



NSF Division of Astronomical Sciences (AST) Report

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Outline

- Highlights, NSF and AST Budgets
- Astronomy and Astrophysics Advisory Committee
- Decadal Survey, Portfolio Review, and OIR System
- Astronomy and Astrophysics Research Grants (AAG)
- Job Opportunities in AST



Highlights, NSF and AST Budgets



Exoplanet Host Stars

- In GG Tau-A, ALMA detects clumps of gas between outer and inner disks of binary star system
- Inflow to replenish Jupiter-mass inner disk
- Speckle imaging of Kepler exoplanet hosts using WIYN and Gemini-N indicates that half of all exoplanet hosts are binary systems

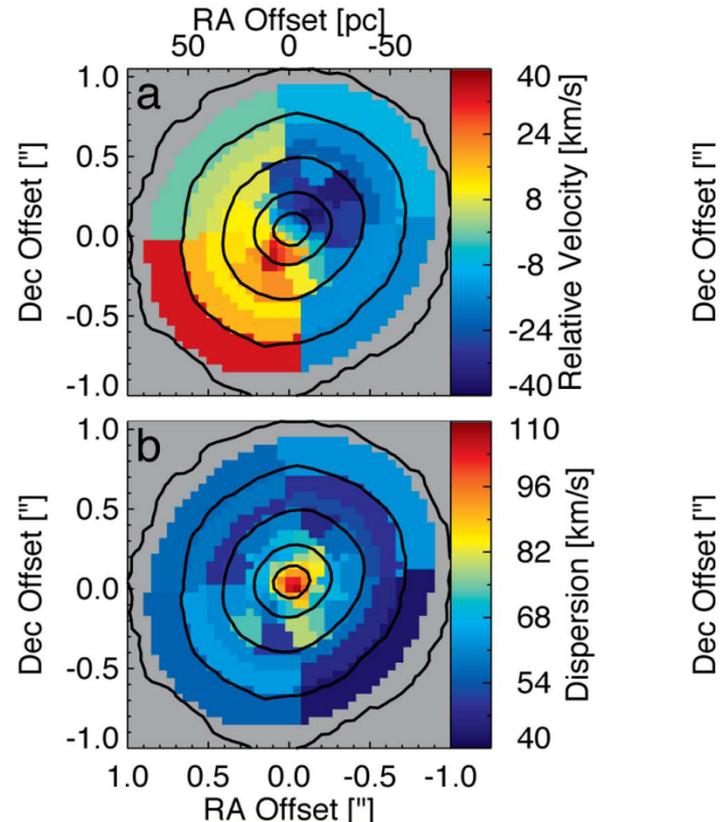


- GG Tau-A: Dutrey et al., Nature in press
- Kepler exoplanet hosts: Howell et al., Ap. J., in press,



Massive Black Hole in M60-UCD1

- Ultra-Compact Dwarf Galaxy M60-UCD1 observed with Gemini-N AO system, imaged with HST
- Spectroscopy shows clear rotation in inner arc-second and high velocity dispersion in inner 0.1 arc-sec
- Interpreted as black hole of $20 \times 10^6 M_{\text{Sun}}$ in galaxy of total mass only $140 \times 10^6 M_{\text{Sun}}$



