

# Directorate for Mathematical and Physical Sciences

Jim Ulvestad  
Acting Assistant Director  
National Science Foundation  
November 16, 2017



Agenda

Personnel Updates

Highlights

Budget Updates



# Agenda – Day 1

- State of the Directorate, Jim Ulvestad
- Division updates, DDs/DDDs
- More effective external partnerships, part 1 (with Divisions)
- Strategy discussion about Big Ideas, Jim U. and Caty Pilachowski
- Prep for Meeting with Director and COO, Jim U. and Caty P.
- Dinner at 5:45pm at Delia's



# Agenda – Day 2

- More effective external partnerships, part 2 (with AD panel)
- Meet with Director and COO
- Debrief: Meeting with Director and COO, Jim U. and Caty P.
- Lunch
- Forming a sub-committee to assess the Physics Frontiers program, Denise Caldwell
- Continued discussion about external partnerships and Big Ideas, Jim U. and Caty P.
- Wrap-up and adjourn



# MPSAC Membership

- Catherine Pilachowski (Chair), Indiana University
- Susanne Brenner, Louisiana State
- Robert Bryant, Duke
- Phil Bucksbaum, Stanford
- Lynne Hillenbrand, Caltech
- Melanie Sanford, University of Michigan
- William Zajc, Columbia
- David Awschalom, University of Chicago
- Miguel Garcia-Garibay, UCLA
- Catherine Hunt, University of Virginia
- Jennifer Lewis, Harvard
- Andrew Millis, Columbia/Simons Foundation



# MPS Advisory Committee

## Quarterly Meetings

(2 at NSF, 0 – 2 Virtual)

**Next Virtual Meeting**  
**Feb 2018**  
**if needed**

**Next Meeting at NSF**  
**May/June 2018**  
**Tentative !!**



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Deputy Director

  
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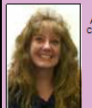
  
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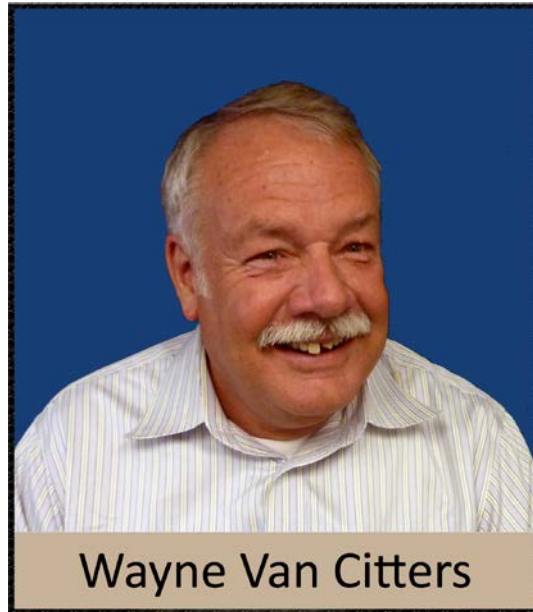
TEL: 703.292.5111 | FIRS: 800.877.8339 | TDD: 800.281.8749





