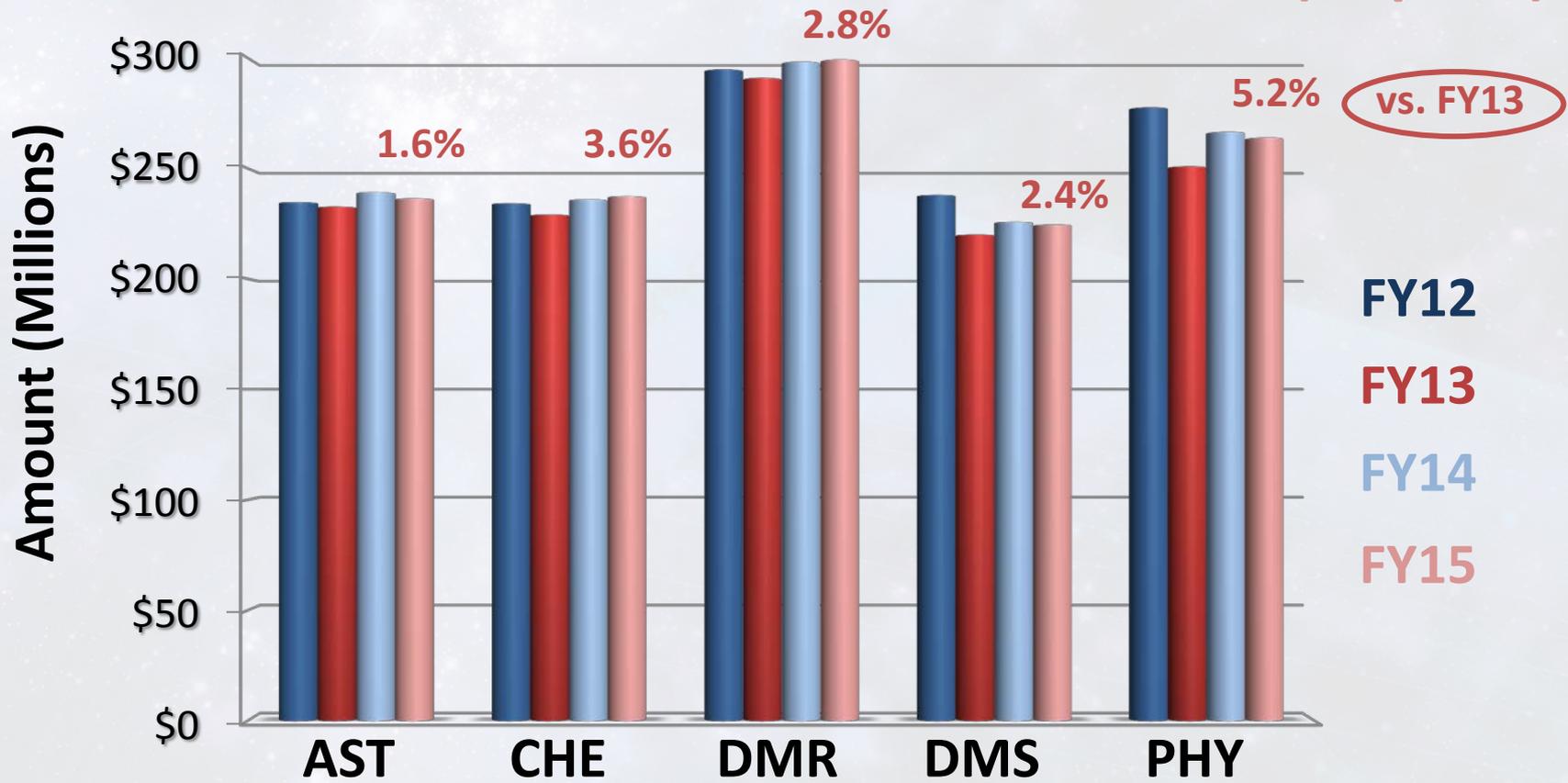
MPS Budgets

FY 2012 \$ 1309 M $\xrightarrow{-4.5\%}$ FY 2013 \$ 1250 M $\xrightarrow{+4.0\%}$ FY 2014 \$ 1300 M (estimate)

