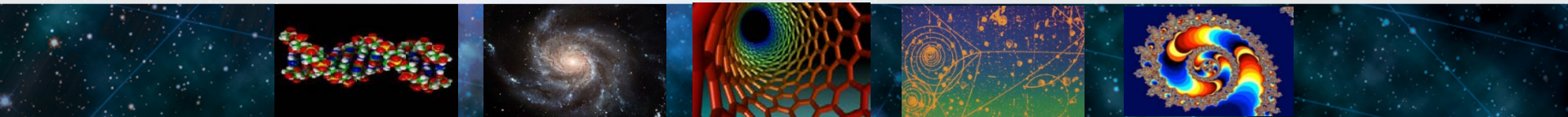
FY 2016 Budget Request

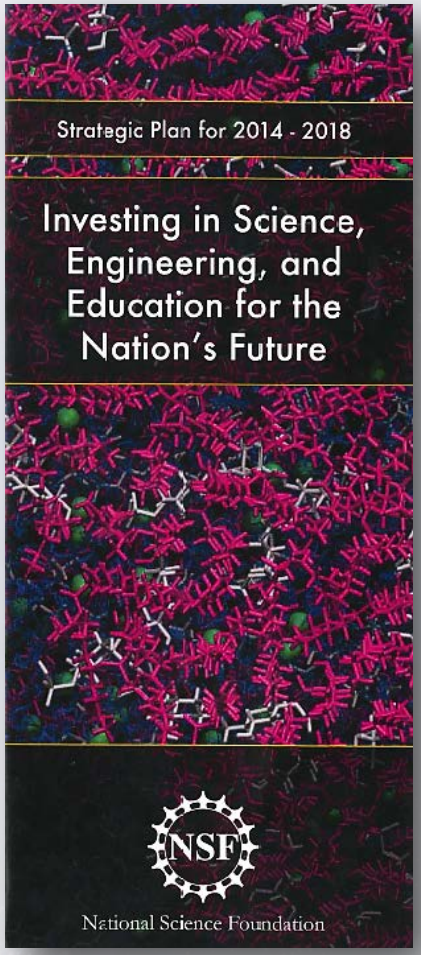
National Science Foundation
Directorate for Mathematical and Physical Sciences

F. Fleming Crim
Assistant Director for
Mathematical and Physical Sciences

February 2, 2015



NSF Core Mission: Fundamental Research

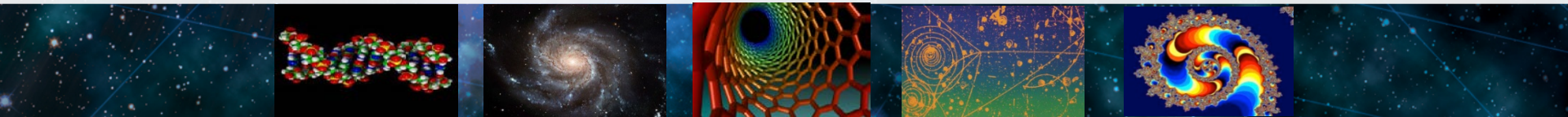


NSF Strategic Goals

Transform the Frontiers

Innovate for Society

Perform as a Model Organization



The Excitement of Advancing Discovery

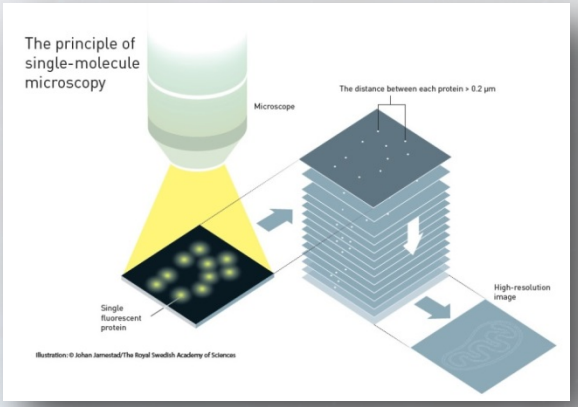
Chemistry Nobel Laureates

Betzig

Hell

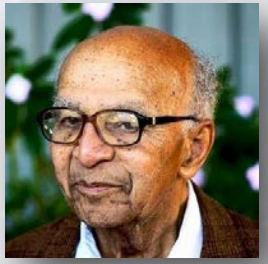
Moerner

Super-Resolved Fluorescence Microscopy



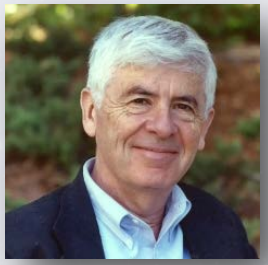
Most Recent Medal of Science Recipients

Blackwell (posth.)



(DMS)

Chorin



(DMS)

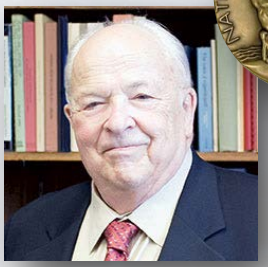
Klinman

(CHE)

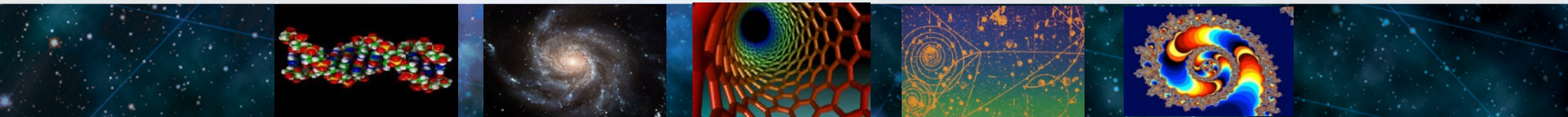
Meinwald

(CHE)

Richter

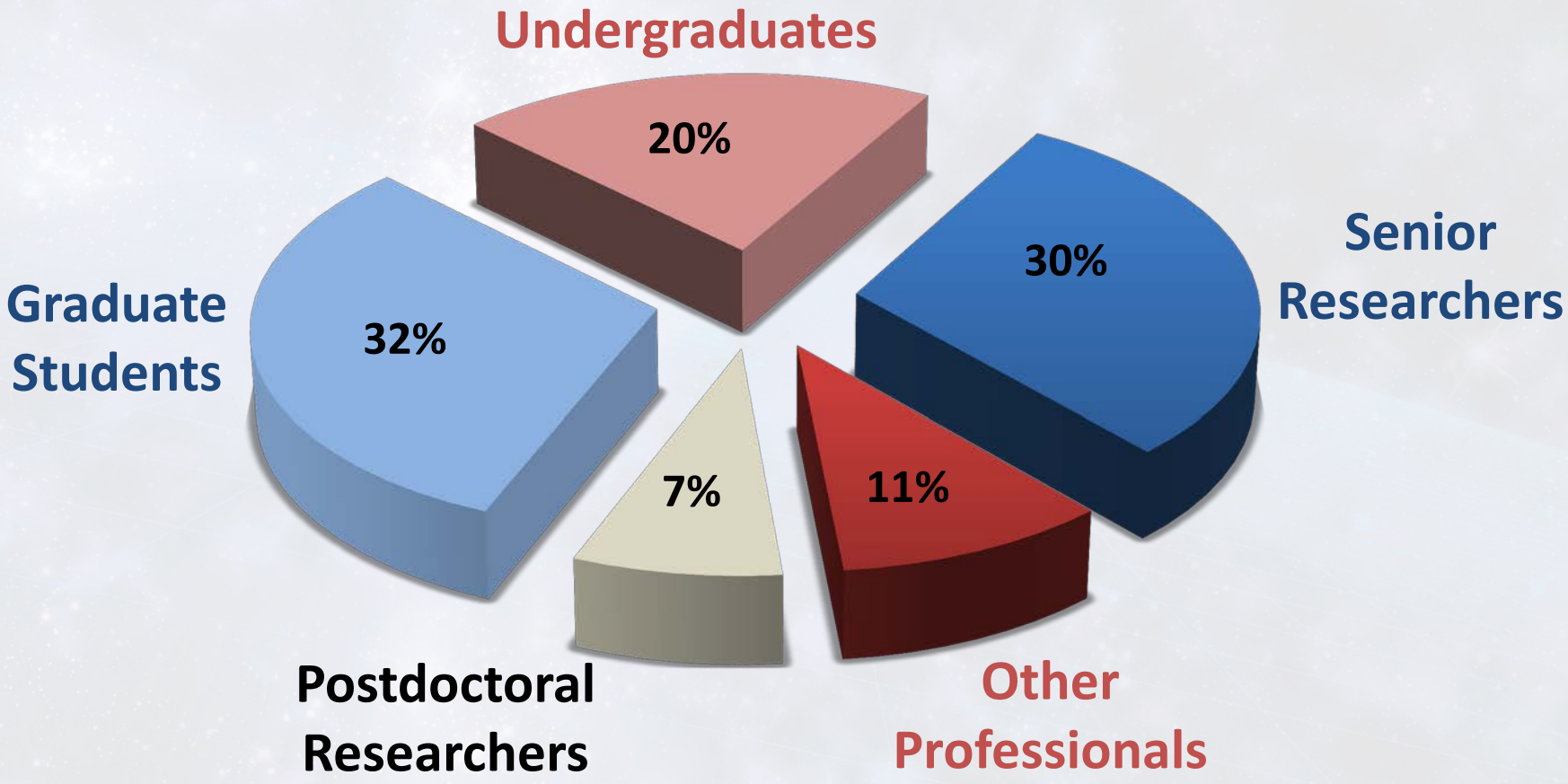


(PHY)