# Office of the Assistant Director

## Farewell and Thanks



**Wayne van Citters**  
**Senior Facilities Advisor**

Retired(ish)/Returned on a part-  
time basis

Replacement search under way



# Office of the Assistant Director

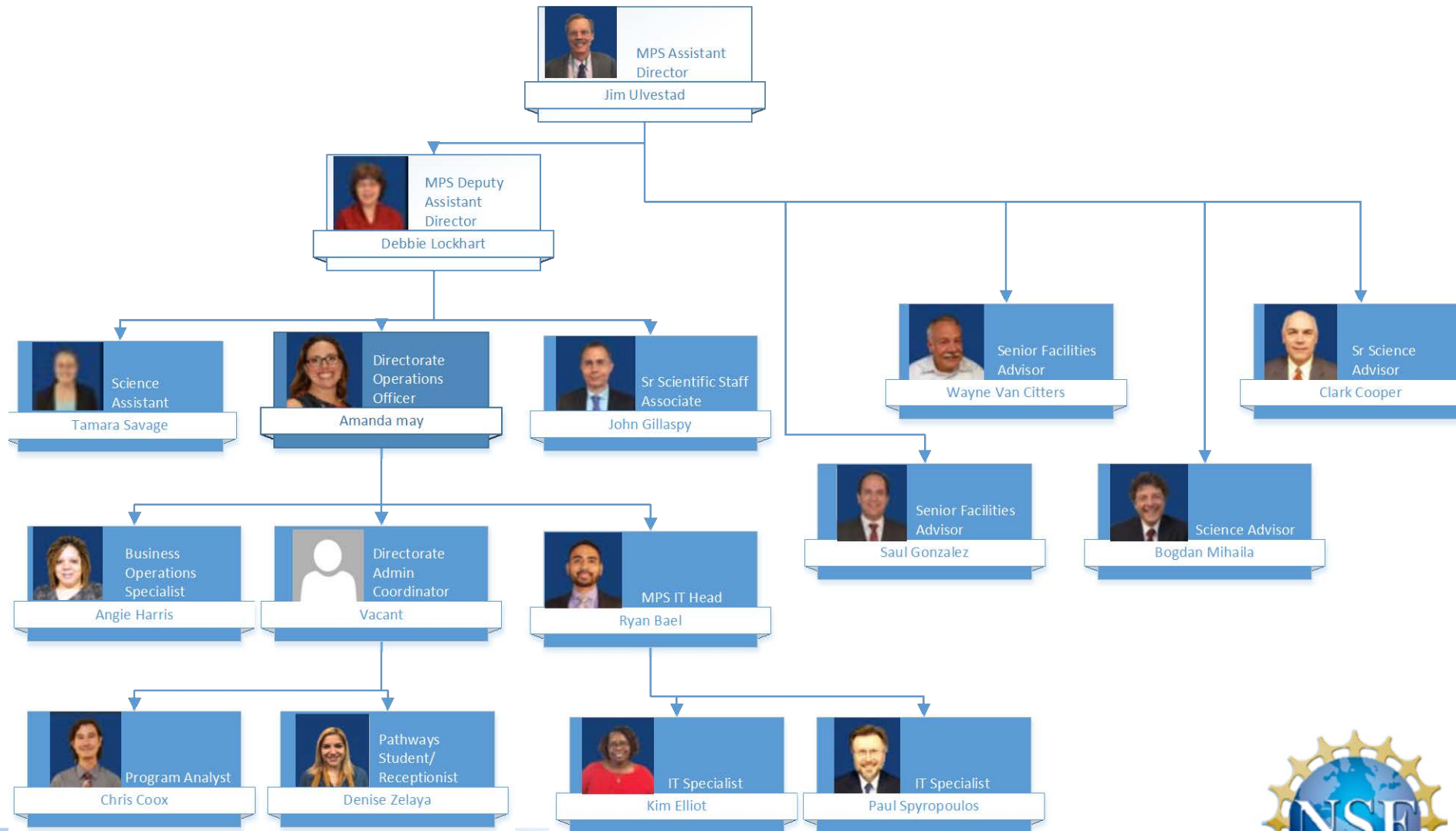
Welcome (January 2)