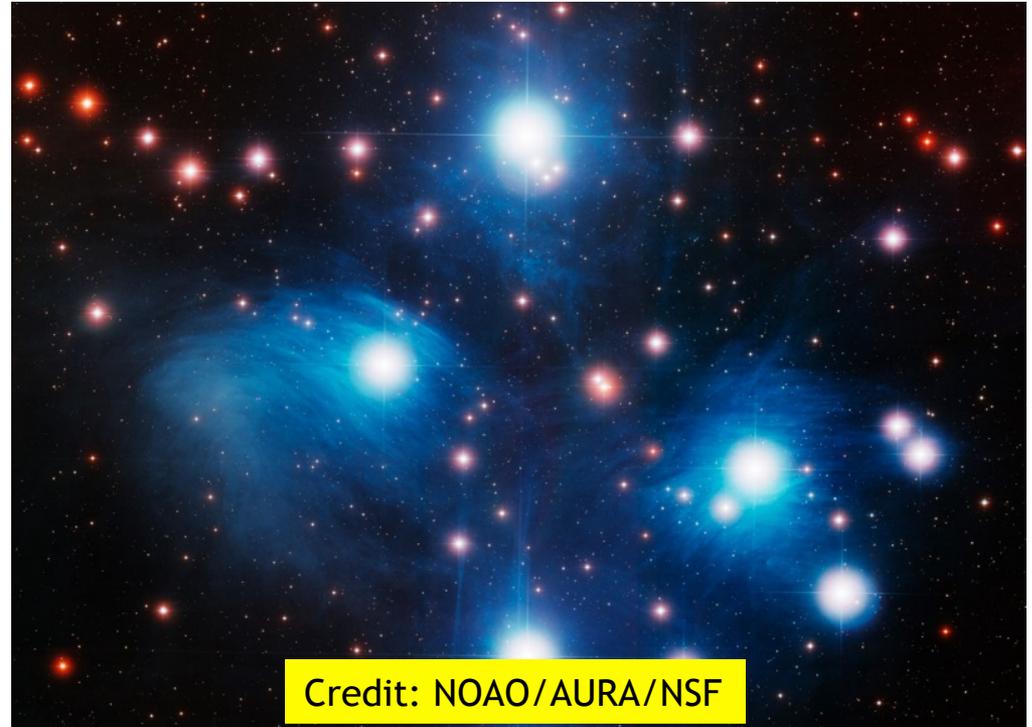
Credit: University of Utah/Nature

- Seth et al., 2014, Nature, 513, 398



Pleiades Distance

- Hipparcos “accepted” distance to Pleiades is 120.2 ± 1.5 pc closer than previously accepted distances that were 10% larger
- VLBI parallax measurements of 5 stars in Pleiades give distance of 136.2 ± 1.2 pc, consistent with pre-Hipparcos results
- Implications for astrophysical models of Pleiades-age stars



- Melis et al. 2014, Science 345, 1029



Highlights

- ALMA construction completed except for punchlist items
 - Spectacular science results already appearing
- Daniel K. Inouye Solar Telescope (DKIST) renamed, construction well on its way
- Construction award made for Large Synoptic Survey Telescope (LSST)
- Mid-Scale Innovations Program (MSIP) concluded its first round, with new awards
- Completed reorganization of grant discipline areas to group Planetary and Exoplanetary Astronomy



Not-So “High”lights

- AST Division budget remains stagnant
 - President’s Budget Request of \$236 million for FY 2015, compared to \$246 million appropriated in FY 2010
- Astronomy and Astrophysics Research Grants (AAG) budget went from \$49.4 million in FY 2010 to \$43.7 million in FY 2014, with funding rate falling from 22% to 16%
- Ended University Radio Observatories and Telescope Systems Instrumentation Program as standalone activities, folded into MSIP
- “Open Access” time headed for reductions in both optical and radio regimes

