NSF Town Hall: AAS 236

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NSF Division of Astronomical Sciences
June 2, 2020
Agenda

• COVID-19 Impacts
• AST Personnel
• NSF Personnel
• Science Highlights from AST Facilities
• Budget Status
• AST Grants Program (Jim Neff)
• Radio/Optical Spectrum Management (B. Ashley Zauderer)
COVID-19 Impacts

• AST facilities
  • Observing: NRAO (VLA, VLBA), GBO, Arecibo, GONG, Gemini (N).
  • Idle: Gemini (S), CTIO, Rubin Obs., ALMA, KPNO, DKIST.
  • Significant restart risks/costs, replan of MREFC programs
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• NSF: *NSF Implementation of OMB Memo M-20-17.*
  • Includes (but not limited to):
    • Allowability of salaries and other project activities.
      
      *Recipients are authorized to continue to charge salaries, stipends, and benefits to currently active NSF awards consistent with the recipients’ policy of paying salaries (under unexpected or extraordinary circumstances) from all funding sources, Federal and non-Federal.*

• Decadal Survey:
  • Delays in release of the decadal survey may impact start of MREFC funding for large ground-based programs.
COVID-19 Impacts: NSF Staff

• March 16: NSF implemented up to 100% telework policy.
  • NSF building essentially closed to staff.
  • Flexible work schedules for staff, flexible dependent care.
  • *Return to work?* NSF never stopped working.

• Work-related travel cancelled.

• All NSF meetings/panels 100% video conference.
  • AST was in middle of panel season.
  • AST has successfully run all panels after mid-March remotely, 2 POs per panel plus Admin support, AST continued as scheduled.
Personnel
Directorate for Mathematical and Physical Sciences (MPS)

- Anne Kinney, Assistant Director (AD) for MPS, left NSF May 1, to become the GSFC Deputy Director in May 2020.

- Sean Jones, Deputy AD, is acting AD.

- Tie Luo, Deputy Division Director of the Division of Mathematical Sciences is acting Deputy AD.
NSF Office of the Director

• France Córdova ended a 6-year term as NSF Director March 31.

• Sethuraman Panchanathan nominated by President to be 15th NSF Director (07 Jan. 2020).

• Kelvin Droegemeier named as Acting NSF Director on April 1. Current Director of OSTP and former member of the National Science Board.
Facility Highlights
NSF’s National Optical-Infrared Astronomy Research Laboratory

NOIRLab
The Inouye Solar Telescope sees large bubbling cells the size of Texas but can also see tiny features as small as Manhattan Island. This is the first time these tiny features have ever been resolved. The Inouye Solar Telescope is showing us three times more detail than anything we’ve ever seen before. For more information about this telescope, visit www.nso.edu
Gemini-N Lucky Imaging of Jupiter

- Gemini-N has collected some of the highest resolution images of Jupiter obtained from the ground.
- Images are part of a multi-year joint program with the Hubble Space Telescope in support of NASA’s Juno mission.
- The facilities combined observe Jupiter’s atmosphere as a system; revealing winds, gases, heat, and weather phenomena.
- Images reveal that lightning strikes, and some of the largest storm systems that create them, are formed in and around large convective cells over deep clouds of water ice and liquid.
- Observations confirm that dark regions in the Great Red Spot are gaps in the cloud cover and not due to cloud color variations.

Astronomers using the infrared imager NEWFIRM on the Mayall telescope on Kitt Peak have identified several overlapping bubbles of hydrogen gas ionized by some of the first stars formed after the cosmic dark ages, a mere 680 million years after the Big Bang.