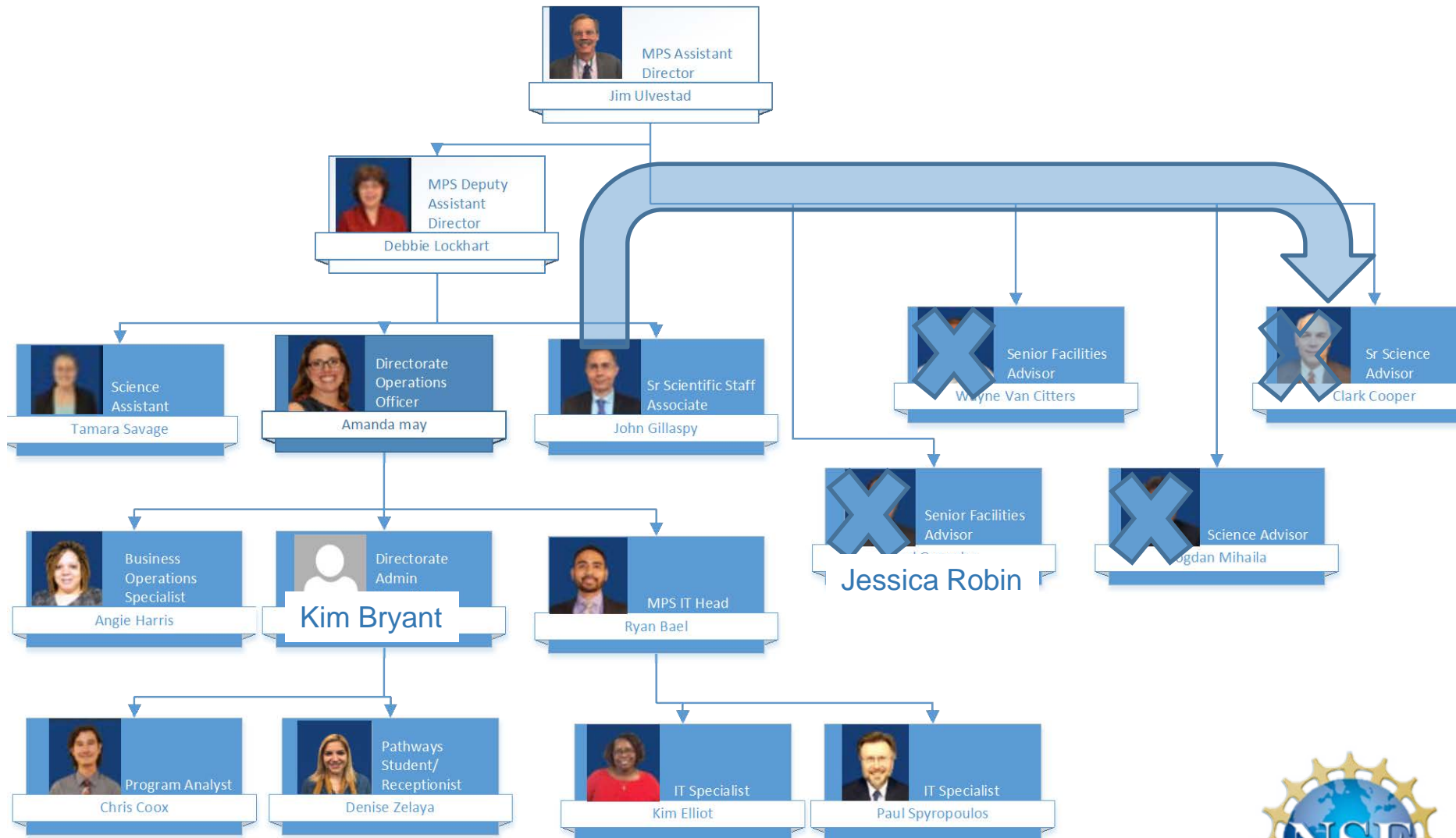
**Anne Kinney**  
Assistant Director  
Designee



# Office of Assistant Director



# Office of Assistant Director



# Mathematical and Physical Sciences (MPS)

Astronomical  
Sciences  
(AST)

Chemistry  
(CHE)

Materials  
Research  
(DMR)

Mathematical  
Sciences  
(DMS)

Physics  
(PHY)



**Richard  
Green, DD**



**Angela  
Wilson, DD**



**Linda  
Sapochak, DD**



**Tie Luo  
Acting DD**



**Denise  
Caldwell, DD**



# Mathematical and Physical Sciences (MPS)

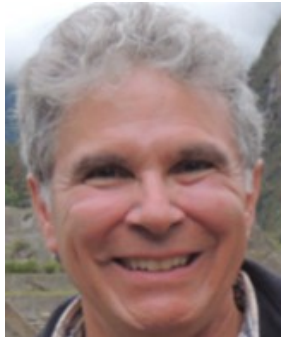
Astronomical  
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Sciences  
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Physics  
(PHY)