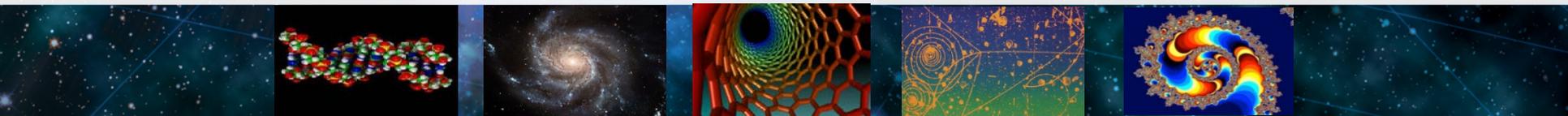
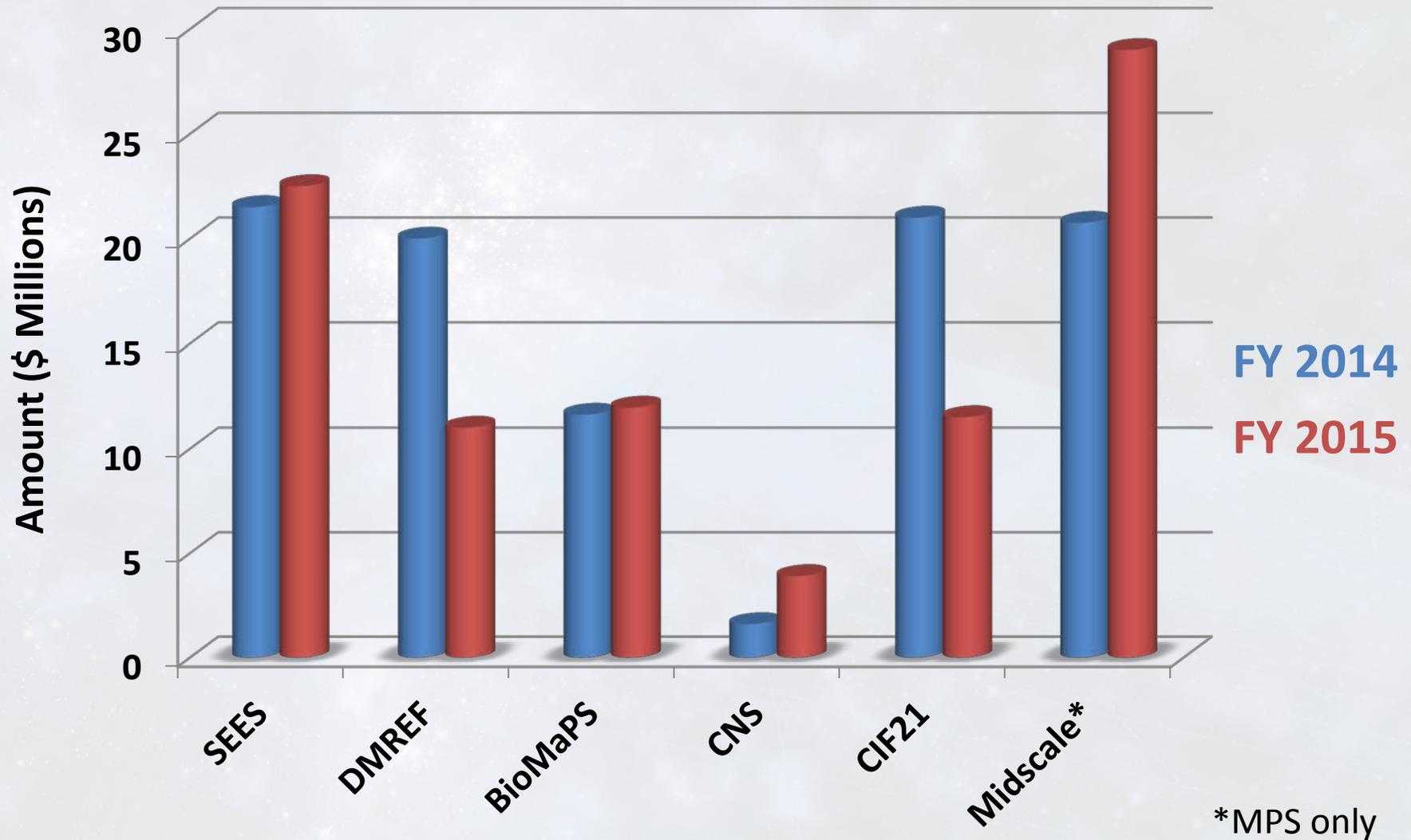


MPS Budgets

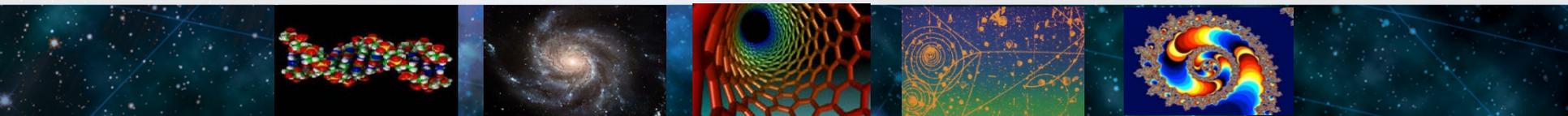
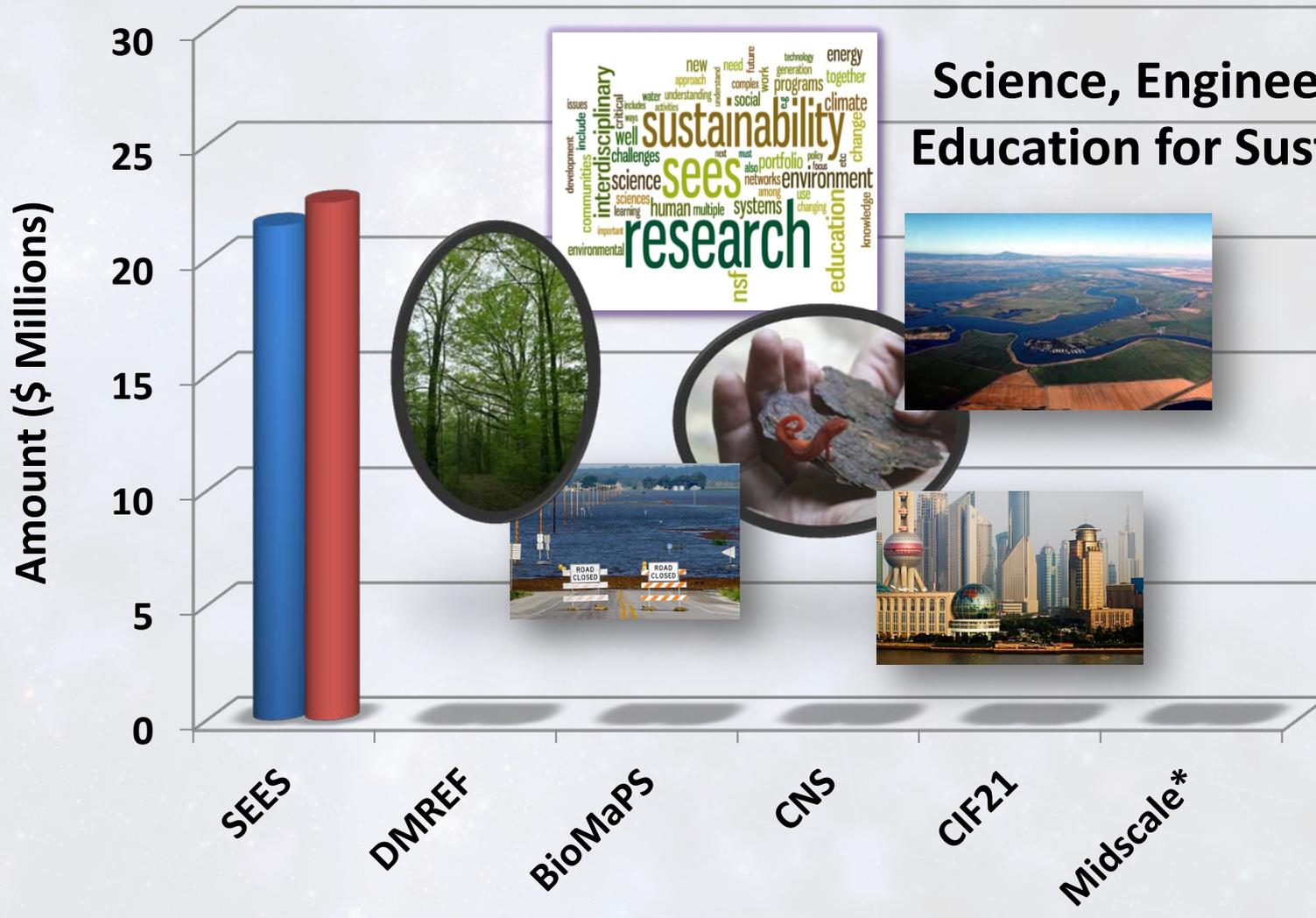
FY 2012 -4.5% **FY 2013** $+4.0\%$ **FY 2014** -0.3% **FY 2015**
\$ 1309 M \rightarrow **\$ 1250 M** \rightarrow **\$ 1300 M** \rightarrow **\$ 1296 M**
 (estimate) (request)