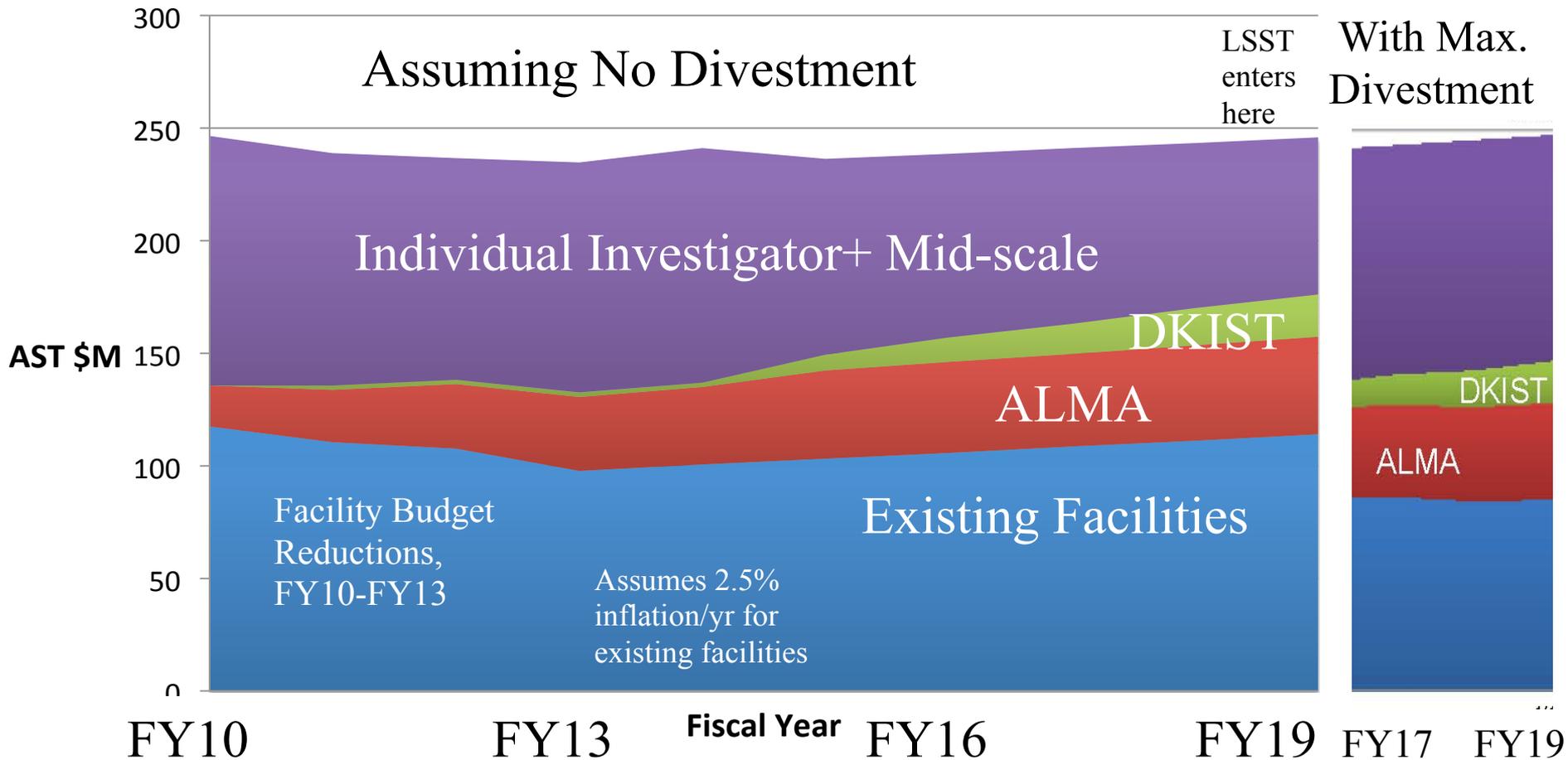


Issues to Watch

- Merit Review oversight by Congress
- America Competes reauthorization
- Outcome of FY 2015 appropriations
 - More sequestration in the future?
- Facility divestment and increasing activities in Chile
- Inspector General concerns about NSF construction projects



AST Portfolio Scenarios



AST budget assumption: FY15=Request, 1%/yr growth thereafter



Astronomy and Astrophysics Advisory Committee (AAAC)



What is the AAAC?

- Advisory Committee chartered by Congress in 2002
 - Advises NSF, NASA, and DOE on interagency astrophysics activities
 - Advises on activities related to NRC decadal surveys
 - Transmits annual report to Congress by March 15 of each year
- 13 members: selected by NSF (4), NASA (4), DOE (3), and OSTP (2)
- Meets four times per year (typically two in person, two by telecon)
 - Next meeting is November 17-18



AAAC “Principles for Access”

- Background
 - Apply principles to all large astrophysics projects and facilities funded by NSF AST, NASA Astrophysics, and DOE HEP
 - Apply principles to international collaborations, interagency collaborations, and collaborations with other public and private entities
 - Assess all proposed large astrophysics projects and facilities against these principles before deciding to undertake them
 - Discuss these principles with partners in current and future large astrophysics partnerships and facilities