- Stars contained in EGS77 Galaxy group.
- Used to discover the two fainter galaxies in the group discovered via NEWFIRM narrow-band imaging.
Barnard’s Galaxy

- Barnard’s Galaxy, a dwarf galaxy neighboring the Milky Way, is revealed in this stunning image from the Blanco 4-m telescope.
- The image reveals regions of intense star formation and a scattering of immense cosmic bubbles.
- Glowing red regions of star formation distributed throughout Barnard’s Galaxy indicate that star formation is widespread.
GBT Detects Faint Repeating Fast Radio Burst

- Fast Radio Bursts (FRBs) are mysterious energetic flashes of radio emission originating from unknown extragalactic sources, and most were thought to be non-repeating.

- GBT follow-ups detected a very faint signals from FRB 171019 – some 9 and 20 months after brighter bursts were found by the Australian Square Kilometre Array Pathfinder (ASKAP) – showing that this FRB repeats in time.

- The very high sensitivity of the GBT allowed detection of ~600x fainter signals.

- More repeating faint FRBs missed by less sensitive observations may be detectable with the GBT, helping to elucidate the nature of FRBs.

GBT and ASKAP detections of FRB 171019 (Kumar et al. 2019, ApJL, 887, L30)

AAS NOVA Highlight, 29 January 2020
NSF’s Arecibo Observatory

- Critical scientific observations continued during challenging past few months
- Detected “mask-shaped” asteroid
- Expected to be largest asteroid to fly by Earth this year
- Distance ~16 times Earth-moon distance

AO radar image of the potentially hazardous object, asteroid 1998 OR2.

AO Management Team led by the University of Central Florida

Planetary Radar team led by Anne Virkki
(Image Credit: UCF)

AO Management Team led by the University of Central Florida

Image Credit: Arecibo Observatory

(52768) 1998 OR2 2020 Apr 17 UT
ALMA Discovers Massive Rotating Disk in Early Universe

- Observations by the Atacama Large Millimeter/submillimeter Array (ALMA) show a massive disk galaxy, similar to our Milky Way, but at ~12.3 billion light years (the most distant rotating galaxy every observed).
- The unprecedented resolution of ALMA allowed measurement of the galaxy’s disk, indicating a rotation velocity of 272 km/sec (comparable to the Milky Way).
- Follow-up observations by the Very Large Array and the Hubble Space Telescope show a star formation rate 10x more than that of the Milky Way.
- Such big, fully formed, galaxies are not expected so early in the history of the universe – only 1.5 billion years after the Big Bang.
- The results appear in *Nature*, 20 May 2020

Top Right: An artist’s impression of the Wolfe Disk
Bottom Right: The ALMA radio image of the disk galaxy.
Credit: NRAO/AUI/NSF, S. Dagnello (top) and ALMA (ESO/NAOJ/NRAO), M. Neeleman; NRAO/AUI/NSF, S. Dagnello (bottom)
Budget
FY 2020 Budget

• Continuing Resolution through Dec 20th.

• Enacted Foundation appropriation increases R&RA 3% (to $6,737M).

• MREFC line fully funds LSST (Rubin Obs) at request level.
  • FY 2019 was last year for DKIST MREFC (per construction plans).

• AST/AAG (grants program): should be reasonable year.

• AST/MSIP (Astro. instrumentation): should be reasonable year.

• NSF/Mid-scale RI-2 (MSRI-2) awards planned (programs in the $20M - $70M range).
Future budgets

- President’s Budget Request (PBR) FY 2021 released Feb.
  - As in previous recent PBRs, funding requested for NSF is reduced from recent fiscal year appropriations.
  - Recently, Congress has appropriated NSF funding above the PBR level.

- Decadal funding:
  - Bipartisan support in Congress to ramp up Federal R&D funding in the 2020s.
  - For example: In late January House Science, Space, & Technology Committee Republicans introduced *Securing American Leadership in Science and Technology Act*
    - F. Lucas (R-OK) (paraphrased): S&T is foundational for addressing generational challenges: competition with China and climate change.
    - Increases NSF budget to $14.9B by 2029.
    - Long term impact of COVID-19 on economy ???

- Endless Frontiers Act
Visit the NSF Booth at AAS 236!