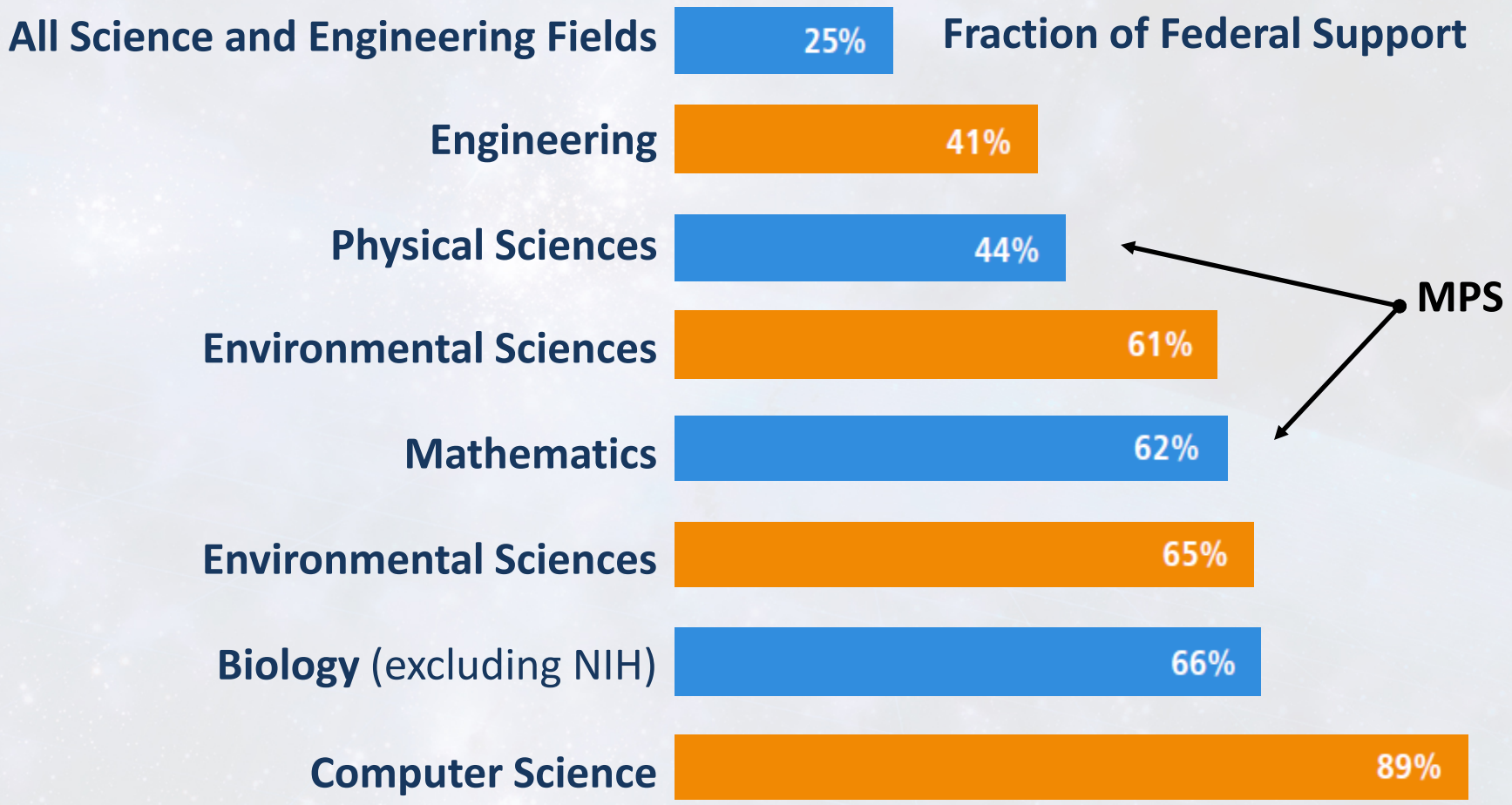
People Do Science

28,400 People in MPS Activities*



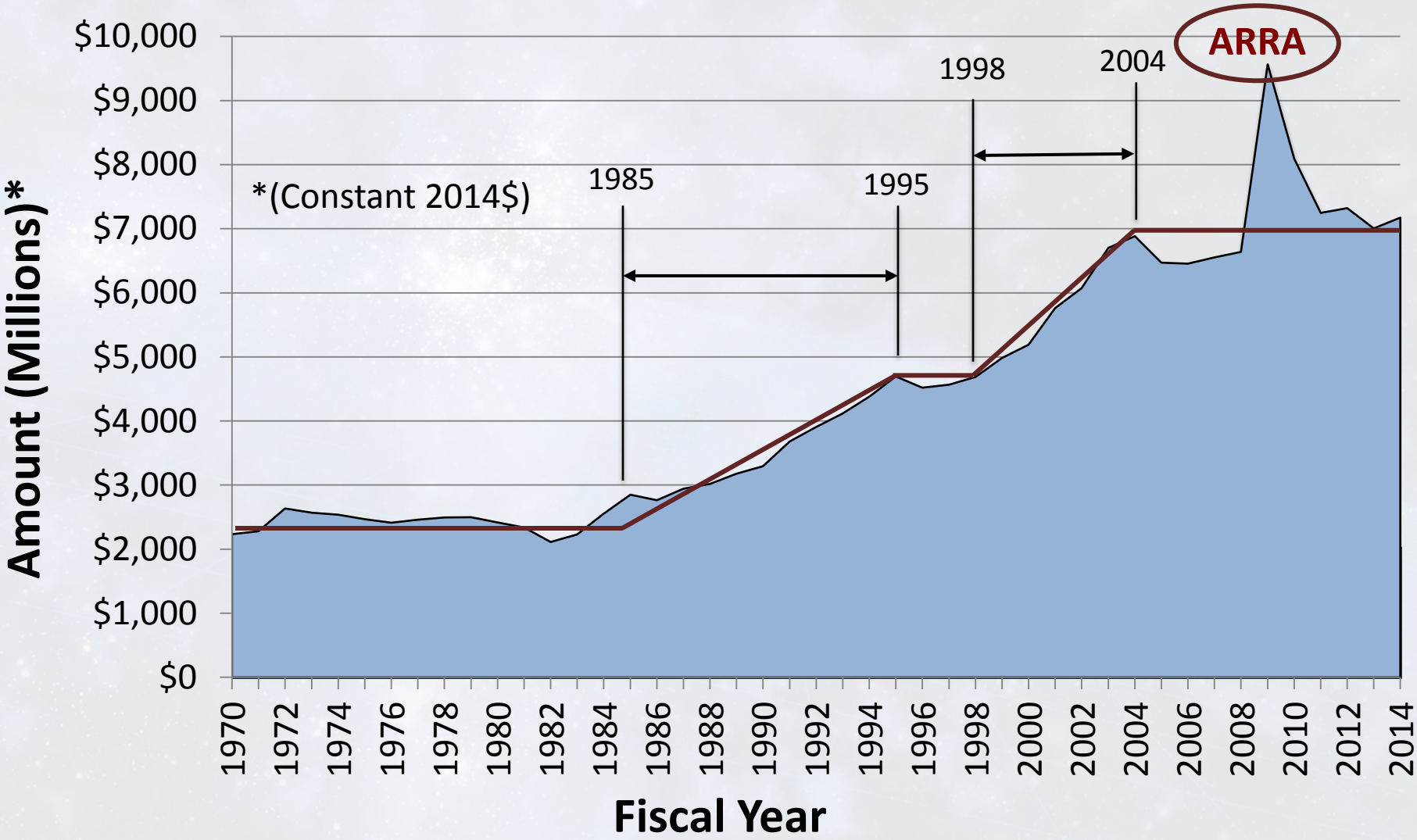
*Estimated for FY 2016

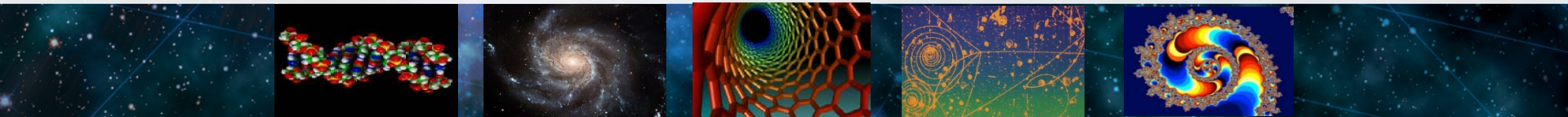
NSF Supports Academic Basic Research



Source: NSF/ Center for National Science and Engineering Statistics, FY 2013

NSF Funding History





UNITED STATES
National Science Foundation

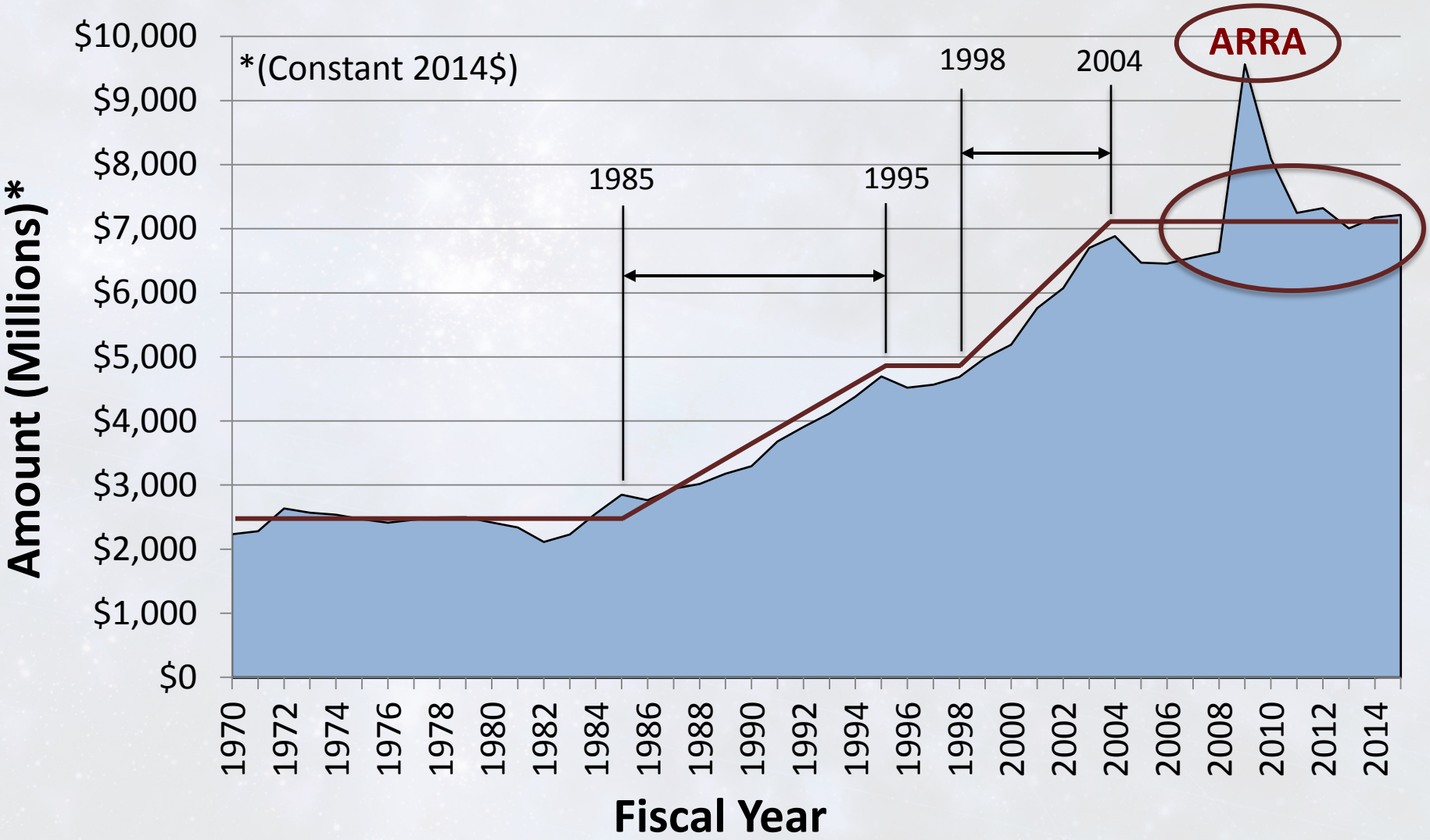
	FY 2014	FY 2015 (request)	
NSF	$ 7172 M	$ 7255 M	1.2%
R&RA	$ 5808 M	$ 5807 M	--