- If agencies deviate significantly from these principles, reason for deviation should be publicly articulated



Six Recommended Principles

- Primary goal: produce best understanding of the universe
 - Balance opportunity for implementing consortium and funding partners with participation by wider community
- Global Coordination
 - Efficient and effective use of resources
- Open Data
 - Accessibility of data in a scientifically useful form; may include period of limited access
- Open Access
 - Merit-based process, with some preferred access for contributors
- Opportunity to Contribute
 - Openly advertised criteria for collaboration membership
- Reciprocity
 - Those desiring access to resources should offer similar access to their own resources



Decadal Survey, Portfolio Review, and OIR System



Decadal Survey (NWNH) Status

- Funding circumstances are substantially below those assumed in NWNH
- LSST construction approval in MREFC line was secured, with award made on August 1, 2014 (survey begins 2022)
- Mid-Scale Innovations Program (MSIP) proposals evaluated, and first awards have been made
- NSF and community participating in TMT Board, Science Advisory Committee, via planning award
- Only CTA and CCAT opportunities - MSIP
- “Small” recommendations: TCAN (Theoretical and Computational Astrophysics Network) started with NASA, no funds available for other recommended increases
- CAA O/IR System Study under way
- Portfolio review carried out in 2011-2012



MSIP and Open Access

- Two previous programs provided “open access”
 - TSIP (Telescope Systems Instrumentation Program) provided fixed number of nights per dollar, typically \$3-4 million/yr in ~2010
 - URO (University Radio Observatories) provided 30-50% of observing time typically \$6-10 million/yr in 2008-2014
 - TSIP and URO programs generally received 3-6 proposals, with funding rates of 25-50%
- MSIP subsumed these programs as a component of MSIP program, which also has open access to data as a goal
 - FY 2013 solicitation was for FY 2014/15 funds
 - Total AST MSIP budget started at ~\$14 million/yr, hence with ~\$28 million available through first solicitation
 - Also attracted several million dollars in co-funding and made small out-year commitments, for total of ~\$35 million
 - Expect similar FY 2015 solicitation for FY 2016/17 funds



MSIP First Results

- 38 pre-proposals, requesting \$400 million (12 full proposals invited)
 - Between a quarter and half classified their proposals as “Open Access” (could specify multiple categories)
 - Observing time/access offered relative to funding (aka cost/benefit) varied widely compared to either TSIP or URO standards
 - Most other proposals (and some with Open Access) involved instrumentation development
 - Community benefit criterion meant that panel had to weight the value per dollar of open access time against the value per dollar of, for example, student training in instrumentation
- MSIP Awards
 - Three full awards, so full-funding rate is below 10%
 - Two offer open data access
 - Seed funding or co-funding expected for 2-3 other awards



NRC/CAA OIR System Study

- “A Strategy to Optimize the U.S. Optical and Infrared System in the Era of the Large Synoptic Survey Telescope (LSST)”
- Committee chaired by Debra Elmegreen, Vassar College
- Three meetings planned
 - July 31/August 1; October 12-13; December 2-3
- Community input received and under discussion
- October meeting had presentations from observatory directors, GMT, TMT, adaptive optics experts, ESO, etc.
- NSF has noted importance of recommendations in areas of instrumentation and data management, plus the people/training needs to support these areas
- Report expected in Spring 2015



Portfolio Review Status

- AST issued Dear Colleague Letter NSF 14-022 on December 20, 2013
 - Lays out future steps for all telescopes that were either recommended for divestment in the near term or for future consideration
 - NSF has begun engineering/environmental feasibility studies for a number of telescopes, while consideration of some others awaits specific external milestones
 - Expect next steps of environmental review to begin in FY 2015, as appropriate
- Congress continues to express interest in implementation



Facility Futures-I

- Kitt Peak 2.1m open availability ended in FY 2014
 - Proposals to take over 2.1m under evaluation
- Mayall 4m leaves NOAO base budget after FY 2015
 - Continued operation for special projects funded outside NOAO base
 - Expect some community access continuing during 2016-2018 transition to DOE DESI project
- NOAO share in WIYN 3.5m telescope
 - Joint NASA/NSF exoplanet program is under development
 - Includes development of Extreme Precision Radial Velocity Spectrograph under NASA solicitation



