

**Meeting Minutes of the
Astronomy and Astrophysics Advisory Committee
2 June 2021**

Members Attending:

John O'Meara (Chair)	Stephan Meyer
Kyle Dawson (Vice-Chair)	Petrus Martens
Ian Dell'Antonio	Alexie Leauthaud
Scott Dodelson	Deirdre Shoemaker
Andrew Connolly	Nancy Chanover
Mansi Kasliwal	Priyamvada Natarajan
Eliza Kempton	

Agency personnel:

Martin Still, NSF-AST	Paul Hertz, NASA
Allison Farrow, NSF-AST	Keith Warfield, NASA
James Neff, NSF-AST	Hashima Hasan, NASA
Chris Smith, NSF-AST	Peter Kurczynski, NASA
Marcus Seigar, NSF-AST	Dan Evans, NASA
Elizabeth Pentecost, NSF-AST	Mario Perez, NASA
Nigel Sharp, NSF-AST	Dominic Benford, NASA
Zoran Ninkov, NSF-AST	Jim Lochner, NASA
Dave Boboltz, NSF-AST	Lorella Angelini, NASA
Ed Ajhar, NSF-AST	Sangeeta Malhotra, NASA
Glen Langston, NSF-AST	Azita Valinia, NASA
Craig McClure, NSF-AST	Brian Williams, NASA
Tanner Abraham, NSF-AST	Kartik Sheth, NASA
Harshal Gupta, NSF-AST	Ira Thorpe, NASA
Alison Peck, NSF-AST	Valerie Connaughton, NASA
Jonathan Williams, NSF-AST	Terence Doiron, NASA
Matt Viau, NSF-AST	Terri Brandt, NASA
David Morris, NSF-AST	Jacob Slutsky, NASA
Donna O'Malley, NSF-AST	Michael New, NASA
John Chapin, NSF-AST	Bernard Kelly, NASA
Luke Sollitt, NSF-AST	Barbara Grofic, NASA
Chris Davis, NSF-AST	Tricia Crumley, DOE
Joseph Pesce, NSF-AST	Drew Baden, DOE
Ashley VanderLey, NSF-AST	Eric Linder, OSTP
Saul Gonzalez, NSF-MPS	Mark Matsumura, OSTP
Randy Phelps, NSF-OD	Tammy Dickinson, OSTP

Others:

Ashlee Wilkins, HSST Committee	Stu Weins, Lockheed Martin
Marcia Smith, SpacePolicyOnline.com	Lewis Groswald, Lockheed Martin
Nick Konidaris, Carnegie Inst. for Science	Dave Murrow, Lockheed Martin
Alexandra Pope, U Mass Amherst	Alison Nordt, Lockheed Martin
Samantha Thompson, Smithsonian	Alexey Vikhlinin, CfA Harvard

Allen Cutler Senate CJS Appropriations
Furea Shirai, Nat'l Instruments
Jason Wright, Penn State U
Joe Levy, Colgate U.
Matt Malkan, UCLA
Harvey Tananbaum, Chandra
Grant Tremblay, CfA Harvard

Murdock Gilchriese, LBNL
Gene Mikulka, C&F
Kelsie Krafton, AAAS
Julia Bauer
Monty Di Biasi
April Olson
Pamela Green

Welcome and Opening remarks (Martin Still)

- Martin Still gave an overview of the FACA requirements for the AAAC members.
- Priyamvada Natarajan will be the new AAAC Chair starting at the AAAC September 2021 meeting.

NASA Program and Budget Update (Paul Hertz)

- NASA's FY22 President's Budget Request (PBR) was released last Friday. NASA is waiting for Congress to adjudicate the budget request and to craft an appropriation bill and decide on the budget awarded to NASA.
- Former Senator Bill Nelson was sworn in on May 3, 2021, as NASA's new Administrator.
- Pam Melroy, former astronaut, has been nominated to be NASA's Deputy Administrator and is awaiting confirmation.

