Minutes of the Meeting of the
Astronomy and Astrophysics Advisory Committee
6 June 2016 Teleconference
National Science Foundation, Arlington, VA

Members attending:	James Buckley	Angela Olinto (Chair)
	Craig Hogan	William Smith (Vice-Chair)
	David Hogg	Angela Speck
	Buell Jannuzi	Suzanne Staggs
	Lisa Kaltenegger	Jean Turner
	Rachel Mandelbaum	Martin White
Agency personnel:	James Ulvestad, NSF-AST	Thomas Wilson, NSF-AST
	Chris Davis, NSF-AST	Randy Phelps, NSF-OIA
	Elizabeth Pentecost, NSF-AST	Jim Whitmore, NSF-PHY
	Ed Ajhar, NSF-AST	Jean Cottam, NSF-PHY
	Philip Puxley, NSF-AST	Vladimir Papatashvilli, NSF-Polar
	Diana Phan, NSF-AST	Paul Hertz, NASA
	Richard Barvainis, NSF-AST	Hashima Hasan, NASA
	Maria Womack, NSF-AST	Eric Linder, DOE
Others:	Monti DiBiasi, SWRI	Tricia Crumley, UTexas
	Karin Hilser, USRA	Heather Bloemhard, AASSara ?
	James Lochner, USRA	Jeff Foust, Space NewsNick?
	Heather Bloemhard, AAS	
	Jeff Foust, Space News	

MEETING CONVENED 12:00 PM EDT, 6 JUNE 2016

The Chair called the meeting to order.

The minutes from the 28-29 January 2016 and 25 February 2016 meetings were approved by the Committee.

Elizabeth Pentecost, the AAAC Recording Secretary, reviewed the list of identified Conflicts of Interest (COIs) for the AAAC. Dr. Staggs provided an additional conflict to her list.

The Committee selected dates for the Winter 2017 meeting, January 26-27, and the teleconference meeting, February 24.

The Chair thanked the members who were rotating off the Committee for their participation. Both Buell Jannuzi and Rachel Mandelbaum agreed to serve as Chair and Vice Chair, respectively, for the coming 2016-2017 year.

The Chair thanked the Committee for its hard work on the annual report. There will be a separate link to the updated Proposal Success Report on the AAAC web site. The Chair presented the report at the Committee on Astronomy and Astrophysics (CAA) meeting in March and the report was very well received. The Chair will be testifying before the House Committee on Science, Space and Technology in July. Jim Ulvestad and Paul Hertz will also testify before the Committee.

The Chair asked Committee members to comment on any issues that might be of importance to the new members of the Committee as well as issues that need follow-up. Some of those issues include divestments (as recommended by the Portfolio Review), Agency budgets, the Mid-Decade Review (to be released soon; this is part of the charge for the AAAC), and the Near Earth Objects (NEO) report (a possible topic for discussion at the next AAAC meeting).

David Hogg asked if the AAAC was going to make any specific recommendations about the oversubscription of grants or should the Committee be thinking about this for next year. Bill Smith indicated that he thought the next step was to get the AAS to undertake data collection that would be before any further comments should be made by the AAAC. Bill asked if the AAS was willing to do it or had any concept in mind about how to do it. A follow-up survey by the AAS and the APS is planned for the future.

Jim Buckley indicated that an important issue for future discussion is the shrinking and constrained budgets for the grants program and mid-scale programs.

Jim Ulvestad asked the Committee what expertise might be needed to cover some of the issues that might arise over the next year. Craig Hogan indicated that gravitational waves is a big issue for NASA and NSF, so expertise in this field would be good to have. Bill Smith noted that the CMB Stage 4 missions might be an area that the Committee would have to pay attention to in the future. Jim Buckley noted that NSF Physics is an integral part of what the Committee does and keeping the Physics Division involved is important.

Paul Hertz provided an update on NASA activities. There has been a leadership change in the Science Mission Directorate (SMD). Dr. John Grunsfeld retired from NASA on May 31 and Mr. Geoffrey Yoder, previously the Deputy Associate Administrator for SMD, is now Acting Associate Administrator for SMD.