**Ralph Gaume**  
DDD



**Carol Bessel**  
DDD



**Sean Jones**  
DDD



**Nandini Kannan**  
Acting DDD



**Brad Keister**  
DDD



## Mathematical and Physical Sciences (MPS)

Astronomical  
Sciences  
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Chemistry  
(CHE)

Materials  
Research  
(DMR)

Mathematical  
Sciences  
(DMS)

Physics  
(PHY)

### Search for DMS Division Director Nearing conclusion

#### Recruitment Committee



**Michael Vogelius**

Dr. Robert Bryant, Duke U.  
Dr. Russel Caflisch, UCLA/Courant  
Dr. Marie Davidian, NC State  
Dr. Bryna Kra, Northwestern U.  
Dr. Francis Su, Harvey Mudd College

## Mathematical and Physical Sciences (MPS)

Astronomical  
Sciences  
(AST)

Chemistry  
(CHE)

Materials  
Research  
(DMR)

Mathematical  
Sciences  
(DMS)

Physics  
(PHY)

### Search for CHE Division Director Summer/Fall 2018

#### Recruitment Committee

Awaiting job posting



**Angela Wilson**



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# Nobel Prizes: 2017

- Eight winners funded by NSF
- Physiology/Medicine: Hall, Rosbash, and Young; for discoveries of molecular mechanisms governing the circadian rhythm
- Physics: Weiss, Thorne, and Barish; for Laser Interferometer Gravitational-Wave Observatory
- Chemistry: Frank; for development of cryo-electron microscopy
- Economics: Thaler; for behavioral economics



A composite image featuring a view of Earth from space on the right side, showing the Americas. On the left, a bright blue light source, possibly a star or distant galaxy, emits a horizontal lens flare across the dark blue background of space.

# RIPPLES OF GRAVITY, FLASHES OF LIGHT:

WORLD'S OBSERVATORIES  
WITNESS A COSMIC CATAclysm

▶ ▶| 🔊 0:00 / 4:17



# A Sampling of Activities and Issues

- Bio Math Institutes (with Simons Foundation)
- TRIPODS (with CISE Directorate)
- Upcoming COVs
  - PHY in FY 2018
  - AST and DMR in FY 2019
- Astronomy on the Mall
- Congressional testimony on Eclipse (Ulvestad) and Quantum Information Science (Kurose)
- Evaluation of Centers for Chemical Innovation
- Decadal survey on Frontiers of Materials Research
- Facility transitions (e.g., Arecibo, CHESS, NSCL)



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# 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
- NSF has developed response plan for all specific requirements



# 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 FY 2017 spending is complete
- Construction of Daniel K. Inouye Solar Telescope and Large Synoptic Survey Telescope continued to be fully funded in FY 2017



# Agency Reorganization & Reform

- Initial hiring freeze, January-April 2017
- OMB memo M-17-22 (April 12)
  - Comprehensive Plan for Reforming the Federal Government and Reducing the Federal Civilian Workforce
- Detailed agency plan will be in FY 2019 budget request



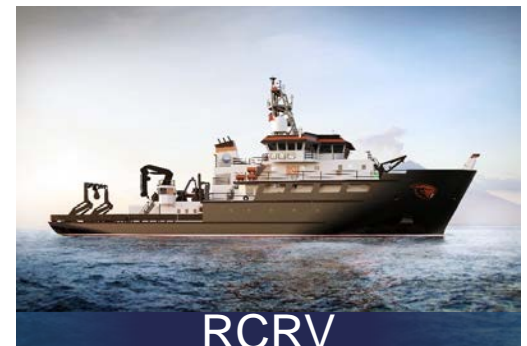
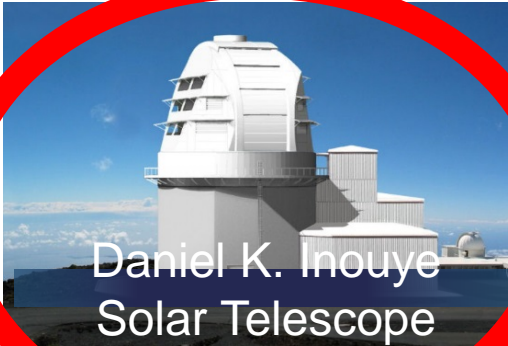