There are 3 upcoming launches:

- CUTE: Colorado Ultraviolet Transit Experiment (University of Colorado) is a CubeSat launching in September as a "rideshare" with the Landsat 9 launch.
- IXPE: Imaging X-ray Polarimetry Explorer (medium sized launch) is currently going through its test campaign. Scheduled for a launch in mid-November.
- James Webb Space Telescope (large sized launch) has completed its environmental testing.

Budget requests include an initiative for inclusion and diversity at NASA and to support that advancement in the community following the death of George Floyd. Budget initiatives include:

- The National Academies has supported a research study to investigate barriers in mission leadership.
- A second study intended to identify the types of data NASA should be collecting to measure progress with diversity and inclusion.
 - o Piloting the requirements of inclusion plans.
- Workshops later this year to discuss how NASA can better serve their community with minority serving institutions.

Covid-19 Update:

- NASA Centers are at a maximum capacity of 25% of onsite work due to COVID precautions, though progressing with higher capacity as more people get vaccinated.
- R&A programs are being executed fully with virtual peer review panels.
- Travel is not allowed for NASA employees other than for mission-critical work.
- NASA's website displays the flexibilities for grantees, contractors, and civil servants regarding COVID.

Research Program

- The postdoctoral program is limited to applicants who already have permission to work in the U.S. because of the inability to get J1-Visas.
- Astrophysics put out a call for funded augmentations and received 170 requests, of which 20-25 applicants (early career researchers) were accepted.

FY22 Budget: The Astrophysics Budget Features (see NASA presentation) has the Decadal Survey in mind with planning milestones for FY21-22 and NASA planning for ASTRO 2020. The hope is to have implementation recommendations within 8-10 weeks after the Decadal Survey is released.

- NASA budget increased R&A by 60% in relation to the FY21 budget.
 - o R&A funding will not be reduced in the out-years.
 - o Funding is also sent out through post-doctoral fellowships, technology funding, and Guest Observer (GO) programs for all of their missions.
 - o Size of average proposal increases with inflation while the acceptance rate is decreasing.
 - o NASA doubled the funding for the graduate student program.
 - o Though the number of funded proposals is increasing, the number of proposals received is increasing at a slightly higher rate, thus there are reductions in the selection rate which is projected to be between 19%-20%.
- R&A program initiatives:
 - o Pioneer Program
 - o Consolidated Exoplanet Research Program
 - o Supporting proposals for capital equipment and upgrades to laboratory equipment in Lab Astro Program.
 - o Doubled funding for graduate student program.
 - o Pilot Program for acquiring DEI plans.

Mansi Kasliwal asked a question about rescheduled launch dates, specifically for Roman. Paul Hertz indicated that COVID has impacted all launch dates. Launch dates will be adjusted accordingly.

Eliza Kempton asked about funding success rates. Paul Hertz indicated that he cannot predict how the community will grow, but if there are increases at historical rates then something will need to be done to prevent the success rates from dropping below 20%. A bi-annual cadence is possible, with no due dates also possible, but NASA will watch the proposal counts.

John O'Meara asked a question about COVID-19 relief. Paul Hertz replied that cost adjustments are still being made based on how the pandemic is playing out. John also asked about virtual peer review panels being here to stay. Paul Hertz replied that NASA surveyed reviewers afterwards, and indications are that people are better able to balance other commitments and also reduce carbon footprints. No decision has been made yet, but the future will likely be a mixed set of virtual & in-person; a Hybrid model is hard because people on screen and people in person have a disparate impact. NASA will need to find a way to make hybrid panels work.

John O'Meara asked about renaming Webb. Paul Hertz indicated he is aware that concerns have been raised. NASA is working with historians to review James Webb's political and historical role.

DOE Program and Budget Update (Drew Baden)

There was a small budget increase over FY20 into FY21. FY21 appropriations details were highlighted (see DOE presentation). Congress has shown strong support for HEP. HEP will not know the FY22 budget for some time, but the FY22 request has an emphasis is on research.