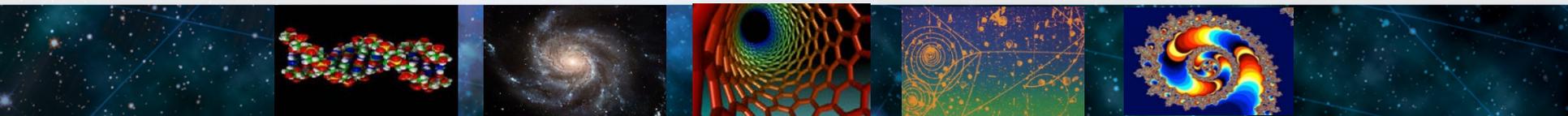
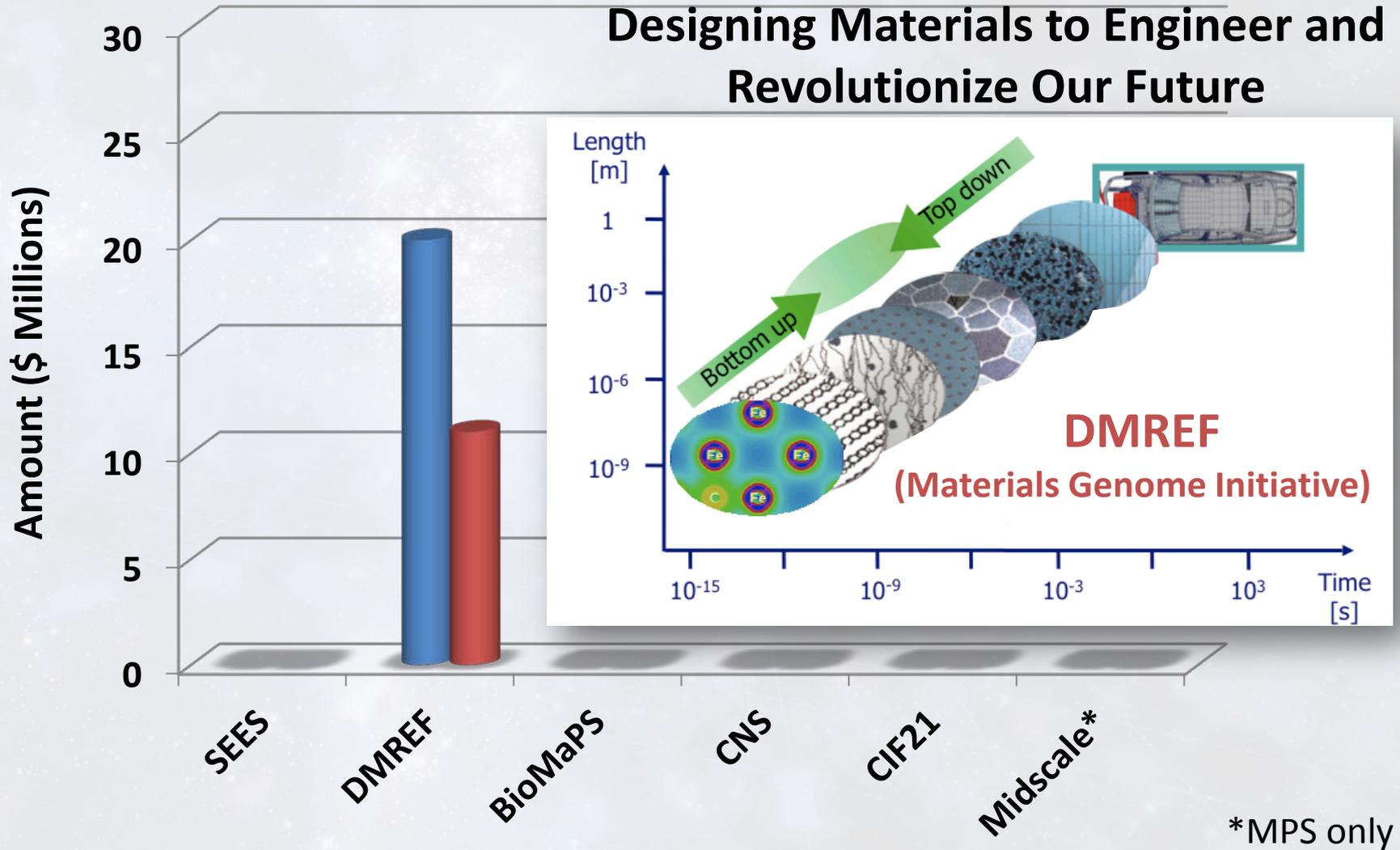
Selected MPS Major Investments