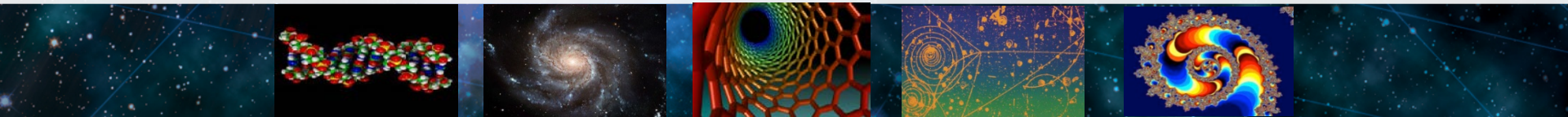
FY 2015
BUDGET REQUEST TO CONGRESS

UNITED STATES
National Science Foundation

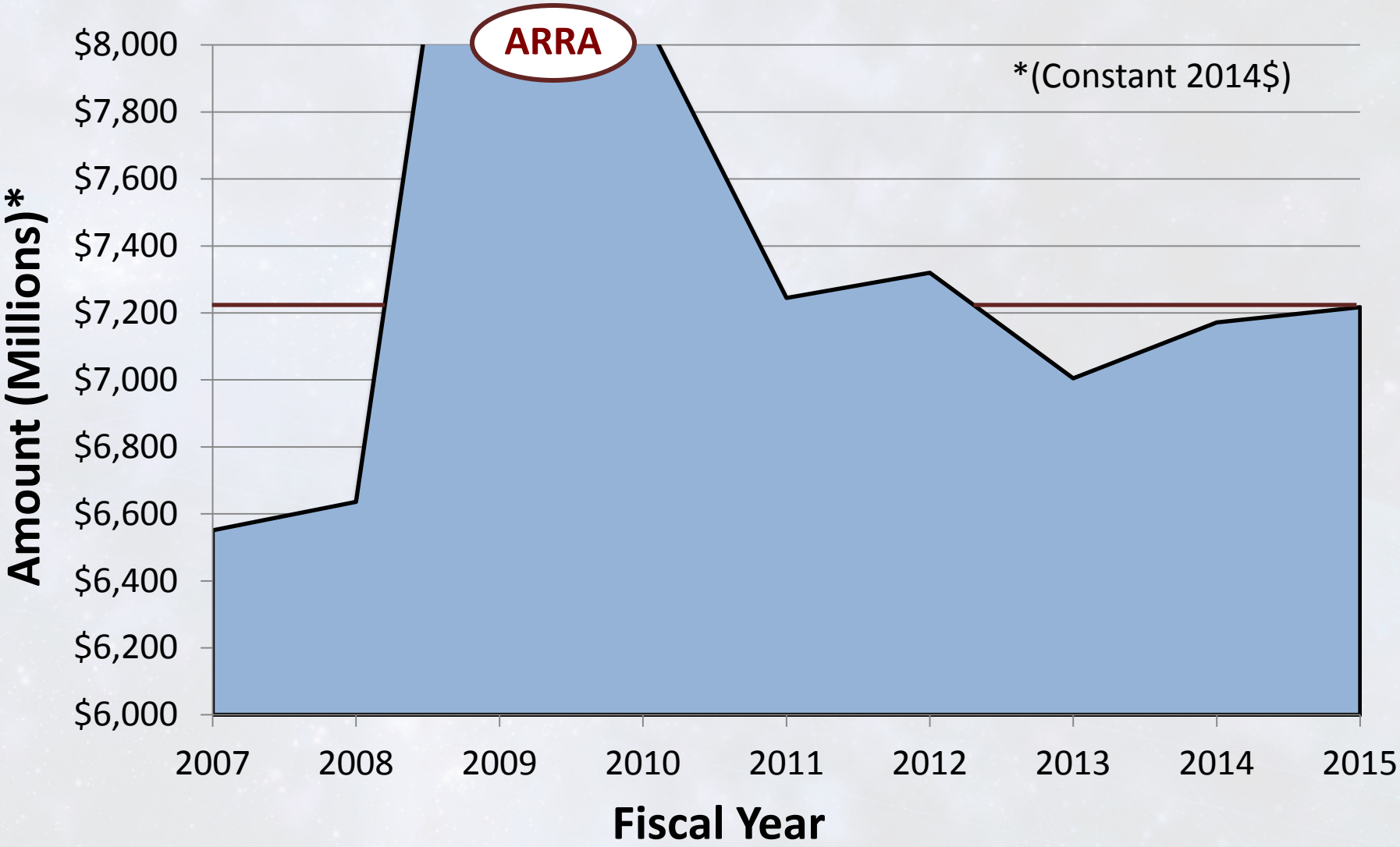
FY 2015 (CROmnibus)	
$ 7344 M	2.4%
$ 5934 M	2.2%

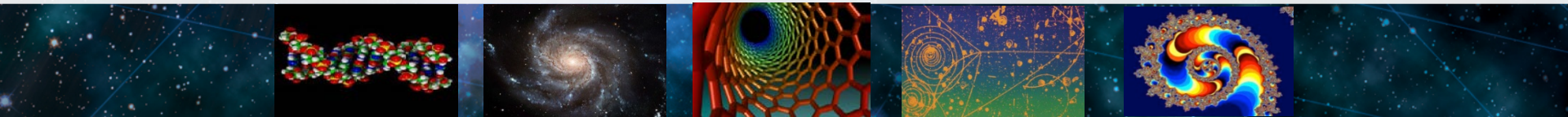
NSF Funding History





NSF Funding History





MPS Budgets

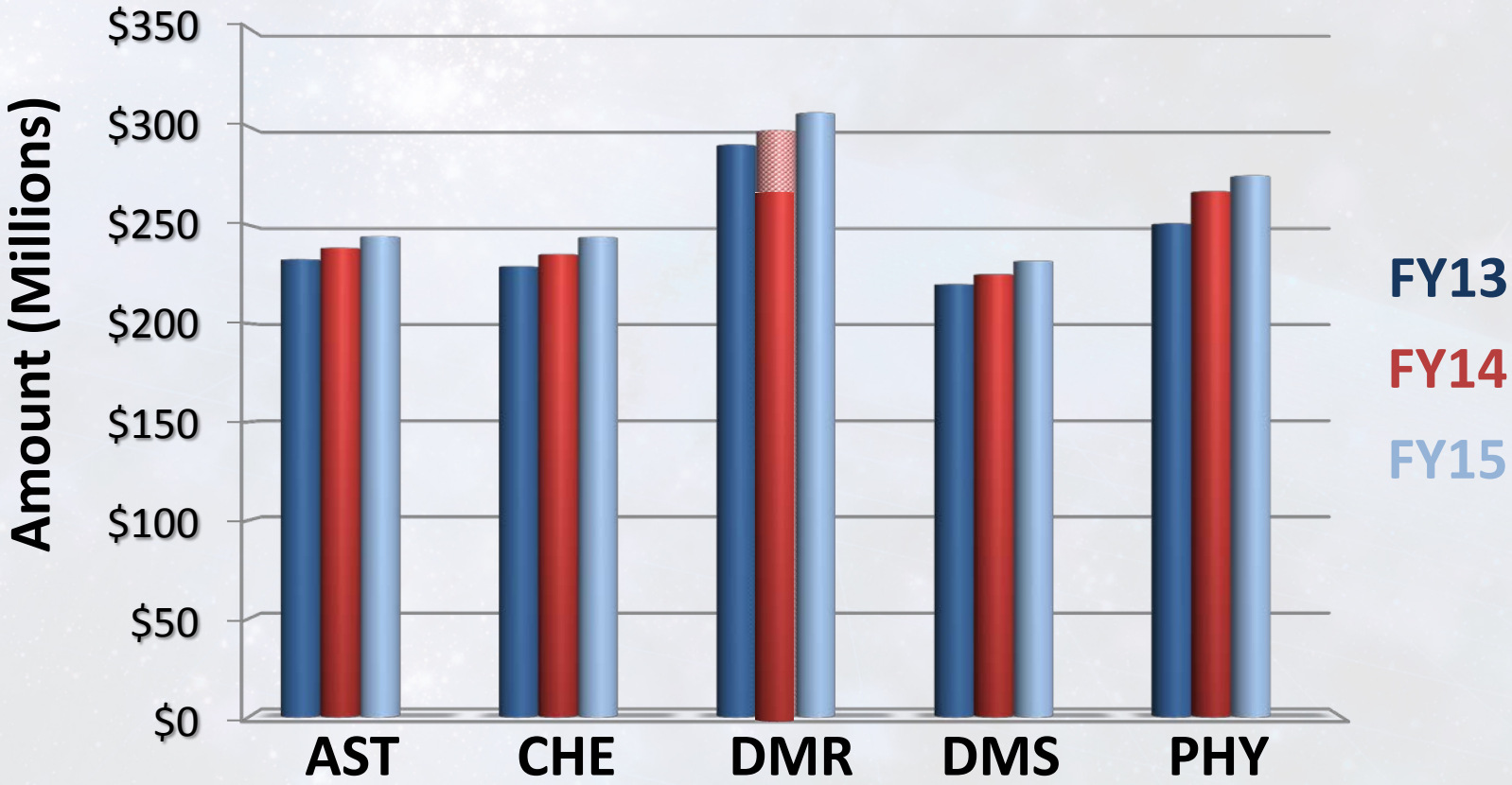
FY 2013
$ 1250 M

+ 4.0% →

FY 2014
$ 1300 M

+2.8% →

FY 2015
$ 1337 M
(estimate)