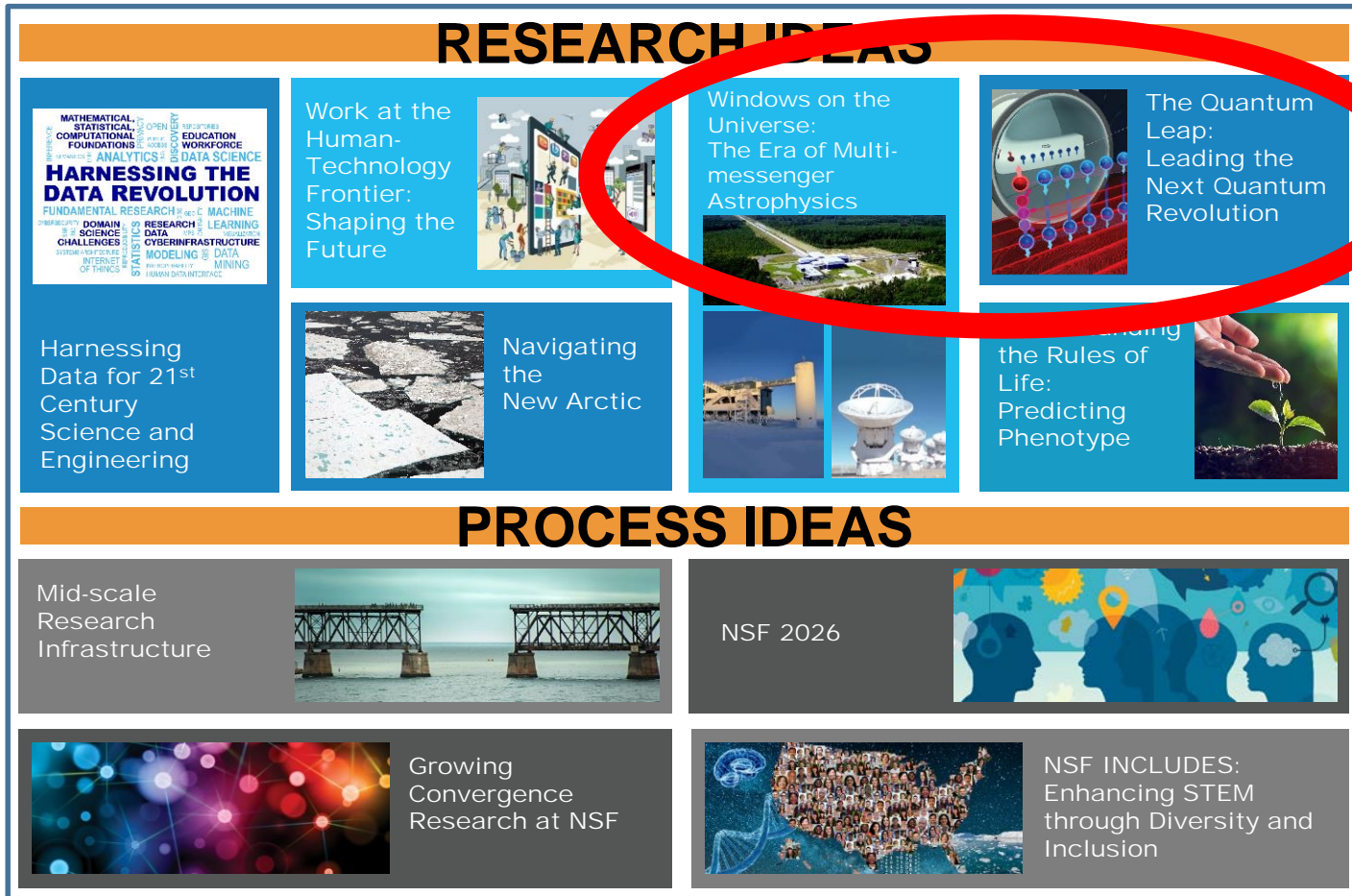
NSF FY 2018  
Budget Request  
Total: \$6.65 billion