DESI is now taking data as of May 2021 and will measure between 30-50 million galaxies. A Rubin Camera project & commissioning update was provided. The Rubin camera fabrication and commissioning project has been restructured due to COVID. Assembly verification is ramping up now, and shipping to Chile next year. There will be a 16-month operations delay due to COVID. The operations project will be shared 50/50 with NSF. A joint DOE/NSF review of the operations plan will happen early next year.

A Cosmic Microwave Background Stage 4 (CMB-S4) update was provided. With sites in Chile and the South Pole, CMB-S4 has a 250+ member collaboration. CMB-S4 is a Congressional-approved major item of equipment. CMB-S4 status and plans overview were provided. DOE and NSF have a long and successful history of partnering. There will be a status review led by DOE in November 2021.

COVID accommodations are available, and DOE is working with PIs on a case-by-case basis. In summary, HEP continues to carry out the 2014 P5 strategic plan.

John O'Meara asked about the response in the budget request to cover COVID costs. Drew Baden replied that he was not aware of any funds; the President's budget holds project budgets flat. OSTP has been moving money as needed to address these impacts.

John also asked about Rubin operations. Ed Ajhar answered that a review is expected before full operations.

John O'Meara gave kudos to the DESI team.

Scott Dodelson asked about jointly coordinating AI efforts across agencies. Drew Baden replied that he did not know of any formal efforts to coordinate across agencies.

NSF Program and Budget Update (Chris Smith)

Chris Smith provided the AAAC with some background about his experience and new role as Acting AST Division Director.

DKIST: Construction was halted during COVID, with gradual reopening in July 2020. Construction schedule pushed out by roughly 1 year due the pandemic. A Call for proposals for time on DKIST has had a lot of interest, including internationally. NSO is considering double-blind review for those proposals.

Vera C. Rubin Observatory: Construction was halted during COVID, with ramping up construction again in September 2020. Dome closure has been successful. All of the delays have created a 16-month delay in completion of the project and increased costs by ~\$60M.

Arecibo Observatory: Debris cleanup has continued, with activities complying with environmental and historical preservation guidelines. Data collection is still ongoing for the 12m telescope, the Lidar facility, and the optical facility at Culebra. The cost of cleanup is roughly \$40-50M, with a Congressional report provided on the slide. The focus now is on the future of Arecibo Observatory with a workshop. The NSF

is looking for actionable and innovative ideas of varying timescales from the community, to include ways to include Puerto Rico and users of the observatory. The virtual workshop begins June 4 with an orientation.

NOIRLab: DESI involves interagency collaboration with DOE. 29 papers have been written and will be released.

GBO: There is a prototype development of a radar (700W) on GBT using cooperative research from NRAO and Raytheon Intelligence & Space. They are considering a 500kW transmitter.

NRAO: a 2021 STEM for All showcase featured many students, including under-represented groups.

AST Staffing: AST Division Director interviews are underway. Ashley Vanderley is in a new role as AST Senior Advisor for Facilities. John Chapin has been named as the new Special Advisor for Spectrum position, joining Jonathan Williams and David Morris supporting spectrum research and oversight. AST has a new Pathways Student, Tanner Abraham as a member of the Program Support team. There are three vacancies for program officers with searches underway.

Programs: Some deadlines are delayed for solicitations. Two new NSF MPS-wide opportunities include MPS Ascend (NSF 21-573) and LEAPS (NSF 21-570). The deadline for proposal submission is mid-June 2021.

Budget: See slides. Arecibo cleanup is shared with the GEO Directorate, and other divisions throughout the NSF.

Q&A: John O'Meara asked about MSIP dollars in the budget, and Jim Neff (NSF AST Deputy Division Director) replied that the money is funded every 2 years; also there is continuous funding from year-to-year to cover the large awards. The next competition is planned for 2022, using FY2023 funds. John also asked about MSRI – Chris Smith replied that MSRI-2 is funded out of MREFC, and that it is an NSF-wide program, not just AST. John had another question about the Facilities Transition Pilot, whether there is language in the President's budget request. Chris replied that he will get back to the AAAC on this, and other O&M issues which are being more actively discussed with the MPS AC, agency-wide, NAS, and Congress.