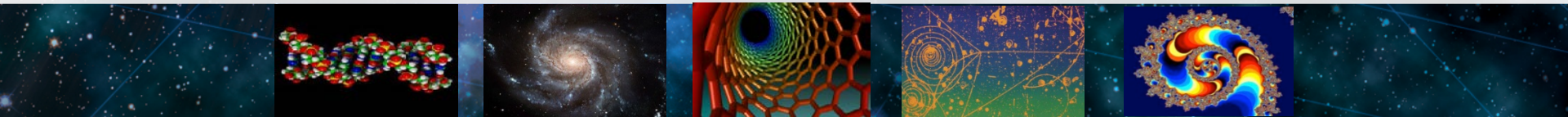


UNITED STATES
National Science Foundation

	FY 2015	FY 2016 (request)	
NSF	$ 7344M	$ 7724 M	5.2%
R&RA	$ 5934 M	$ 6186 M	4.2%

FY 2016

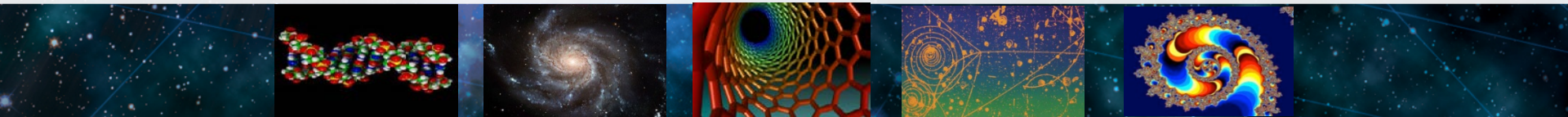
BUDGET REQUEST TO CONGRESS



FY 2016 Budget Request

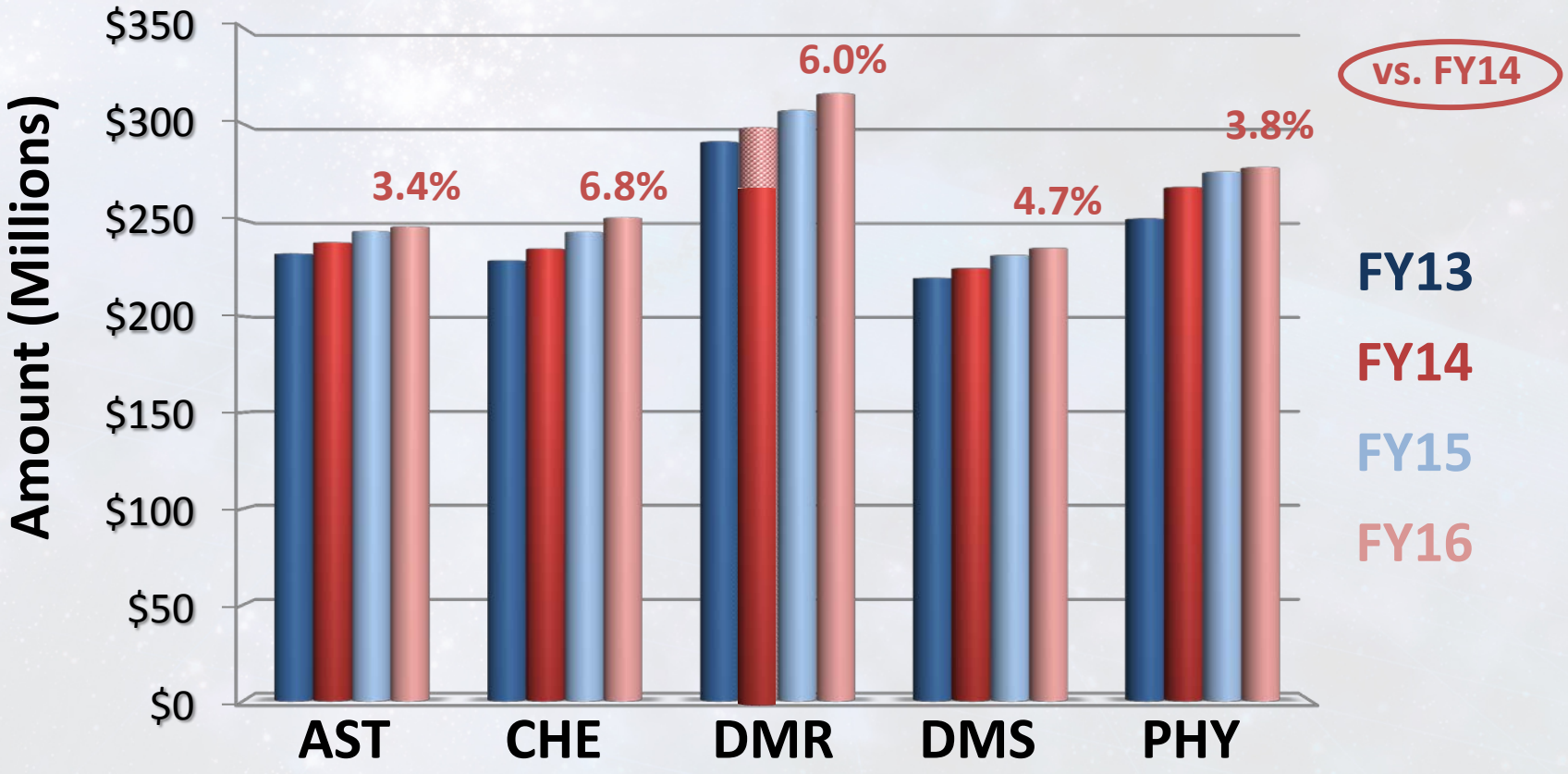
NSF Budget by Appropriation
($ in millions)

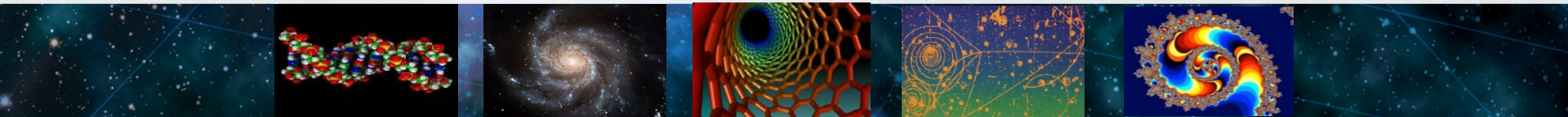
	FY 2015 Estimate	FY 2016 Request	Change
Research & Related Activities	$ 5934	**$ 6186**	**4%**
Education & Human Resources	866	**963**	**11%**
Major Research Equipment & Facilities Construction	201	**200**	**-0.2%**
Agency Operations & Award Management	325	**355**	**9%**
National Science Board	4	**4**	**--**
Office of Inspector General	14	**15**	**5%**
Total NSF	**$ 7344**	**$ 7724**	**5%**



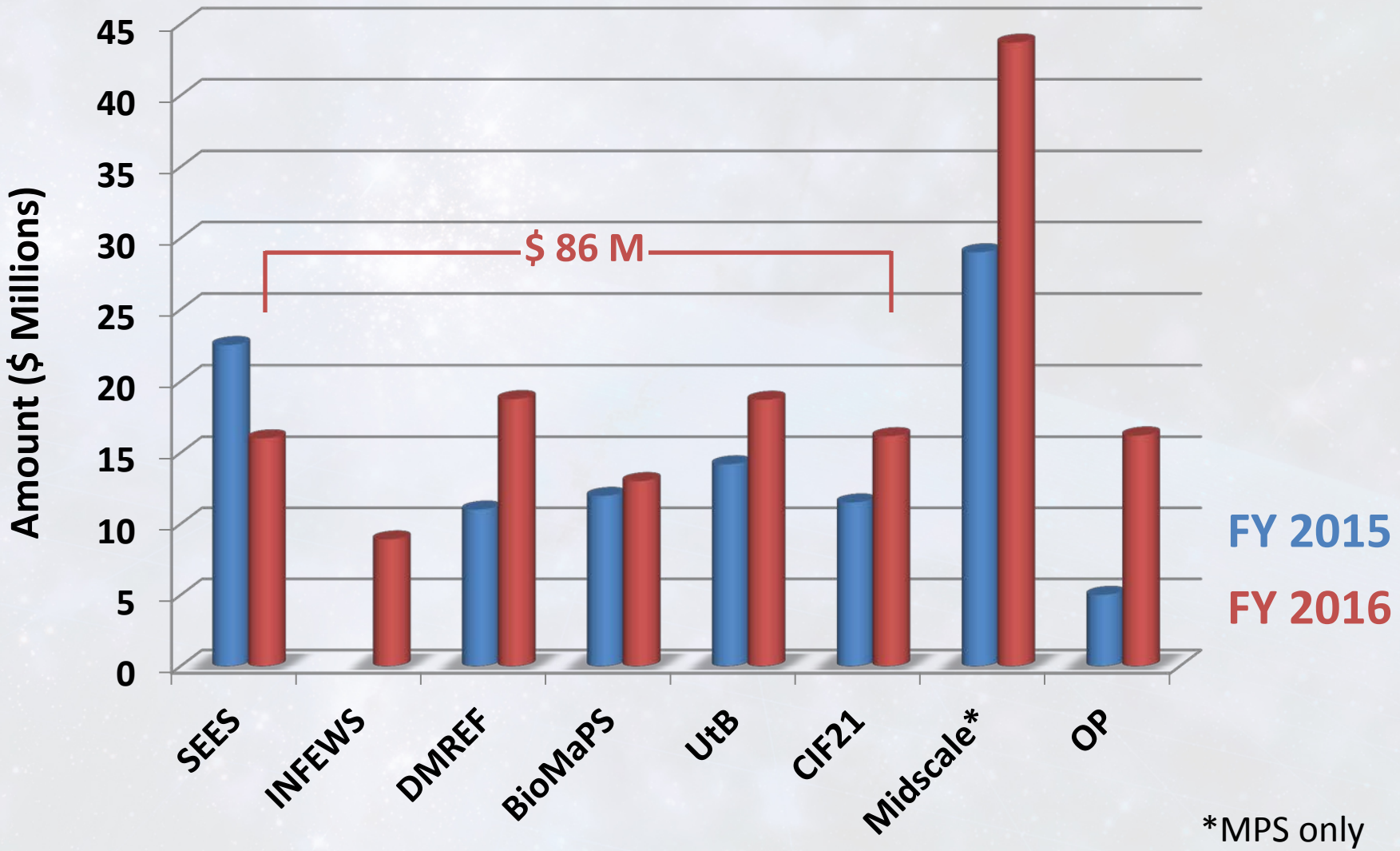
MPS Budgets

FY 2013 $ 1250 M → (+ 4.0%) → FY 2014 $ 1300 M → (+2.8%) → FY 2015 $ 1337 M (estimate) → (+2.2%) → FY 2016 $ 1366 M (request)



