



Perspectives from the National Science Foundation

HEPAP Meeting

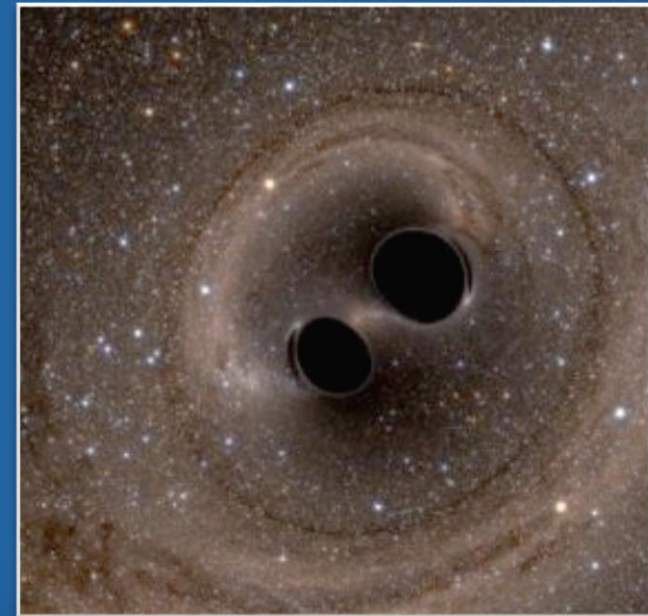
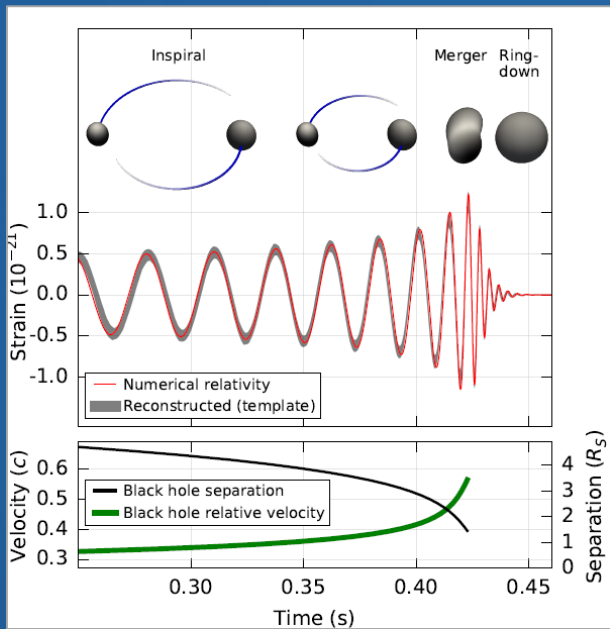
Denise Caldwell

Director, Physics Division

Mathematical and Physical Sciences

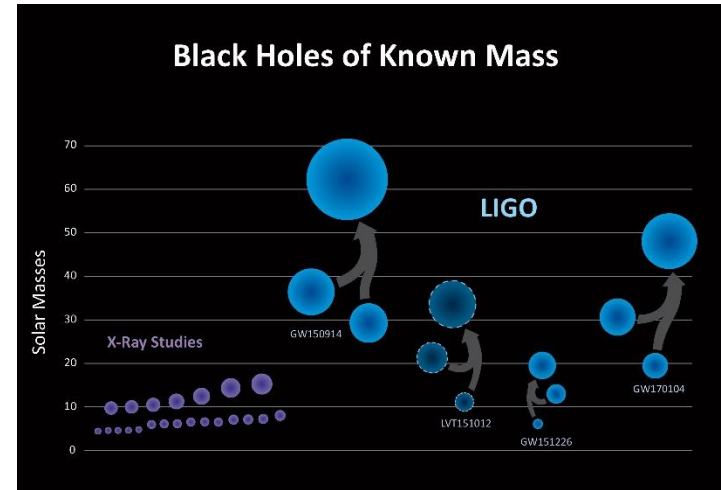
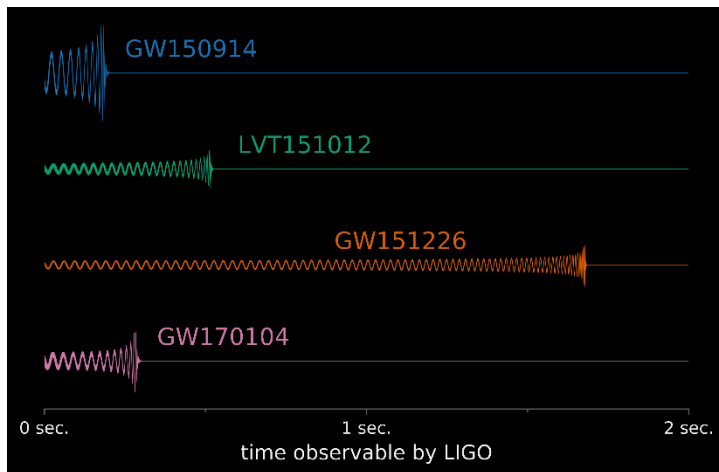
June 5, 2017