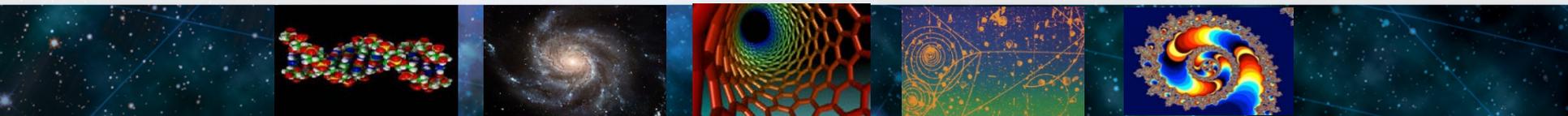
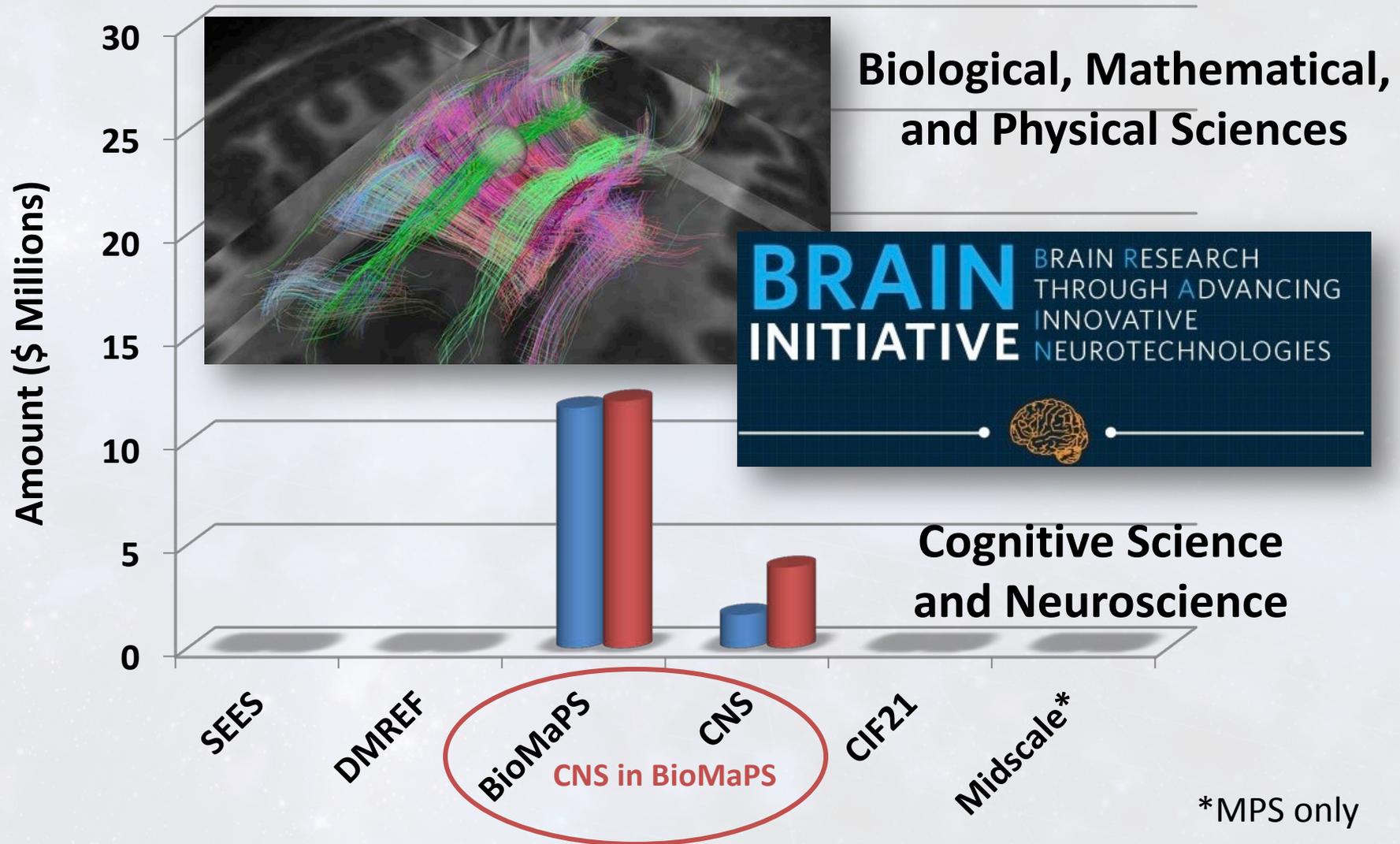
Selected MPS Major Investments