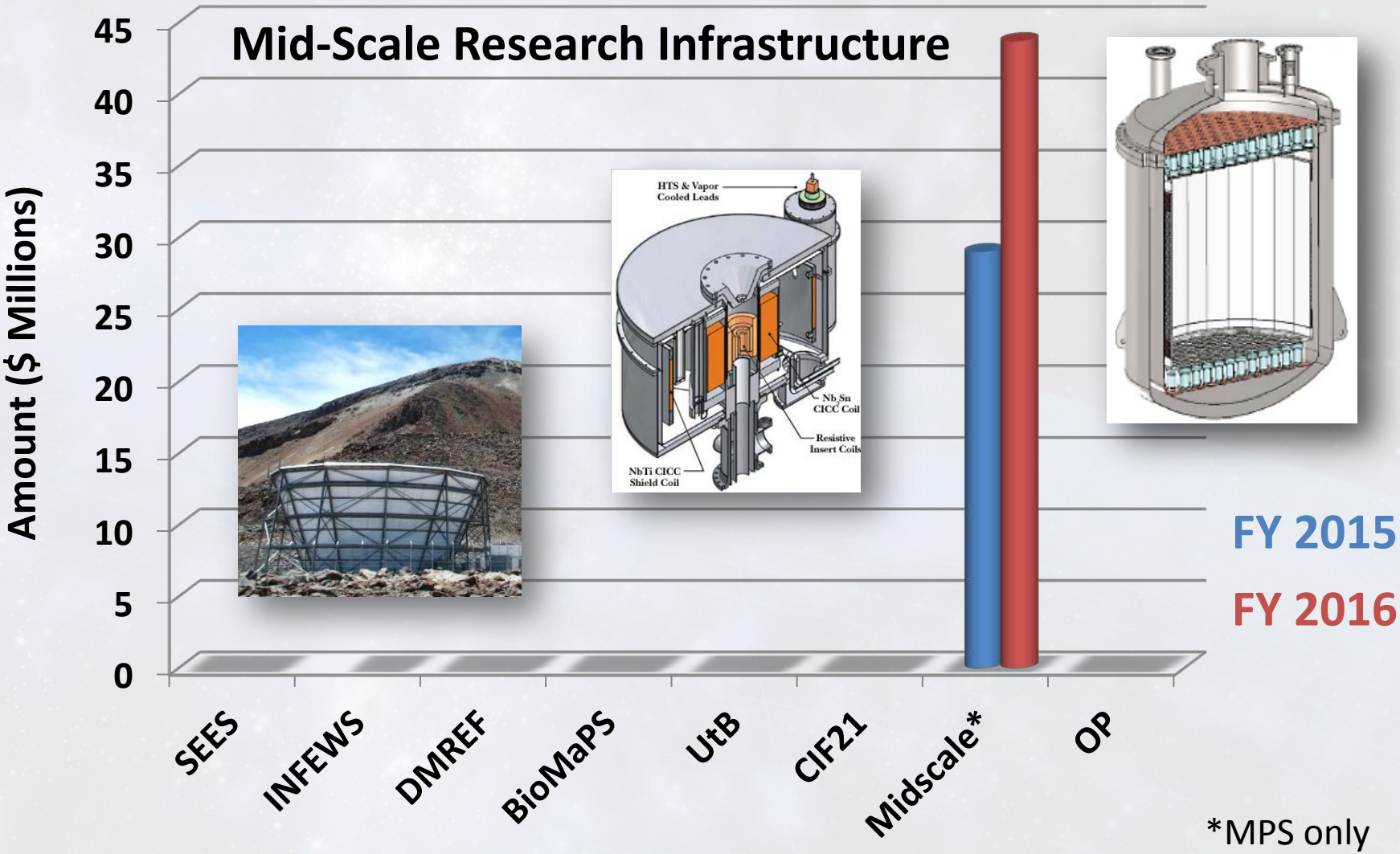


Selected MPS Major Investments



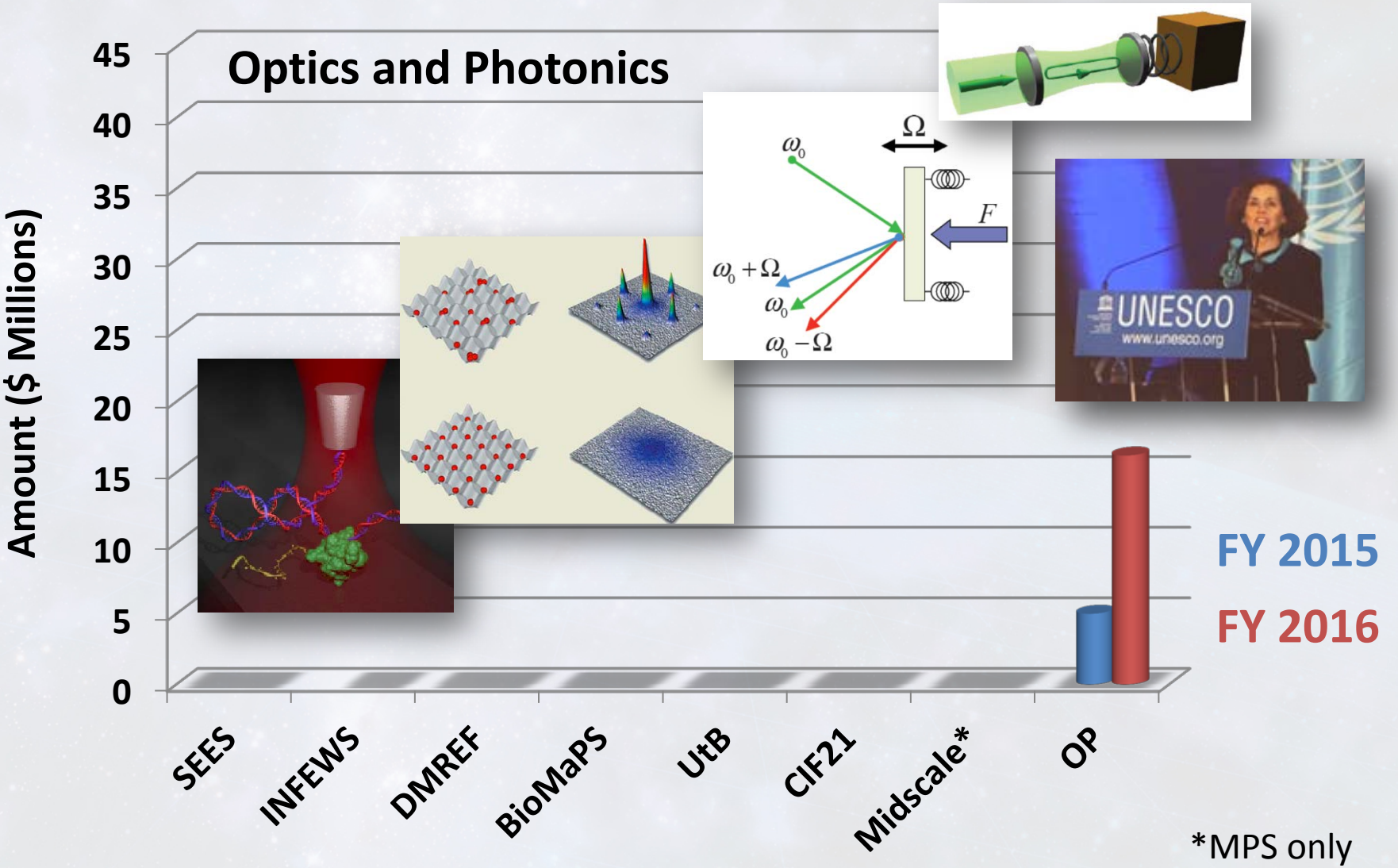
*MPS only

Selected MPS Major Investments



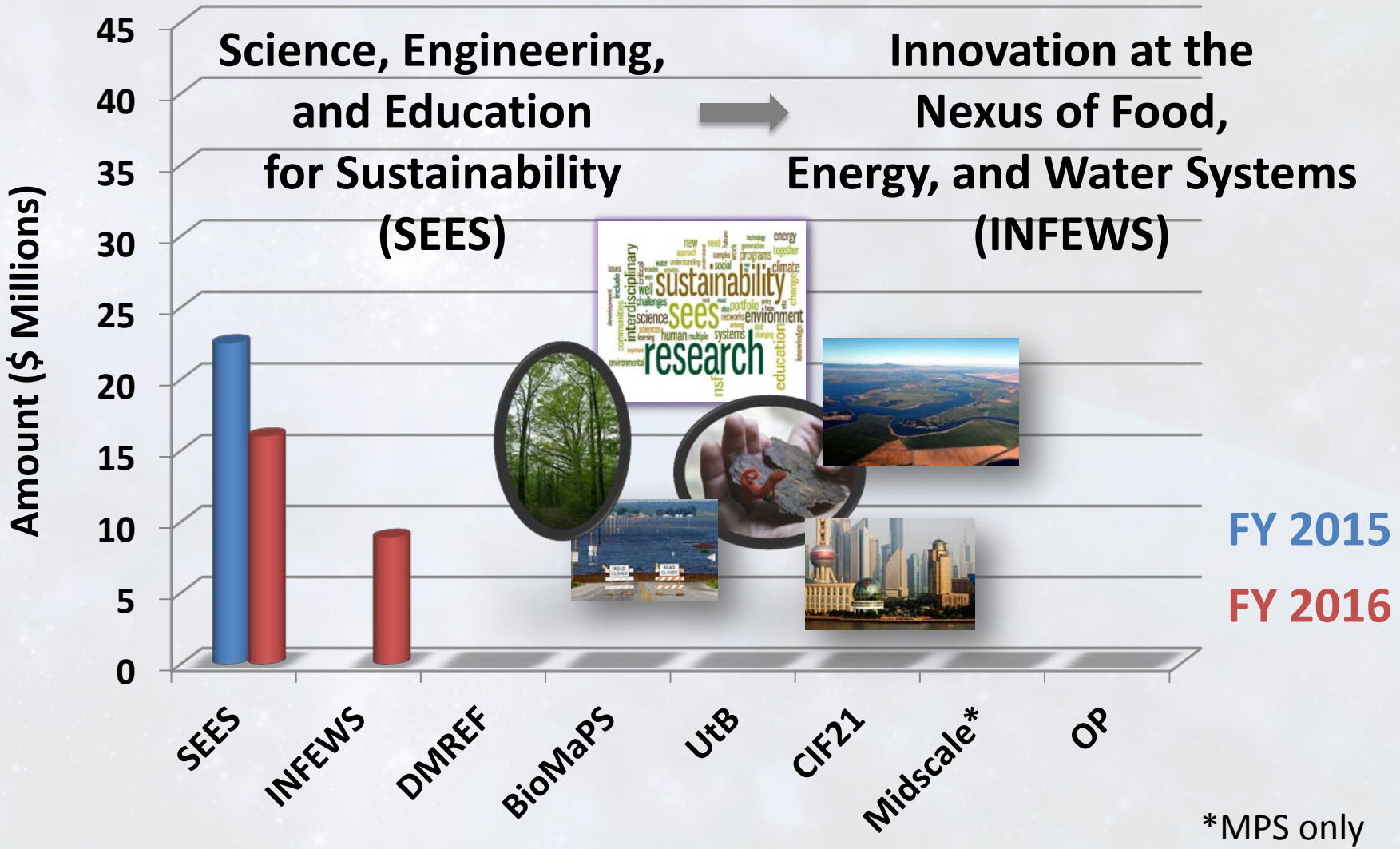
*MPS only

Selected MPS Major Investments