After a Century, Gravitational Waves Detected on Earth



Third Confirmed LIGO Detection GW170104

The newfound black hole, formed by the merger, has a mass about 49 times that of our sun. This fills in a gap between the masses of the two merged black holes detected previously by LIGO, with solar masses of 62 (first detection) and 21 (second detection).



Original Black Holes Masses: 19 and 31 M_{\odot} .
Final Black Hole Mass: 49 M_{\odot}
Distance: 880 Mpc ($z = 0.18$). The farthest detection so far.

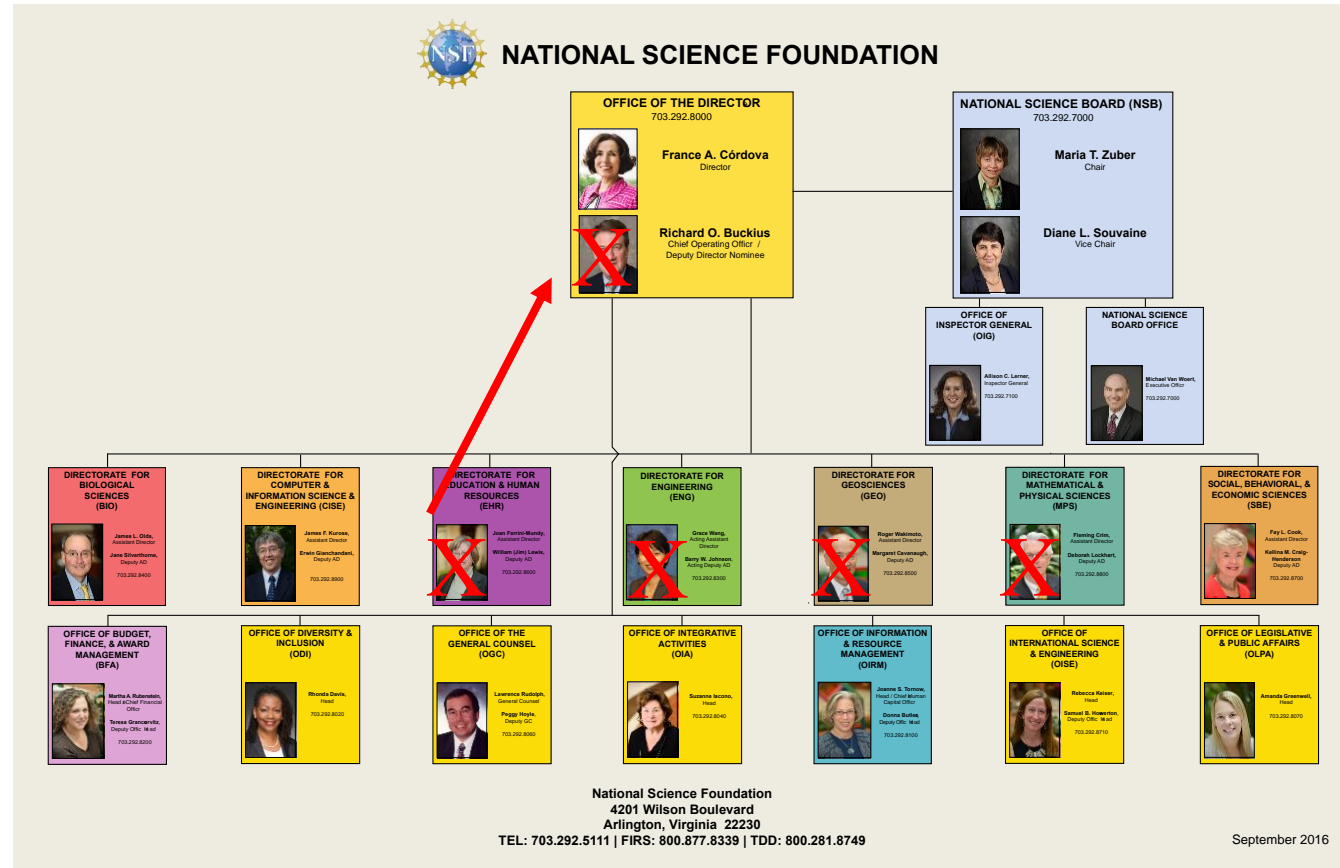
Unlike the previous two detections, it is likely that in this merger the BH spins were initially counter aligned with the orbital angular momentum