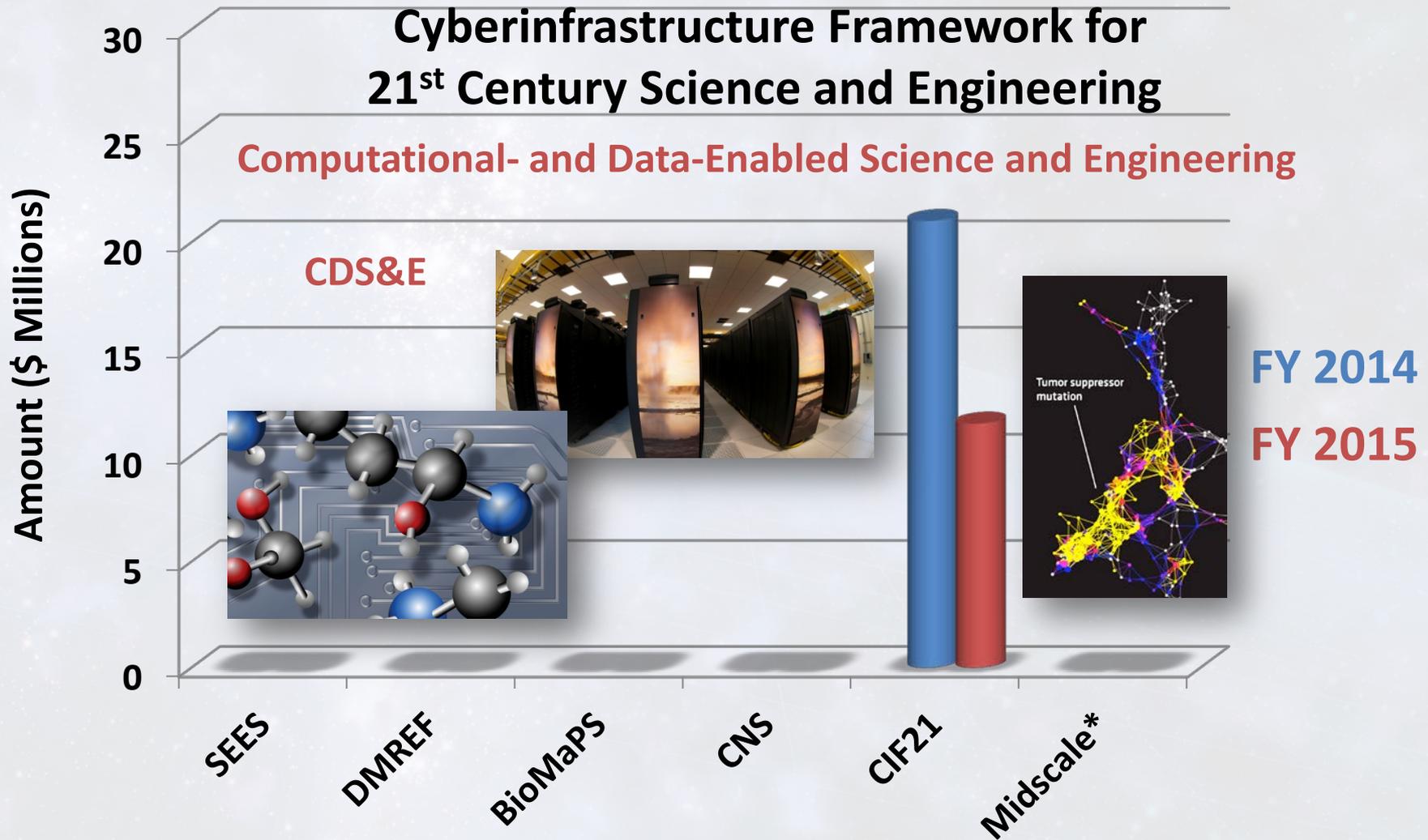
Selected MPS Major Investments



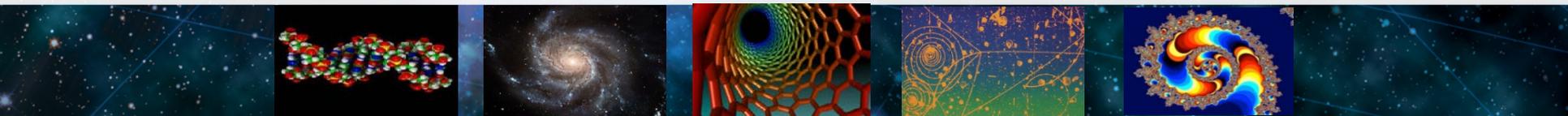
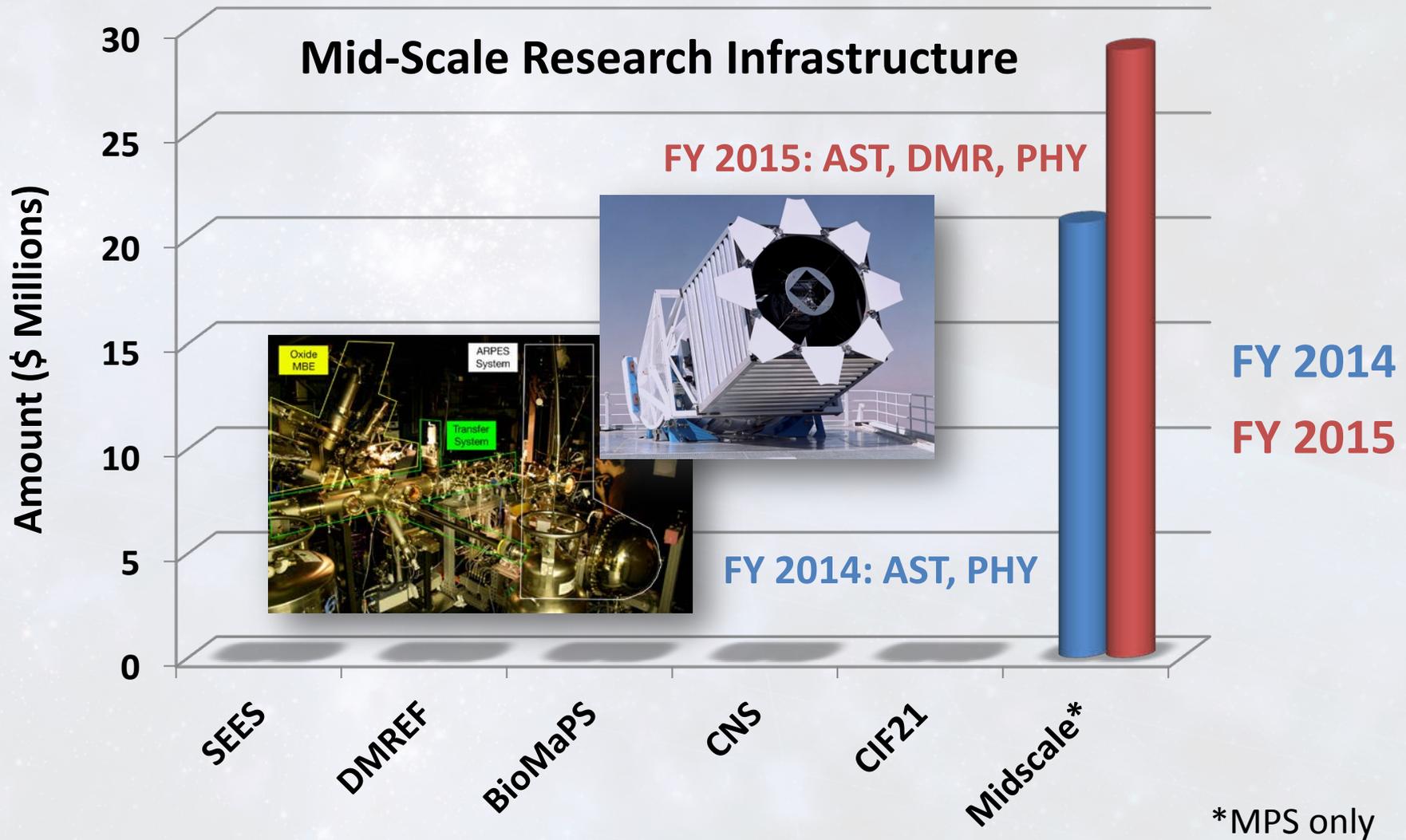
Selected MPS Major Investments



Selected MPS Major Investments



Selected MPS Major Investments



MPS Participation in NSF-Wide Initiatives



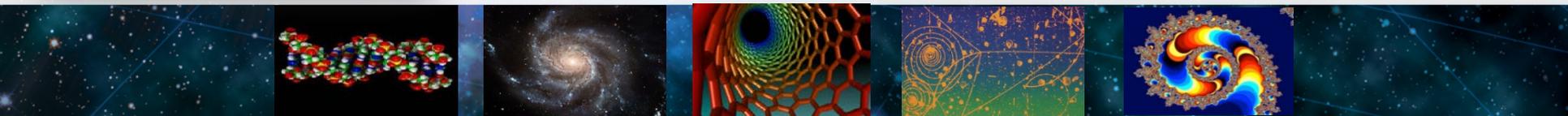
Cognitive Science and Neuroscience
Cyber-Enabled Materials, Manufacturing, and Smart Systems
Cyberinfrastructure Framework for the 21st Century
Science, Engineering, and Education for Sustainability
Secure and Trustworthy Cyberspace