Facility Futures-2

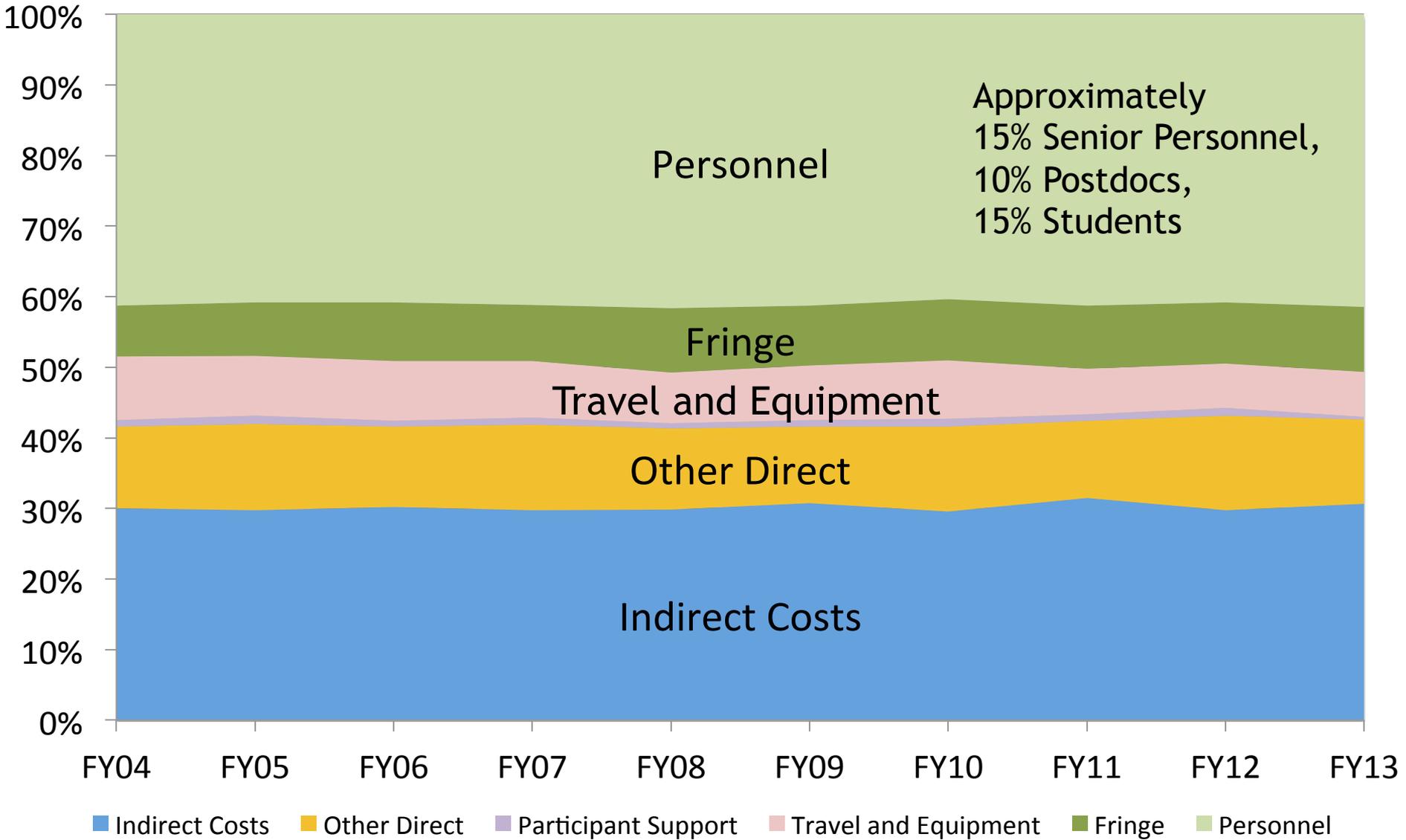
- GBT and VLBA partitioned from NRAO management competition
 - Engineering and environmental baseline review taking place for both
 - Similar to NOAO Kitt Peak, these are outside NRAO base budget in competition, with any operations to be funded separately
 - Partnerships under development
- DKIST will supplant open-access NSO observatories
 - Partnership discussions for GONG, Sac Peak, McMath-Pierce
- Arecibo undergoing baseline review similar to GBT
 - Will lead to decision about status post-2016