No evidence of departure from GR.



Transitions: NSF

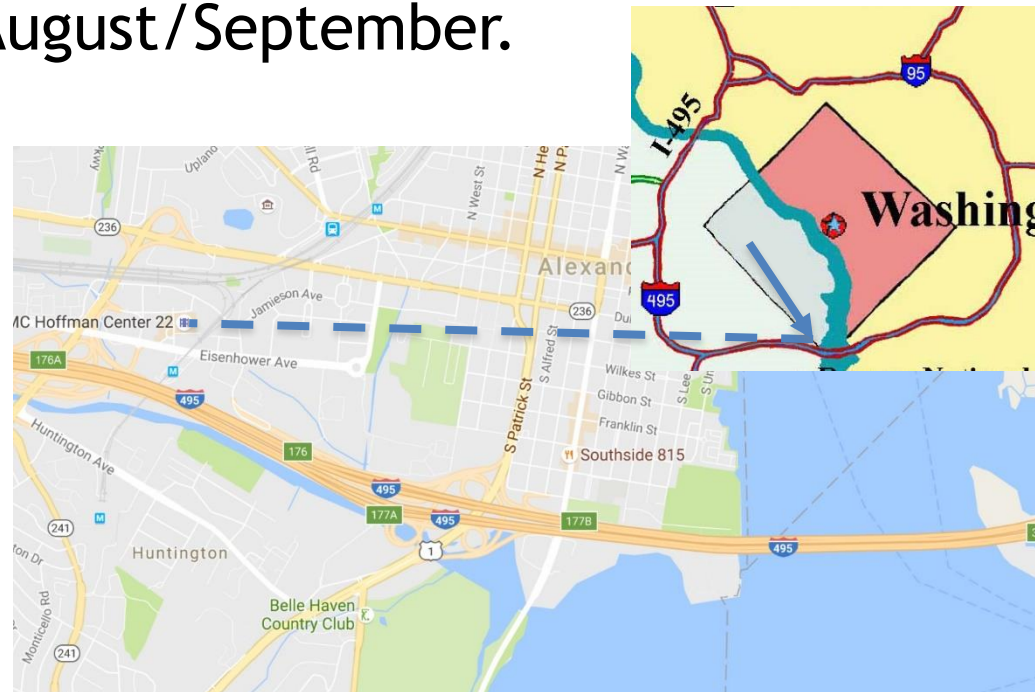
- Major NSF leadership transition in Jan/Feb
- Acting ADs for MPS, GEO, ENG, and EHR
- New Acting Chief Operating Officer
- GEO AD started on June 1; ENG AD will start on June 19.