CNS, CEMMSS, CIF21, SEES, SaTC

\$75.6M



5.8% of MPS Budget



Building the STEM Pipeline Through MPS Research

CAREER Young Teacher-Scholars

	FY 2014 Estimate	FY2015 Request
MPS	\$ 65M	\$ 66M
NSF	\$ 210M	\$ 213M

31% of CAREER funding from MPS

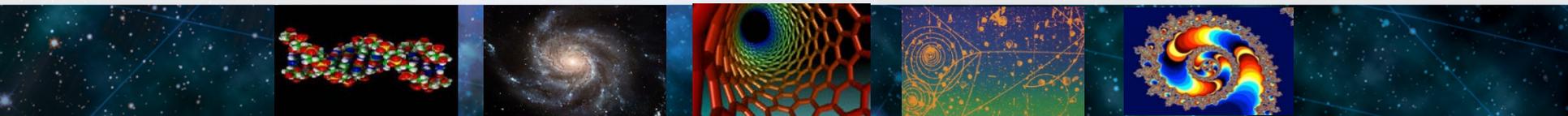
Research Experiences for Undergraduates (REU) Undergraduate Research Programs



	FY 2014 Estimate	FY2015 Request
MPS	\$ 22.4M	\$ 21.2M
NSF	\$ 75.3M	\$ 75.1M



28% of REU funding from MPS



MPS-Supported Multi-user Facilities



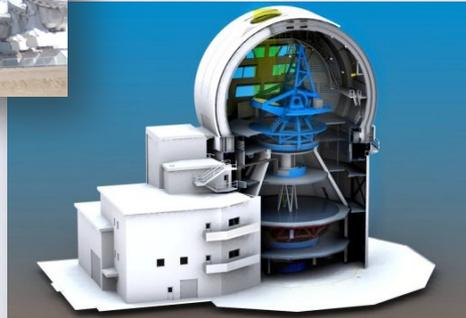
ALMA

Gemini South



Blanco

DKIST (ATST)