# Continued Investment in NSF Research Infrastructure



# NSF's 10 Big Ideas



# NSF Principles Applied for FY 2018 Request

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





# MPS in FY 2018 Request

(in Millions)

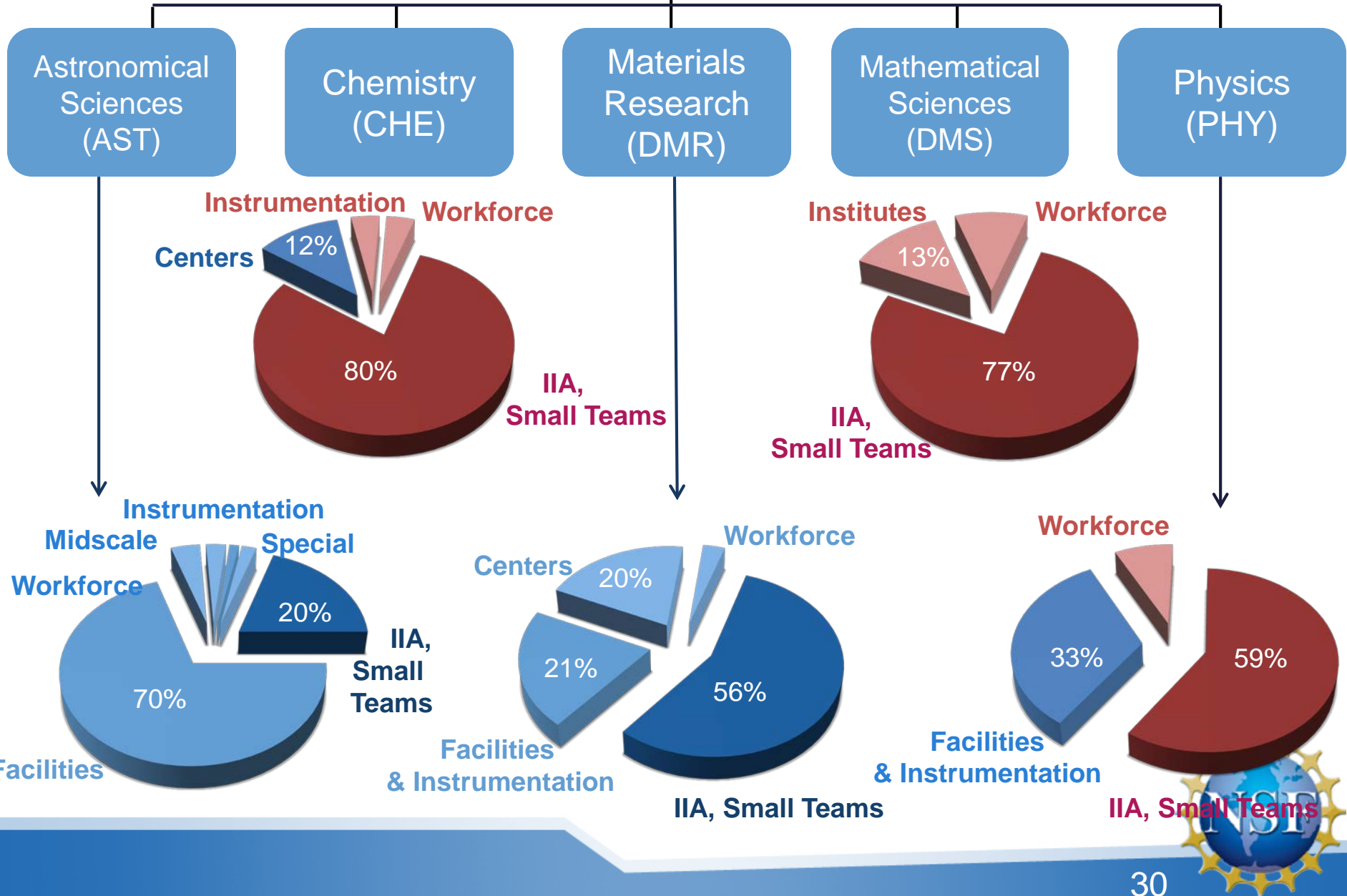
FY 2016  
Actual

Amount

Percent

- Slight DMR and PHY increases in FY 2017 caused by hosting of new NSF Science and Technology Centers
- Construction of DKIST and LSST are in a separate budget line, fully funded in request