NSF is Moving!

- NSF will move from its current location in Arlington, Virginia to a location in Alexandria, Virginia in July-September 2017.
- The Directorate for Mathematical and Physical Sciences, including PHY, is scheduled to move over an extended Labor Day weekend in August/September.



MPS Transitions

- Fleming Crim returned to Wisconsin in January 2017; Jim Ulvestad is Acting Assistant Director. Future Assistant Director has not yet been identified.
- Deborah Lockhart became Deputy Assistant Director on April 3, 2016.



Federal Government Reform

- Hiring freeze (January-April) had short-term transitory impacts on ability of NSF to staff open positions.
- OMB issued guidance on reform of Federal agencies, ending the freeze.
- PHY is fully staffed at present.
- Initial agency reform ideas due to OMB on June 30; “final” plans in FY 2019 Budget Request.



American Innovation and Competitiveness Act (AICA)

- New Authorization Act for NSF (and NIST), passed by Congress in early January.
- No specific funding targets incorporated.
- Supports NSF principles of merit review.
- Language relating to NSF awards being in the national interest.
- Language about facility oversight.
- Instructions to Physical Sciences Subcommittee relating to HEP.



FY 2017 Appropriation

- FY 2017 appropriation passed by Congress in early May (with <5 months left in FY 2017).
 - Essentially flat with respect to FY 2016.
- NSF currently preparing FY 2017 plan to be submitted to Congress via OMB.
 - Expect PHY budget to be approximately flat.
- Processing of awards handicapped by late budget and early financial closeout.



FY 2017 Budget--PHY

\$M	FY 2015 Actual	FY 2016 Actual	FY 2017 Request Disc.	FY 2017 Approp.
NSF Total	7344	7494	7564	7472
NSF R&RA	5934	5998	6079	6034
MPS	1337	1349	1355	---
PHY	276.1	276.9	278.5	---

The FY 2017 Appropriation of \$6034 million for Research & Related Activities is equal to the Enacted Value for FY 2016. Actual R&RA in FY 2016 was somewhat lower because of transfers between accounts.



NATIONAL
SCIENCE
FOUNDATION

FISCAL
YEAR
2018

BUDGET
REQUEST

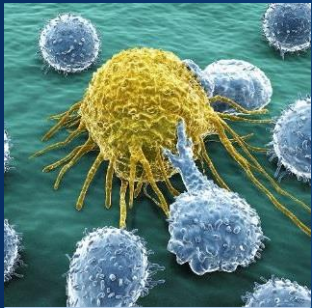


Dr. France A. Córdova
Director, National Science Foundation

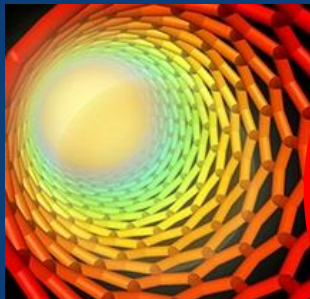


Mathematical and Physical Sciences
Dr. James S. Ulvestad
Assistant Director (Acting)

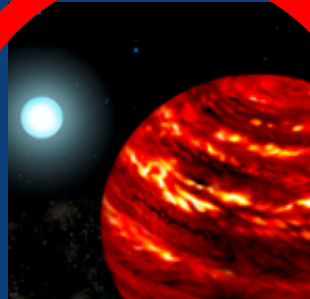
NSF Funds Research and Education across all Fields of Science and Engineering



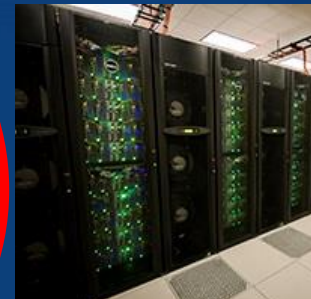
Biological Sciences



Engineering



Mathematical & Physical Sciences



Computer & Information Science & Engineering



Geosciences (including Polar Programs)