Astronomy and Astrophysics Research Grants (AAG)



AAG Global Budget Breakdown



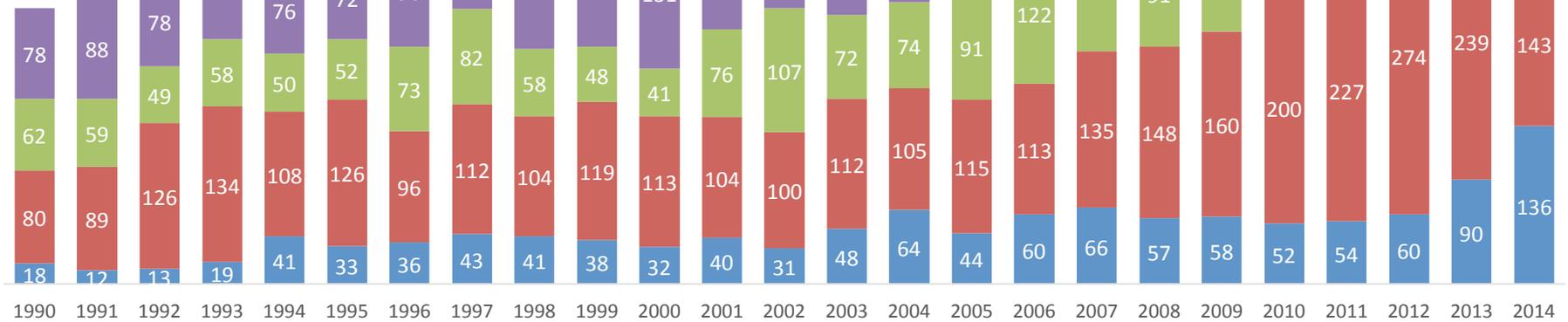


Proposals in AAG

732

PLA SAA
GAL EXC

238

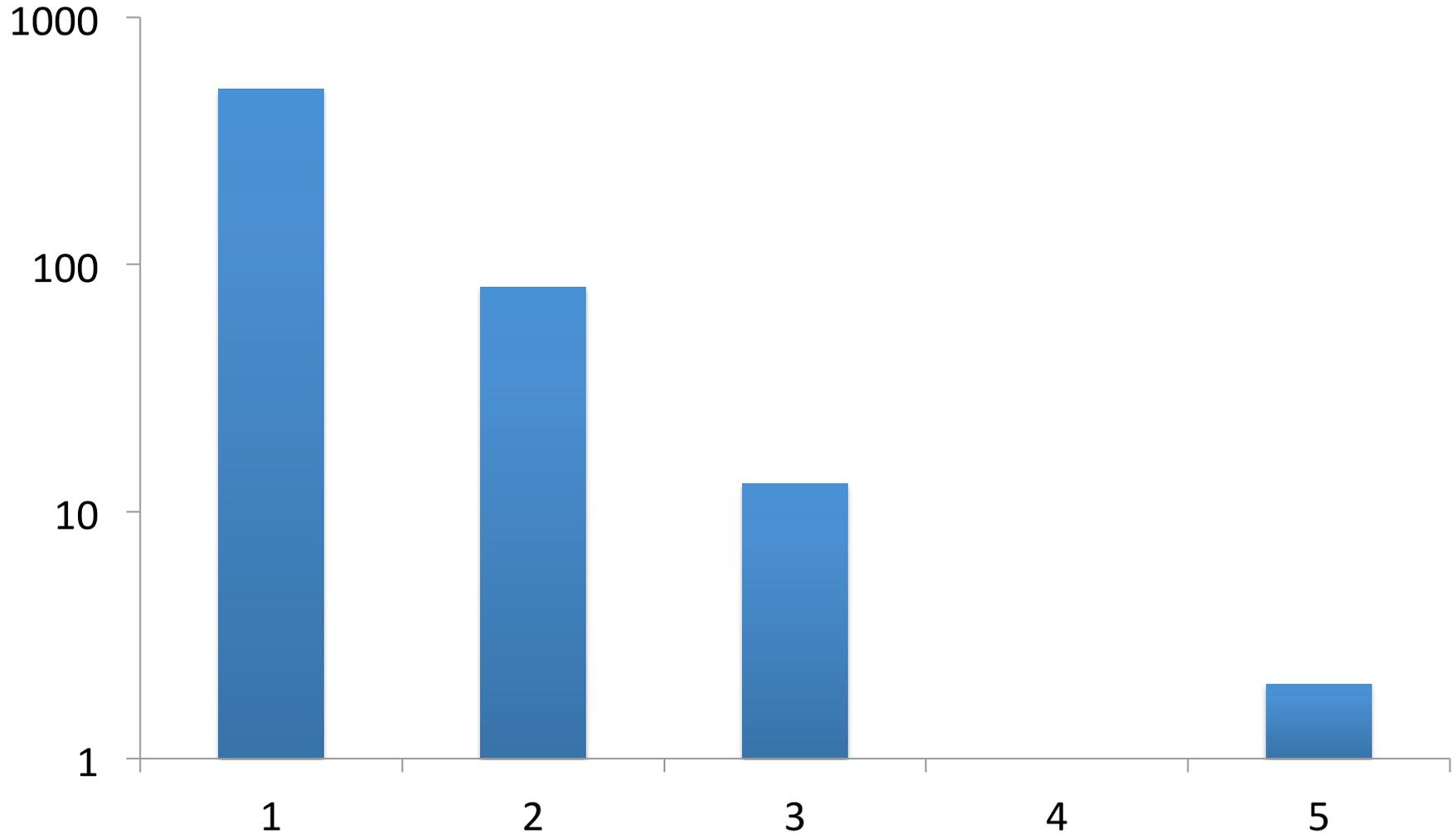


1990

2014



Multiple Submissions in FY14





AAG Now and Future

- FY14 funding rate was 16%, because of some year-end funding offsets in other areas that enabled us to put our year-end “reserve” into AAG
- Changes needed to achieve best review, reduce workload
 - Under consideration: reducing frequency of AAG calls, restricting numbers of proposals per investigator/institution
 - Strongly encouraging investigators to restrict themselves to 1 AAG proposal in FY 2015
 - AST needs to develop strategy for what to do when funding rates hit 12%, 10%, 8%



Job Opportunities in AST



Types of AST Positions

- Program Officer/Director
 - Permanent Federal Employee
 - Must be a U.S. citizen or seeking citizenship
 - Rotators
 - Intergovernmental Personnel Act (IPA)- remain an employee of home institution
 - 1 - 3 years (in rare cases, 4 years)
 - Visiting Scientist, Engineer, and Educator (VSEE) Program (VSEE)
 - 1 -2 years
 - Must be a U.S. Citizen or able to demonstrate seeking citizenship
- Temporary Federal Employee (FedTemp)
- Expert - usually short term, few months to 1 yr
- AAAS Policy Fellow



Open and Upcoming AST Positions

- AST expects several openings for permanent positions over next few years
 - Emphasis on facility oversight in some cases
 - AST has five new federal program officers hired in last two years (three since August)
 - Grants Program: Glen Langston
 - Spectrum management: Mangala Sharma and Sandra Cruz-Pol
 - Facilities: Dave Boboltz and Ralph Gaume
- Current IPA rotator opening, with emphasis on planetary/exoplanetary or stellar astronomy
 - Opportunity to participate in defining joint NSF-NASA program in exoplanetary science