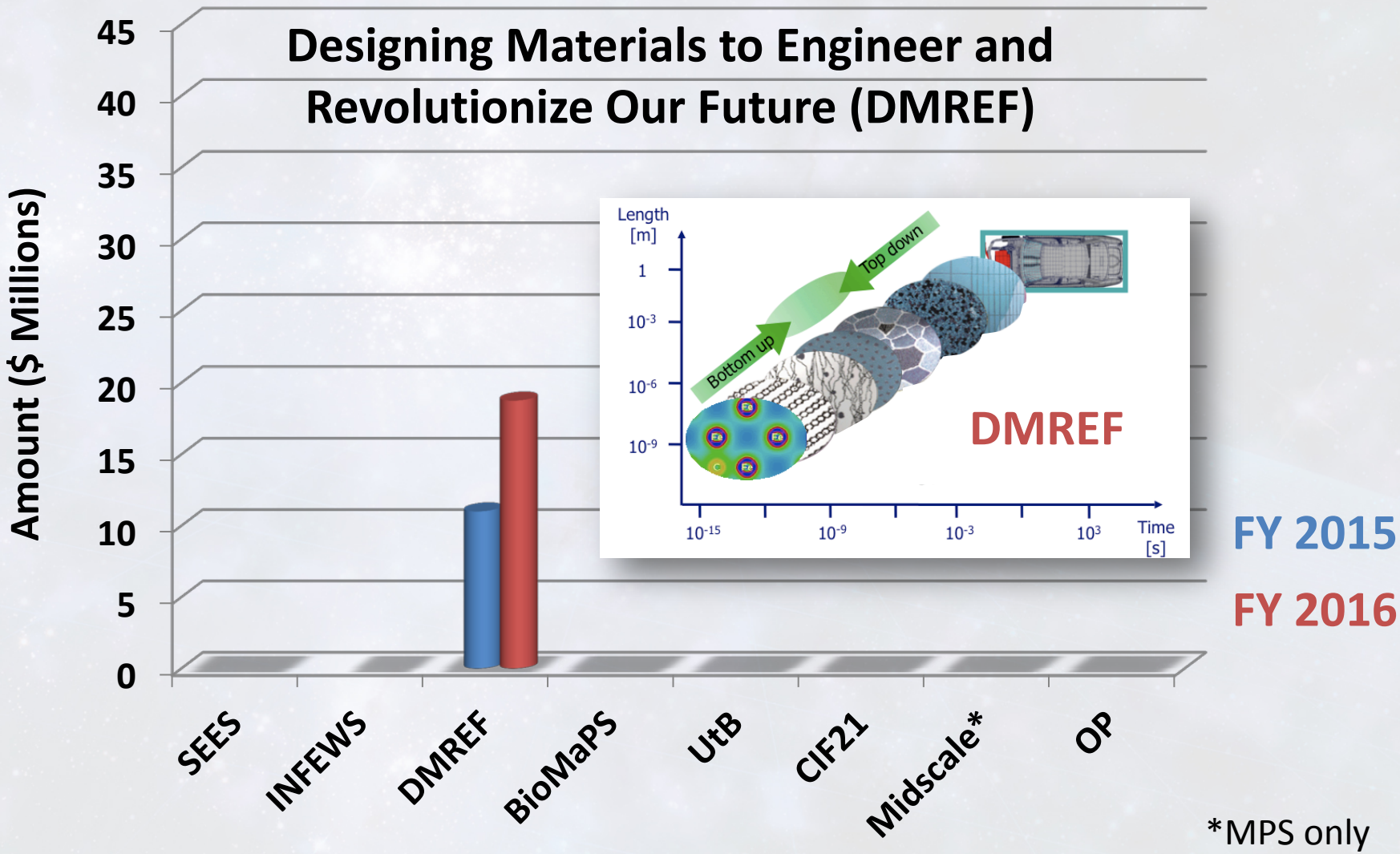
*MPS only

Selected MPS Major Investments



*MPS only

Selected MPS Major Investments



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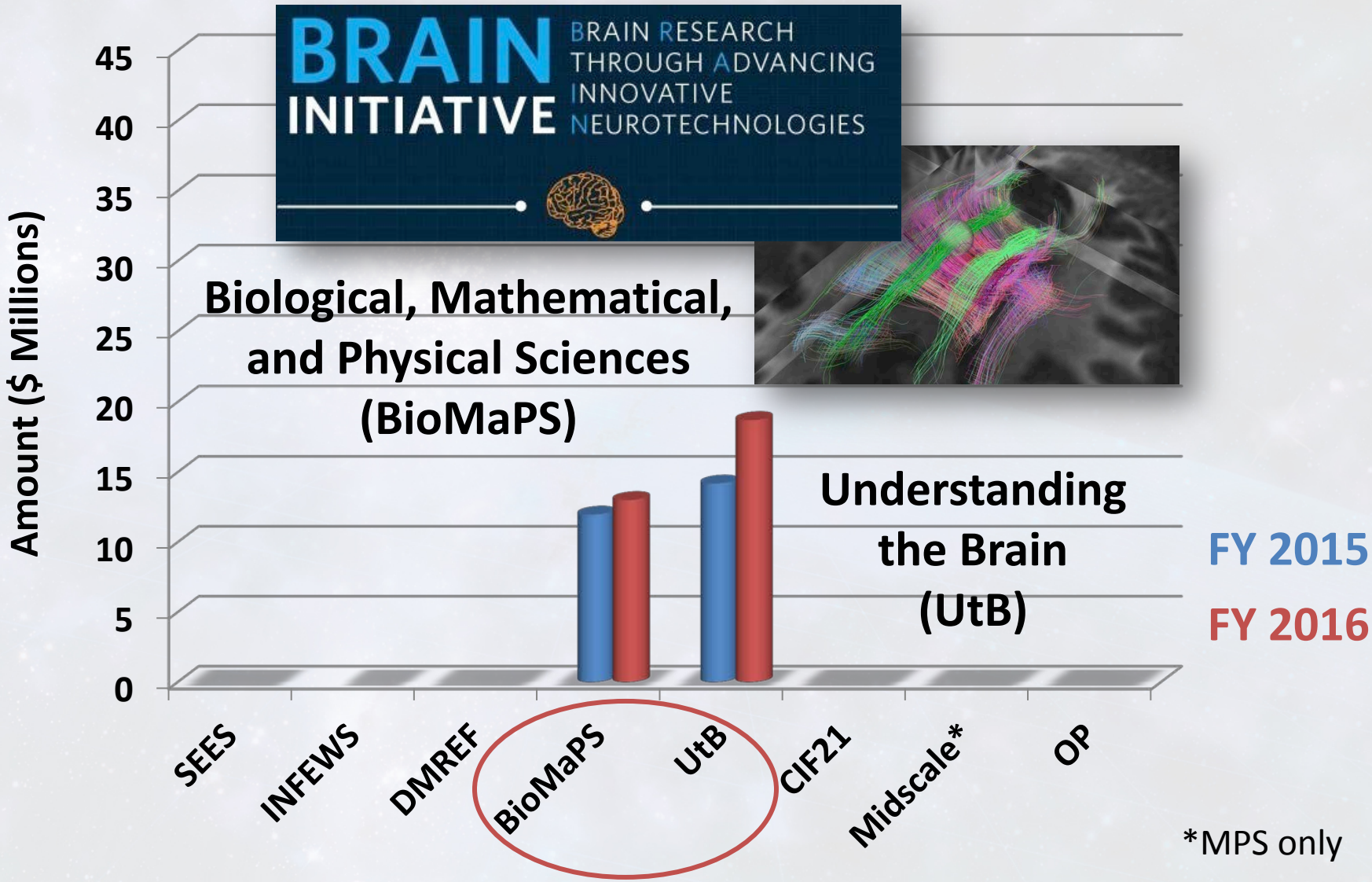
Selected MPS Major Investments