Integrative Activities



Education & Human Resources



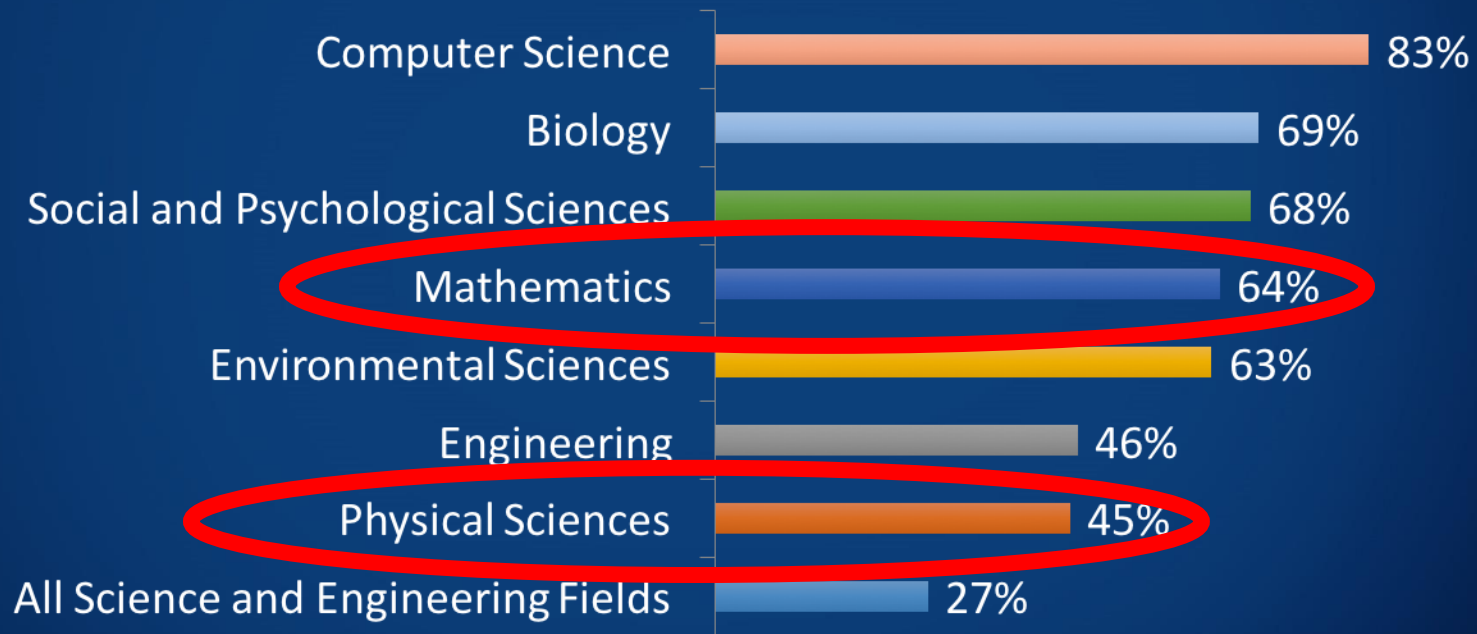
Social, Behavioral & Economic Sciences



International Science & Engineering



NSF Support of Academic Basic Research in Selected Fields (as a percentage of total federal support)



Note: Biology includes Biological Science and Environmental Science. Biology and Psychological Sciences exclude National Institutes of Health funding from the total amount of federal support.