The FY2016 appropriation and FY2017 President's Budget Request provide funding for NASA astrophysics to continue its programs, missions, projects, and support research technology. The total funding for the Astrophysics Division (including JWST, but excluding STEM) for FY2016 remains at ~$1.35B. This fully funds JWST to remain on plan for an October 2018 launch. It funds WFIRST formulation starting in February 2016 and allows all currently operating missions to continue, following the 2016 Senior Review (reported release later this week and will be discussed at AAS meeting). It will require some adjustments to the FY2017 proposal depending on the Senior Review outcome. The operating missions continue to generate important and compelling science results, and new missions are under development for the future. Progress is being made toward recommendations of the 2010 Decadal Survey. The NRC Mid Decade Review (with NSF and DOE) is underway and the report is expected in June/July. NASA is initiating large and medium mission concept studies as input for the 2020 Decadal Survey.

The FY 2017 President's Budget Request (PBR) for NASA Astrophysics was submitted to Congress on February 9, $757 million for Astrophysics and $569 million for JWST. This supports the commitment of an October 2018 launch date for JWST, formulates the WFIRST mission, continues development of the TESS exoplanet mission for launch by FY2018, supports operating missions extensions subject to the results of the 2018 Senior review, enables down selection of the next SMEX mission and selection of the next MIDEX mission concepts, and increases support for research and analysis. The budget supports other Decadal Survey priorities such as continuing the Explorer Announcement of Opportunities (AOs) at the cadence of 4 per decade, ESA's Athena X-ray observatory and L3 gravitational wave observatory, precursor exoplanet science and technology, and retains prior growth in research and analysis and the suborbital programs.

NASA has begun to study large mission concepts as input to the 2020 Decadal Survey. NASA has appointed Science and Technology Definition Teams (SDTs) and initiated four large mission concept studies: Far Infrared Surveyor, Habitable Exoplanet Imaging Mission, Large Ultraviolet/Optical/Infrared Surveyor, and X-ray Surveyor. The SDT's have a significant role in developing the science case, flowing that science case into mission parameters, vetting the technology gap list and making direct trades of science vs. cost/capability. NASA is also planning to issue a call for medium-size mission concept studies.

Angela Olinto asked about the $3M shortfall in the grants program. Hertz replied that they are in the process of reviewing proposals and will be able to report back to the AAAC in the Fall after they make their selections.

Craig Hogan inquired about NASA's involvement in gravitational waves; how does NASA think about community building and what can he tell his students about NASA's involvement? Hertz replied that NASA has invested in technology for a space based gravitational wave observatory, that NASA is working toward a partnership on an ESA-led gravitational wave observatory, but that community building is something NASA needs to think about.

Jim Ulvestad provided an update on NSF activities. Construction continues to progress on the Large Synoptic Survey Telescope (LSST) with no change in the start date of late 2022 for the 10-year survey. The Daniel K. Inouye Solar Telescope (DKIST) is making excellent construction progress, with some delays in site work due to poor weather in Hawai'i; DKIST is scheduled for completion in late 2019. Coincidentally, the data rate for DKIST is approximately equal to that of LSST (10-20 Terabytes/day), but will occur three years earlier; the data will have a different character than the LSST data, thus creating some different challenges in data handling.

The Senate Appropriations Committee marked up the NSF budget with Research and Related Activities (R&RA) exactly flat from FY 2016 to FY2 2017 and MREFC funds for a third Regional Class Research Vessel (RCRV). However, the House Appropriations Committee increased R&RA by $46 million, but completely cutting the RCRV from the NSF request; NSF is awaiting further Congressional action.

The FY2017 PBR for NSF is a total increase of 6.5% in the Research and Related Activities account ($6.425 billion vs. $6.034 billion for FY 2016) and 6.4% for AST ($262.61 million vs. $246.73 million for FY2016). The FY 2017 budget fully funds the two AST construction projects, DKIST and LSST. There are two flavors of spending for FY 2017 in the PBR, "Discretionary" which adheres to the two-year budget levels passed by Congress in late 2015, and "Mandatory", spending that is funded by a dedicated revenue stream, and requires a Congressional action separate from the standard appropriation bill.

In response to AAAC recommendations, NSF, NASA, and DOE and key project leadership continue to meet to discuss joint processing of LSST, WFIRST, and Euclid data. NSF and DOE continue to work on a plan for ground-based CMB Stage 4 experiments. The Agencies continue to pursue international partnerships following the "Principles of Access." In their annual report, the AAAC encouraged that full programmatic funding be provided to the Agencies to execute their programs, which is not in the current Congressional markups for FY 2017. Community-based groups should study growth in the research community, and with this in mind, NSF and NASA have held discussions with the AAS and the NRC about potential study parameters in relation to the next decadal survey.