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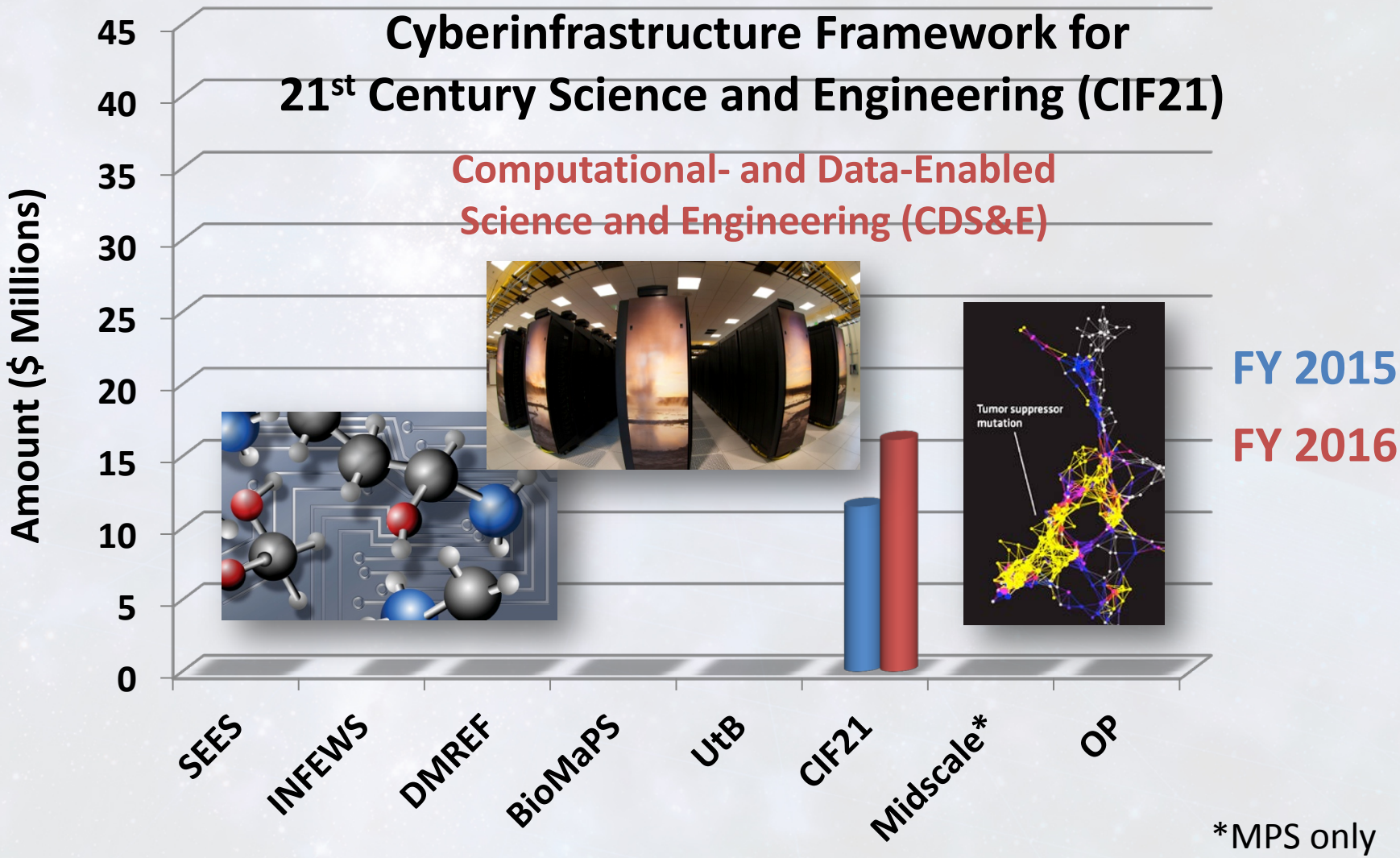
Selected MPS Major Investments



*MPS only

MPS Participation in NSF-Wide Initiatives

- Cyber-Enabled Materials, Manufacturing, and Smart Systems
- Cyberinfrastructure Framework for the 21st Century
- Innovation Corps
- INCLUDES
- Innovation at the Nexus of Food, Energy, Water Systems
- Science, Engineering, and Education for Sustainability
- Secure and Trustworthy Cyberspace
- Understanding the Brain

CEMMSS, CIF21, I-Corps, INCLUDES, INFEWS, SEES, SaTC, UtB

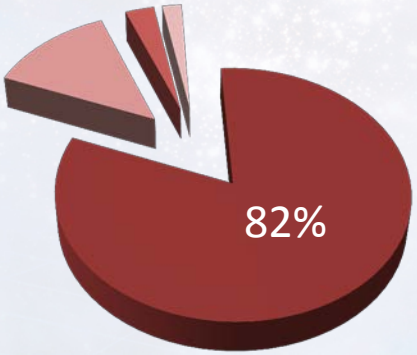
$87.3M

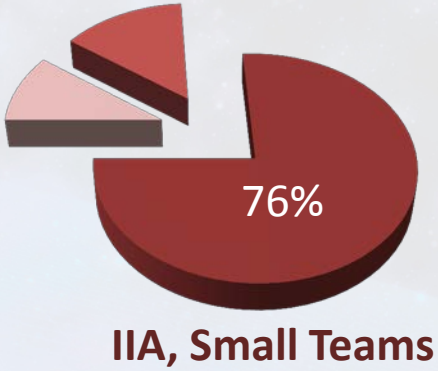
⬇

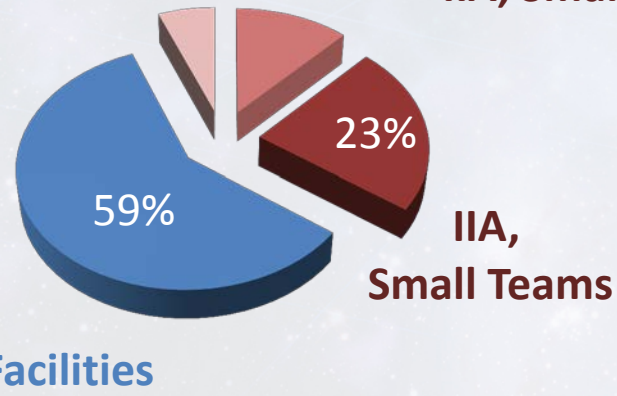
6.4% of MPS Budget

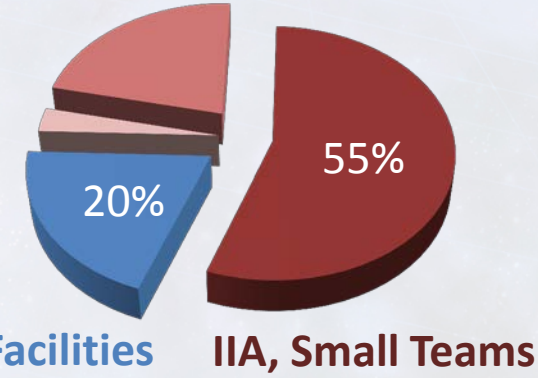
FY 2015 Estimate: $ 1337M

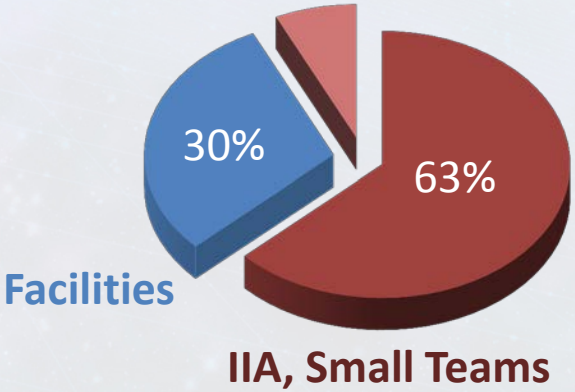
Astronomical Sciences (AST)	Chemistry (CHE)	Materials Research (DMR)	Mathematical Sciences (DMS)	Physics (PHY)
$ 244M	$ 244M	$ 307M	$ 232M	$ 275M

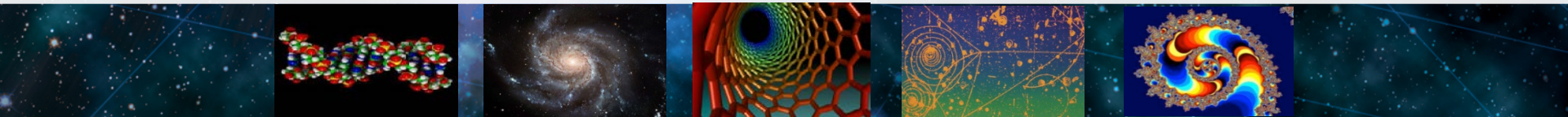




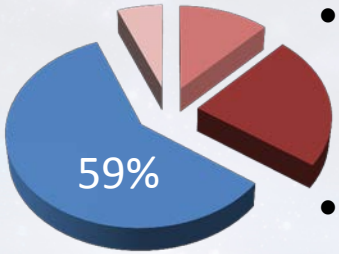




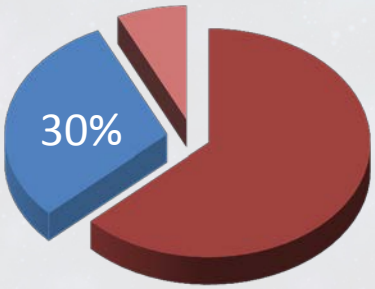




Astronomy (AST)



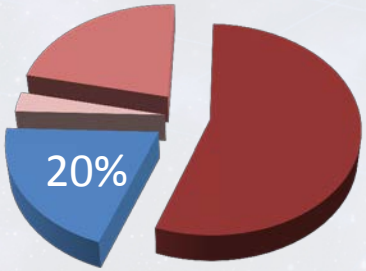
- Arecibo Observatory
- Atacama Large Millimeter Array (ALMA)
- Daniel K. Inouye Solar Telescope (DKIST (ATST))
- Gemini Observatory
- Large Synoptic Survey Telescope (LSST)
- National Optical Astronomy Observatory (NOAO)
- National Radio Astronomy Observatory (NRAO)
- National Solar Observatory (NSO)



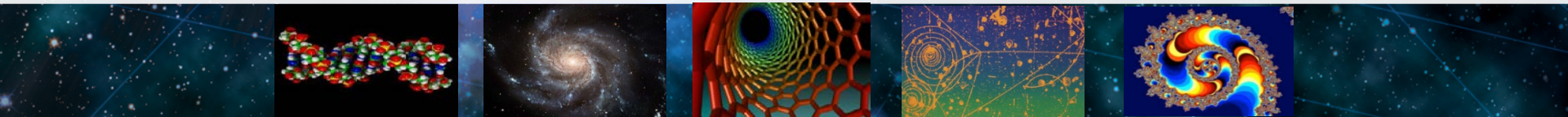
Physics (PHY)

- Ice Cube Neutrino Observatory
- Large Hadron Collider (LHC)
- Laser Interferometer Gravitational Wave Observatory (LIGO)
- National Superconducting Cyclotron Laboratory (NSCL)

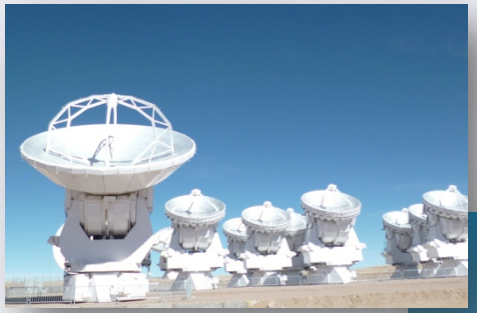
Materials Research (DMR)