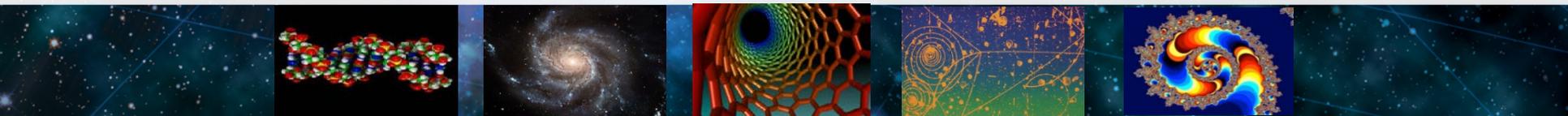
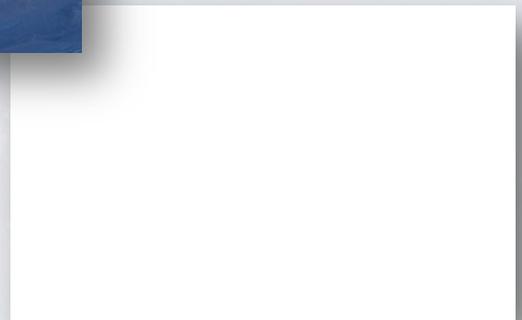


IceCube

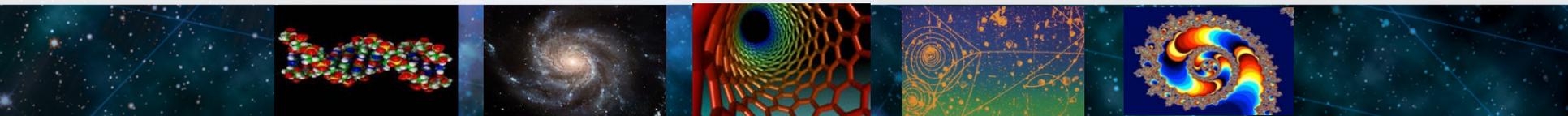
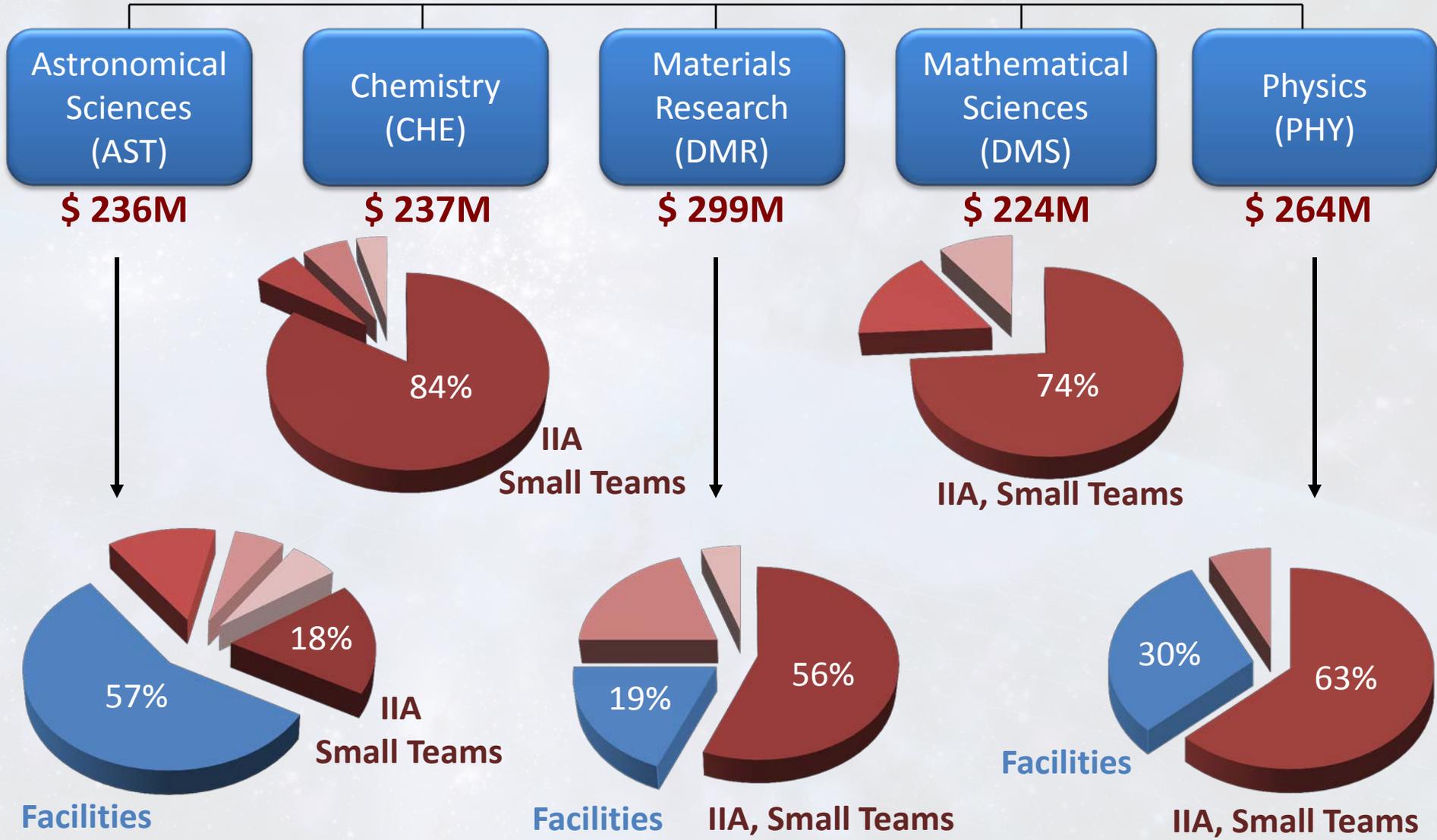