2020-2021 AAAC Report Readout (John O'Meara)

- COVID-19
 - The agencies are successful at mitigating the impacts of COVID-19. They should focus on supporting early-career scientists, and Congress should offset planned cuts.
- Data
 - The response from Agencies is unclear. However, agencies are making good progress in developing standards and guidelines for astronomy data. The AAAC believes in open code due to the provenance of data to replicate results concerning large facilities and major initiatives. The AAAC believes agencies should conduct a review on data access and revisit its Access Principles in the wake of Astro2020. The community needs best practices, standards, and guidelines around AI and machine learning.
- NEOs and Mega-Constellations
 - Near-Earth Asteroids (NEOs). The charge of the George E. Brown Act is not being met currently. There is a concern with delays in the NEO surveyor mission Key Decision

- Point (KDP), but these issues may be less of a problem since the filing of this report. Current and future ground and space missions are necessary to succeed in this effort.
- Mega-constellations. AAAC feels the cross-agency efforts are needed to appropriately work with industry leaders to mitigate the impact of satellites mega-constellations on optical and radio astronomy. Need best practices and quantifiable data to assess impact. The extension of mega-constellations into broader spectrum management. Recommend the further establishment of radio-quiet zones and extend vertically into low earth orbit and beyond.
 - Agency highlights
 - NSF. The MSIP program is under- and variably-funded. Metrics to ascertain the success of MRI, MSIP, and MSRI are challenging to obtain, which prevents the AAAC from assessing it. The current way NSF reports its budget compared to other agencies prevents the AAAC from weighing in on it because the numbers are a year out of date. The AAAC strongly supports the Facilities Operations Transition pilot, but it is significantly underfunded.
 - NASA. The AAAC is pleased to see the addition of inclusion as a core value for NASA. AAAC requests reports on the implementation of the Strategy for Data Management and Computing for Groundbreaking Science. The AAAC requests continued reporting on dual-anonymous implementation. The AAAC recognizes it is an imperfect tool and needs to get a sense of how it evolves. The AAAC requests reports on efforts to increase the diversity of mission PIs.
 - DOE Office of Science. The AAAC requests reports on CMB-S4 and updates on implementing a long-term operations plan for the Rubin Observatory. Furthermore, the AAAC requests updates on DESI science operations and programs.
 - Diversity, Equity, and Inclusion
 - Evidence of bias mitigation in the review process. Lack of demographic data makes it challenging to assess programs. Organizations need to collaborate with OMB concerning this effort. The AAAC requests regular DEI initiative updates from each agency.
 - Astro2020
 - Budget constraints threaten US leadership in astronomy. The Agencies will be challenged to implement an ambitious set of recommendations from Astro2020.

Comment Period

Chris Smith asked for additional input on data the AAAC requires to understand the success rates of MRI, MSIP, and MSRI programs. Some of these programs are NSF-broad, so assessing impact will be difficult. AST will work on getting these numbers. John O'Meara responded that the AAAC would like AST-specific information. Martin Still indicated that it is essential that the Committee knows what it wants to hear before the meetings and requests agenda topics in advance. Chris Smith suggests while this meeting is fresh in your mind, make the request for information now.

The meeting minutes from prior meetings were approved.

Chris Smith emphasized the importance of machine learning and AI and asked members to discuss further ethical and societal implications of training the workforce. Andrew Connolly stated that these techniques impact society as a whole. The astronomy community must include training on fairness and diversity. Astronomy must be aware of the work in this area in academia and society. Priyamvada Natarajan stated that ethical and societal implications occur after completing the effort, and the goal is to bring up these

issues in the planning phase. Chris Smith stated that astronomy can develop more AI experts that a wider community can use, and these experts must learn to interact in other areas.

Martin Still concluded the meeting at 3:48.