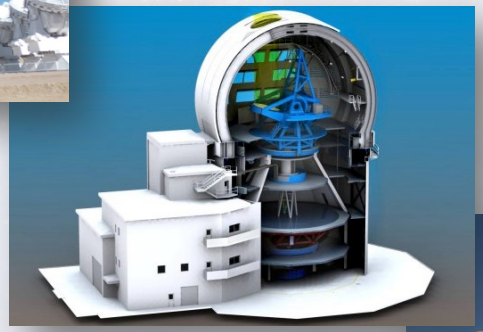
- Cornell High Energy Synchrotron Source (CHESS)
- National High Magnetic Field Laboratory (NHMFL)
- Center for High Resolution Neutron Scattering (CHRNS)



Examples of MPS-Supported Multi-user Facilities



ALMA



DKIST

Gemini

NOAO

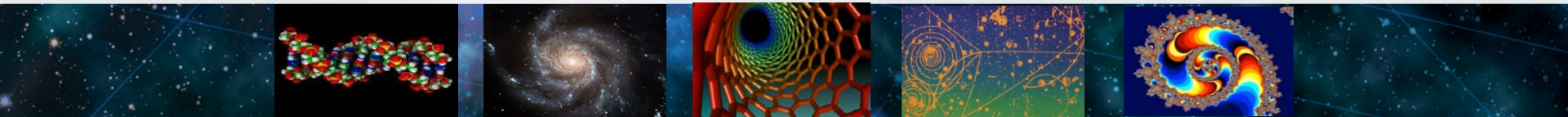
IceCube

NHMFL

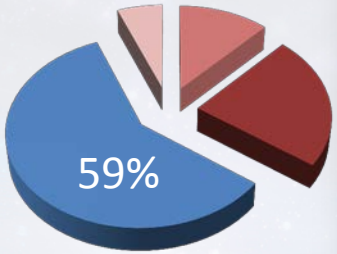
LIGO

Two Different Budget Lines for Facilities

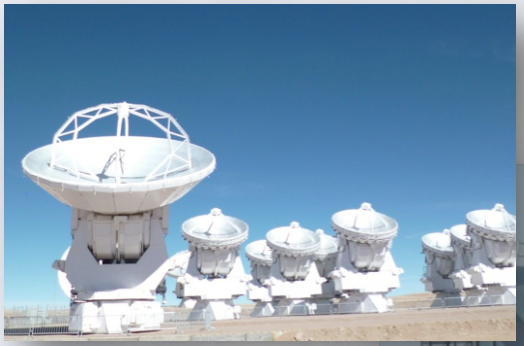
NSF FY 2016 Request ($ in millions)	FY 2016 Request
Research & Related Activities	**$ 6186**
Education & Human Resources	963
Major Research Equipment & Facilities Construction	**200**
Agency Operations & Award Management	355
National Science Board	4
Office of Inspector General	15
Total NSF	**$ 7,724**



Two Different Budget Lines for Facilities



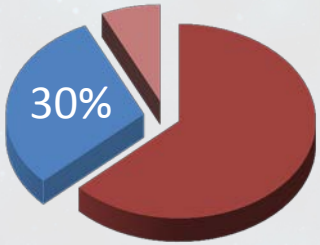
AST



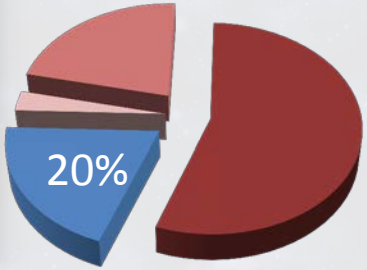
ALMA

Operations (R&RA)

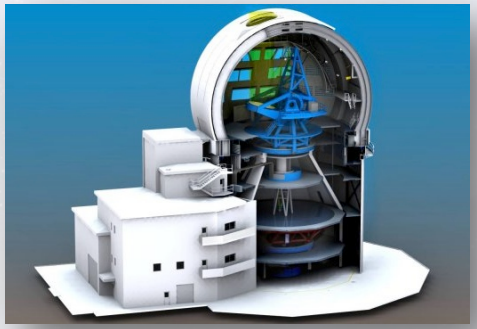
IceCube



PHY

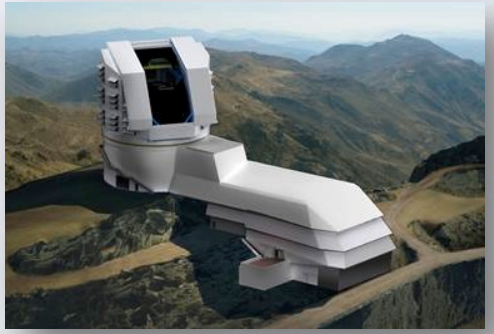


DMR



DKIST

Major Research Equipment and Facilities Construction (MREFC)



LSST

Building the STEM Pipeline Through MPS Research

CAREER
Young Teacher-Scholars

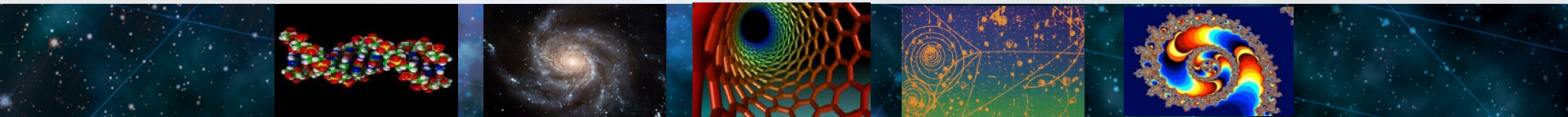
	FY 2015 Estimate	FY2016 Request
MPS	$ 67M	$ 70M
NSF	$ 223M	$ 232M

30% of CAREER funding from MPS

Research Experiences for Undergraduates (REU)
Undergraduate Research Programs

	FY 2014 Estimate	FY2015 Request
MPS	$ 21.2M	$ 20.8M
NSF	$ 73.2M	$ 77.6M

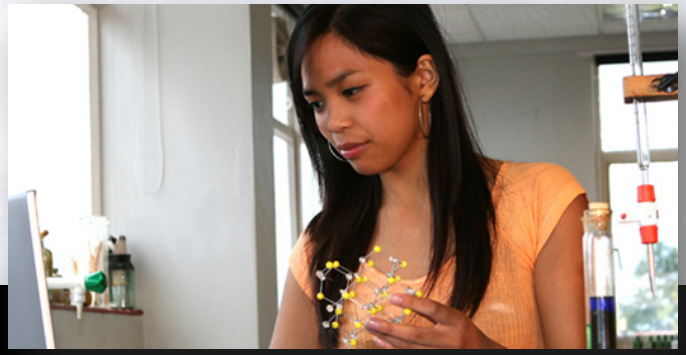
27% of REU funding from MPS



Building the STEM Pipeline Through MPS Research

Alliances for Graduate Education and the Professoriate (AGEP)

Supplements to support under-represented graduate students

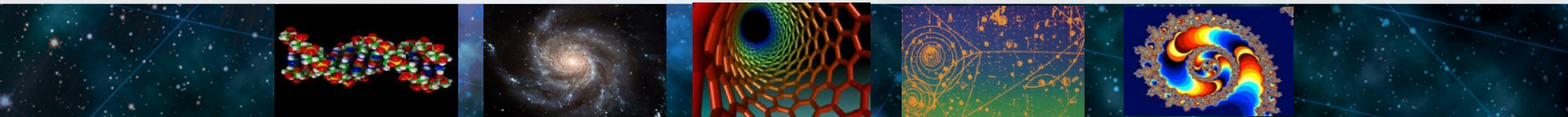


AGEP Alliances for Graduate Education and the Professoriate

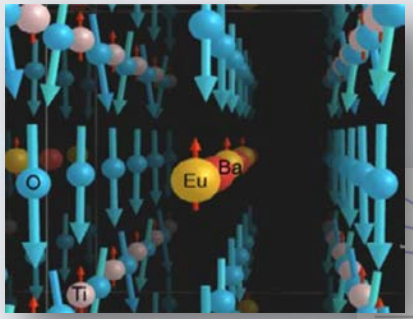
FY 2012: 27 **FY 2013: 39** **FY 2014: 42**

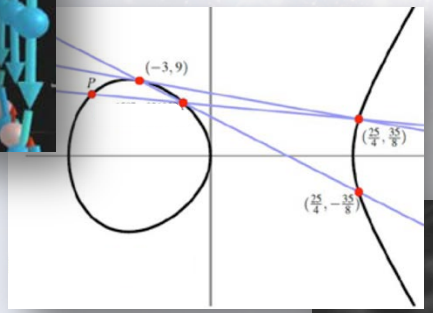
MPS Graduate Research Supplements for Veterans (MPS-GRSV)

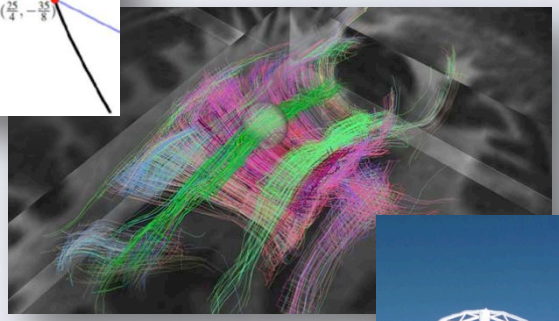
FY 2015 Dear Colleague Letter (NSF 15-024)



Fundamental Research in the Mathematical and Physical Sciences







Advancing Discovery

Building Blocks for Innovation

Forefront Facilities

Inspiring the Next Generation

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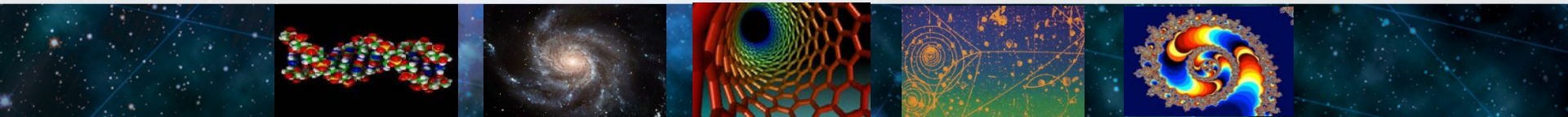
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