# NSF Principles Applied to MPS

- Support early career
  - CAREER request kept 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 MPS research awards.
- Protect the core; cross disciplinary programs
  - Major research facilities are “core” to MPS.
  - Reduced dedicated funds to cross-disciplinary programs.
  - Rolled cross-disciplinary efforts into existing grants programs to retain flexibility to fund the best science.
- Strategic and prioritized reductions within directorates
  - Highest priority facilities fully funded; small reductions to a few facilities in transition.
  - Reduced mid-scale and instrumentation; support individual investigators.
  - Prioritized programs leading to “Big Ideas”.



# FY 2018 Appropriation Status

- Congress has passed a Continuing Resolution through December 8, at approximately FY 2017 funding levels
- Note: Budget Control Act (aka “sequester”) still in effect
- Appropriations Subcommittee Bills (in \$M):

Line	FY16 Actual	FY17 Enacted	FY 18 Request	House	Senate
NSF	7,494	7,472	6,653	7,339	7,311
R&RA	5,998	6,034	5,362	6,034	5,918
EHR	884	880	761	880	862
MREFC	242	209	183	78	183
AOAM	351	330	329	329	329
NSB	4	4	4	4	4
OIG	15	15	15	15	15





# FY 2019 Budget Request

- Currently in preparation
- Expect public release in January/February 2018
- Will include Agency Reform Plan



# Questions and Discussion



# Backup Slides



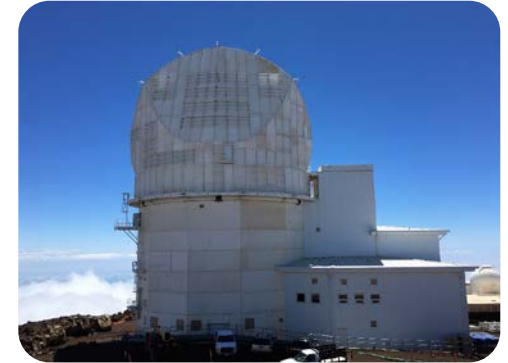
# Daniel K. Inouye Solar Telescope (DKIST)

## The World's Most Capable Solar Telescope



### Budget and Schedule

- Total cost \$344M
- Construction 76% complete
- First light in early 2020



### Milestones and Retired Risks

- Telescope primary mirror transported to the summit of Haleakalā (Aug. 2017)
- Hawai'i Supreme Court upheld DKIST use permit and management plan (Oct. 2016)
- The Coudé rotator platform assembly inside the enclosure is completed (2016)

### Risks

- Remaining technical risks are low
- No future wide-load transports anticipated, retiring much of the risk from protests



# Large Synoptic Survey Telescope (LSST)

## Beginning a New Era in Astronomy and Astrophysics



### Budget and Schedule

- NSF \$473M, DOE \$168M (camera), Private \$39M
  - Construction 43% complete
  - Survey start scheduled for FY 2023

### Milestones and Retired Risks

- Primary mirror completed and in storage
- Camera sensor delivery no longer on critical path
- Site construction progressing: artist's conception (right) vs actual construction picture (left)
  - Primary mirror cell assembly progressing satisfactorily
- Operations proposal received from AURA (Aug 2017). Review scheduled for Dec. 2017
  - Calibration telescope dome installed



### Risks

- Project delays during construction: earthquake, weather, site, labor agreement, exchange rate
  - construction shut down 14 days in June 2017 due to winter weather/impassable roads
  - schedule and funding contingency planned to handle