Source: NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development



National Science Foundation

FY 2018 BUDGET REQUEST TO CONGRESS

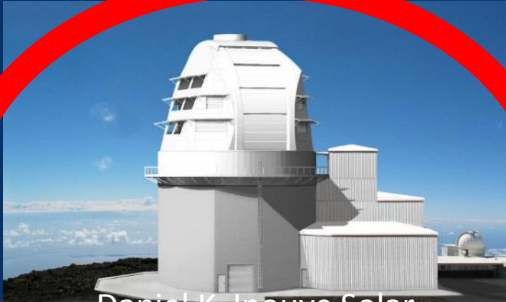


NSF FY 2018
Budget Request
Total: \$6.65 billion





Continued Investment in NSF Research Infrastructure



Daniel K. Inouye Solar
Telescope



LSST



RCRV



LIGO



CYBERINFRASTRUCTURE



ALMA

NSF's 10 Big Ideas



RESEARCH IDEAS

Harnessing the Data Revolution
A word cloud featuring terms like MATHEMATICAL, STATISTICAL, COMPUTATIONAL, FOUNDATIONS, OPEN, RESEARCH, EDUCATION, WORKFORCE, ANALYTICS, DATA SCIENCE, FUNDAMENTAL, MACHINE, LEARNING, SCIENCE, DATA, CYBERINFRASTRUCTURE, CHALLENGES, MODELING, DATA, MINING, INTERNET, OF THINGS, and FUSION DATA INTERFACE.

Work at the Human-Technology Frontier: Shaping the Future
Illustration of people interacting with a large digital display board.

Windows on the Universe: The Era of Multi-messenger Astrophysics
Aerial view of a large astronomical observatory facility.

The Quantum Leap: Leading the Next Quantum Revolution
Illustration of a quantum circuit with qubits and gates.

Harnessing Data for 21st Century Science and Engineering
Aerial view of a rocky, cratered landscape.

Navigating the New Arctic
A satellite dish and other scientific equipment in a snowy environment.

Understanding the Rules of Life: Predicting Phenotype
A hand holding a small green seedling over soil.

PROCESS IDEAS

Mid-scale Research Infrastructure
A large steel truss bridge spanning a body of water.

NSF 2026
Illustration of human silhouettes with icons representing various scientific fields like biology, physics, and earth science.

Growing Convergence Research at NSF
A network of glowing nodes and connections, representing data or research convergence.

NSF INCLUDES: Enhancing STEM through Diversity and Inclusion
A large group of diverse people standing together, with a DNA helix and a globe in the background.

Principles Applied for FY 2018 Request

- Continue to fund all S&E disciplines
- Support early career
- Protect the core
- Roll back “accretions” (things scaled up since 2008)
- Cross disciplinary programs are important
- Strategic and prioritized reductions within directorates

MPS Overall Funding—FY 2018 Request

MPS Funding

(Dollars in Millions)

	FY 2016 Actual	FY 2017 (TBD)	FY 2018 Request	Change Over FY 2016 Actual	
				Amount	Percent
Astronomical Sciences (AST)	\$246.63	-	\$221.15	-\$25.48	-10.3%
Chemistry (CHE)	246.52	-	221.05	-25.47	-10.3%
Materials Research (DMR)	309.88	-	282.87	-27.01	-8.7%
Mathematical Sciences (DMS)	233.95	-	209.78	-24.17	-10.3%
Physics (PHY)	276.91	-	253.30	-23.61	-8.5%
Office of Multidisciplinary Activities (OMA)	34.89	-	31.28	-3.61	-10.3%
Total	\$1,348.78	-	\$1,219.43	-\$129.35	-9.6%

Principles Applied to MPS

- Support early career
 - CAREER request relatively stable. Targeted REU reductions if undergraduate students could be supported through national facilities and normal research awards. 8,000 graduate students to be supported through research awards.
- Protect the core; cross disciplinary programs
 - Major research facilities are “core” to MPS.
 - Retained flexibility to fund the best science by rolling some cross-disciplinary programs into core programs.
- Strategic and prioritized reductions within directorates
 - Emphasized funding of highest priority facilities; reductions proposed for some facilities in transition.
 - Reduced mid-scale and instrumentation; support individual investigators.
 - Prioritized low-level investments leading to “Big Ideas”.

Looking Ahead: FY 2018 Budget



Markup, reconciliation of appropriation bills



Our Mission from the Beginning



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