NHMFL

LIGO

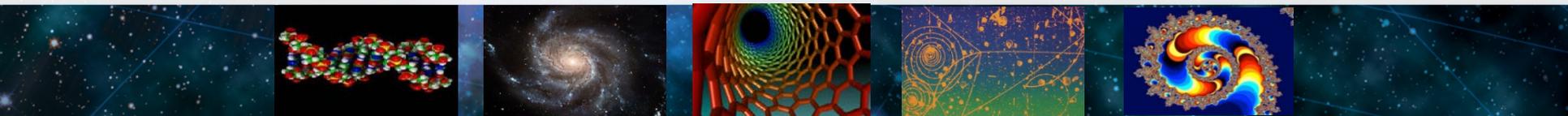


FY 2015 Request: \$ 1296M



Two Different Budget Lines for Facilities

NSF FY 2015 Request (\$ in millions)	FY 2015 Request
Research & Related Activities	\$ 5,807
Education & Human Resources	890
Major Research Equipment & Facilities Construction	201
Agency Operations & Award Management	338
National Science Board	4
Office of Inspector General	14
Total NSF	\$ 7,255





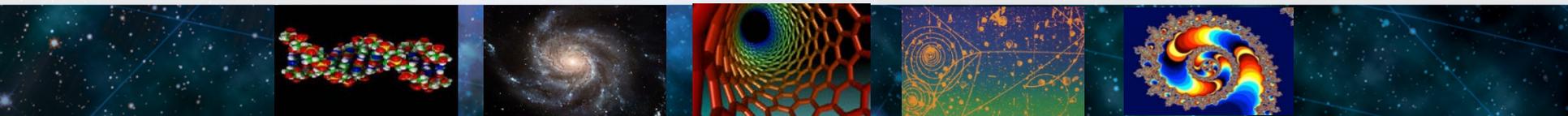
FY 2015 MPS Budget Request to Congress

MPS Funding

(Dollars in Millions)

	FY 2013 Actual	FY 2014 Estimate	FY 2015 Request	Change Over FY 2014 Estimate	
				Amount	Percent
Astronomical Sciences (AST)	\$232.17	\$239.06	\$236.24	-\$2.82	-1.2%
Chemistry (CHE)	229.39	235.79	237.23	1.44	0.6%
Materials Research (DMR)	291.09	298.01	298.99	0.98	0.3%
Mathematical Sciences (DMS)	219.02	225.64	224.40	-1.24	-0.5%
Physics (PHY)	250.45	266.30	263.70	-2.60	-1.0%
Office of Multidisciplinary Activities (OMA)	27.22	35.00	35.00	-	-
Total, MPS	\$1,249.34	\$1,299.80	\$1,295.56	-\$4.24	-0.3%

Totals may not add due to rounding.





Physics Division Request for FY 2015 is \$263.7 M

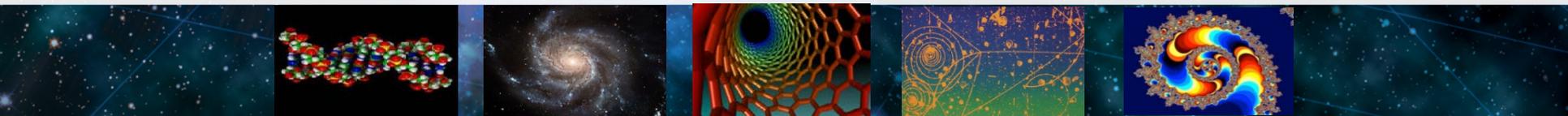
Approximately 2% for Operations -
Panels, IPA Appointments, IPA Travel, M&S

Approximately 32% for M&O for Facilities –
ATLAS and CMS, IceCube, LIGO, NSCL

Approximately 8% for Physics Frontiers Centers – Competition Underway

Approximately 3% for Education and Broadening Participation –
REU Sites, LIGO Education Center, QuarkNet

Leaves 55% (\$145 M) to Cover Five Major Areas of Physics –
Experimental and Theoretical





PHY Perspective

Balance: Facilities \leftrightarrow Individual Investigator Awards
 \rightarrow Operations Costs \leftrightarrow Research Support

Balance: Atomic, Molecular, Optical and Plasma Physics \leftrightarrow Gravitational Physics \leftrightarrow
Nuclear Physics \leftrightarrow Particle Physics \leftrightarrow Physics of Living Systems

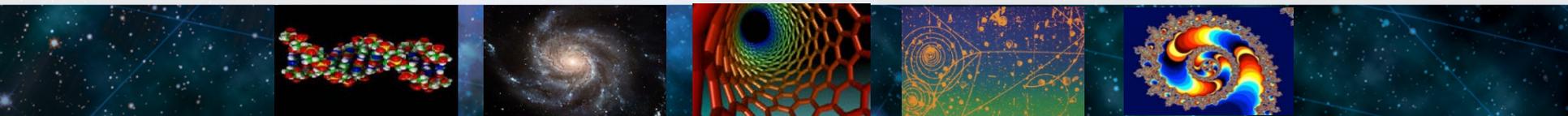
Responsive: NSF responds to proposals.

Primary source of ideas are the proposals that are submitted
Vetted by a vigorous merit review procedure

Community Input: Workshops

Advisory Committees (HEPAP, NSAC)

Looking Forward to Recommendations of P5





Connections

Core ↔ Priority Areas

Obvious and Not-So-Obvious

CDS&E: Impacts all research areas in the Division

BRAIN: Imaging and Detector Technology; Theoretical Approaches

Program ↔ Program

Cross-Cutting Programs: Accelerator Science, Computational Physics, Physics Frontiers Centers