The final engineering/environmental feasibility studies have been received for Arecibo, Green Bank, and Sacramento Peak. Those for Kitt Peak (2.1m, McMath-Pierce, vacuum tower) and the VLBA are expected in June. The Kitt Peak 4m telescope is transitioning to DOE funding in 2018. NASA has

selected the awardee for the Extreme Precision Doppler Spectrometer for the WIYN telescope on Kitt Peak. The Arecibo Environmental Impact Statement (EIS) process has started. AST is expecting to start formal environmental review processes for additional facilities this year, with decision points ranging from mid-2017 to early 2018.

Bill Smith asked what NSF is doing about reporting to Congress on any divestment activities. Ulvestad replied that AST has been talking with Congressional staffers on a regular basis. Congressional staff are interested in how this plays into the Decadal Survey recommendations and community recommendations.

Suzanne Staggs asked whether there are other ways to provide funding for CMB experiments (other than through the MREFC process). Ulvestad indicated that NSF is looking at several new research initiatives and one of those is an NSF-wide Mid-scale projects initiatives but nothing has been decided yet. One of the challenges faced is that a CMB Stage-4 proposal would have to be competed. Even though such an activity was a priority of the P5 report, it was not a strategic initiative of the 2010 Decadal Survey, so there is not a rationale for AST to move CMB-S4 ahead of Decadal Survey priorities that AST has not been able to fund as a result of the Decadal Survey priorities.

Rachel Mandelbaum noted that another NSF Division has removed the proposal deadline for some of its programs. She asked whether the mechanisms the other Division used could be transferrable to AST. Ulvestad indicated that the programs tried without a deadline were in the Earth Sciences Division in the Directorate for Geosciences (GEO), and the programs were self-contained where the program officers had a lot of flexibility to run the program as a stand-alone independent of anything else. AST is looking at different mechanisms but it is not clear that the experiences from the programs in GEO are applicable to those in AST. Thus AST is proceeding carefully in considering no-deadline possibilities.

Eric Linder provided an update on DOE activities. The enacted FY 2016 budget for HEP is $795 million. The enacted FY16 Budget for HEP is above the PBR and is squarely in P5's Scenario B. The four Cosmic Frontier MIE Projects (LSST, DESI, LZ, and SuperCDMS-SNOLab) all had budget increases. Even though the FY16 approved budget is more than the requested amount, due to the budget guidance DOE received and other constraints, the research budget is still constrained and reduced by a few % overall. The FY 2017 President's Budget Request (PBR) for HEP ($818 million) aims to continue the successful implementation of the P5 strategy. The FY 2017 PRB for the Cosmic Frontier is $130.07 million, slightly below the FY 2016 enacted budget ($130.58 million). The request is carefully balanced between support for projects ($212M), facility operations ($252M), and scientific research ($354M). As recommended by P5, a complementary suite of MIE projects will address dark matter and dark energy - continue their fabrication activities at the planned levels. Planned fabrication funding increases support for the LSST camera ($45M), DESI ($10M), LZ ($10.5M), and SuperCDMS-SNOLab ($4M).

All 4 Cosmic Frontier MIE fabrication projects (DESI, LSST, LZ, and SuperCDMS-SNOLab) have passed new milestones in the last year. HEP has been involved at a low level in Cosmic Microwave Background (CMB) experiments for decades, especially in technology and computing. DOE is now funding the South Pole Telescope-3G camera. The HEP has been involved for the past year in a Cosmic Visions CMB group that is coordinating HEP efforts in this area. The community has been participating in community workshops and is preparing a draft Science Book. As recommended by P5, HEP is planning to participate in the CMB-S4 experiments.

In response to the AAAC Report, a Tri-Agency/Tri-Project Group meets monthly to discuss DOE/NASA/NSF cooperation on Euclid/LSST/WFIRST, in particular Joint Data Processing and Joint Simulations. NSF, NASA, and DOE talk regularly about program planning, overlaps, and any issues that might arise in any interagency projects. Depending on science, project, contribution, and agency considerations, sometimes DOE partners on fabrication or provide facilities. DOE makes country-level

agreements to allow science partnerships to move forward. HEP participates in the Global Science Forum's Astro-particle Physics International Forum (APIF).

Jim Ulvestad, Paul Hertz and Eric Linder thanked Angela Olinto, Craig Hogan, Suzanne Staggs, Angela Speck, and Jim Buckley for their service on the AAAC. Hertz noted that the Agencies could not do their jobs without the participation and support from the community members.

MEETING ADJOURNED AT 3:30 PM EDT, 6 June 2016