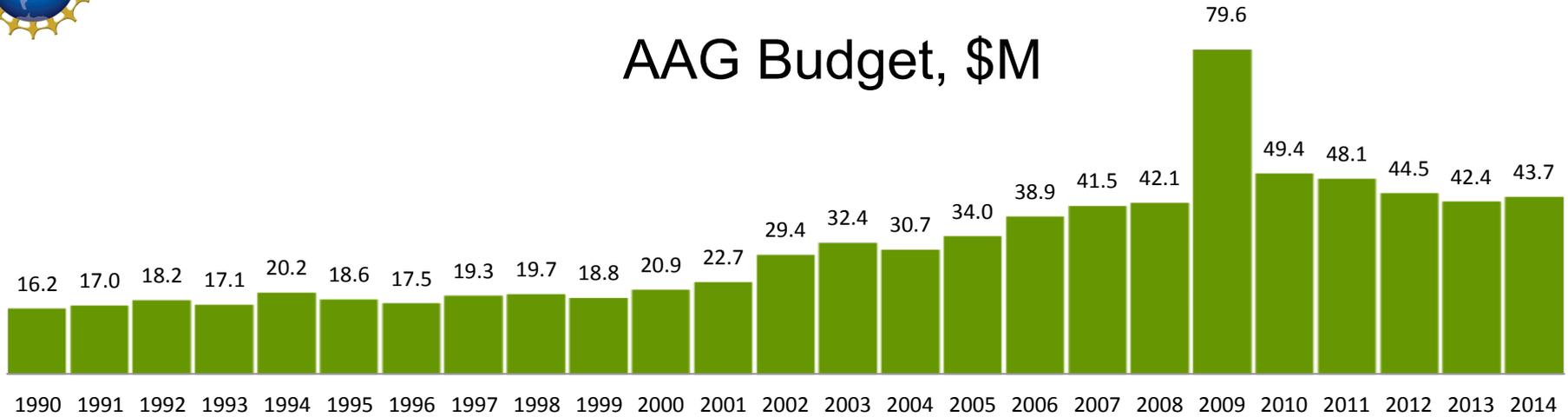


Backups

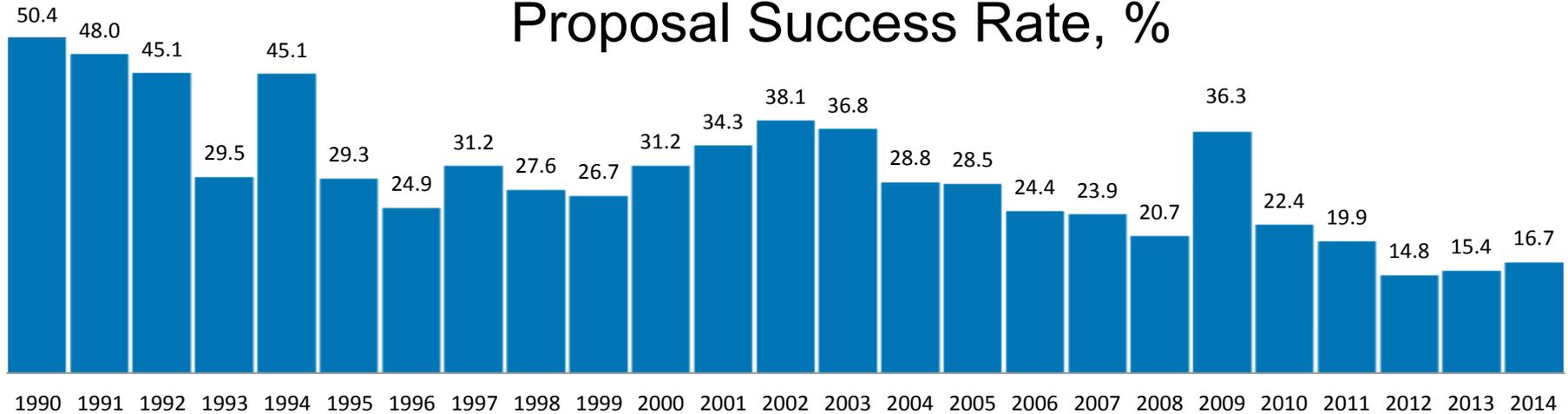
(as shown+extra)



AAG Budget, \$M

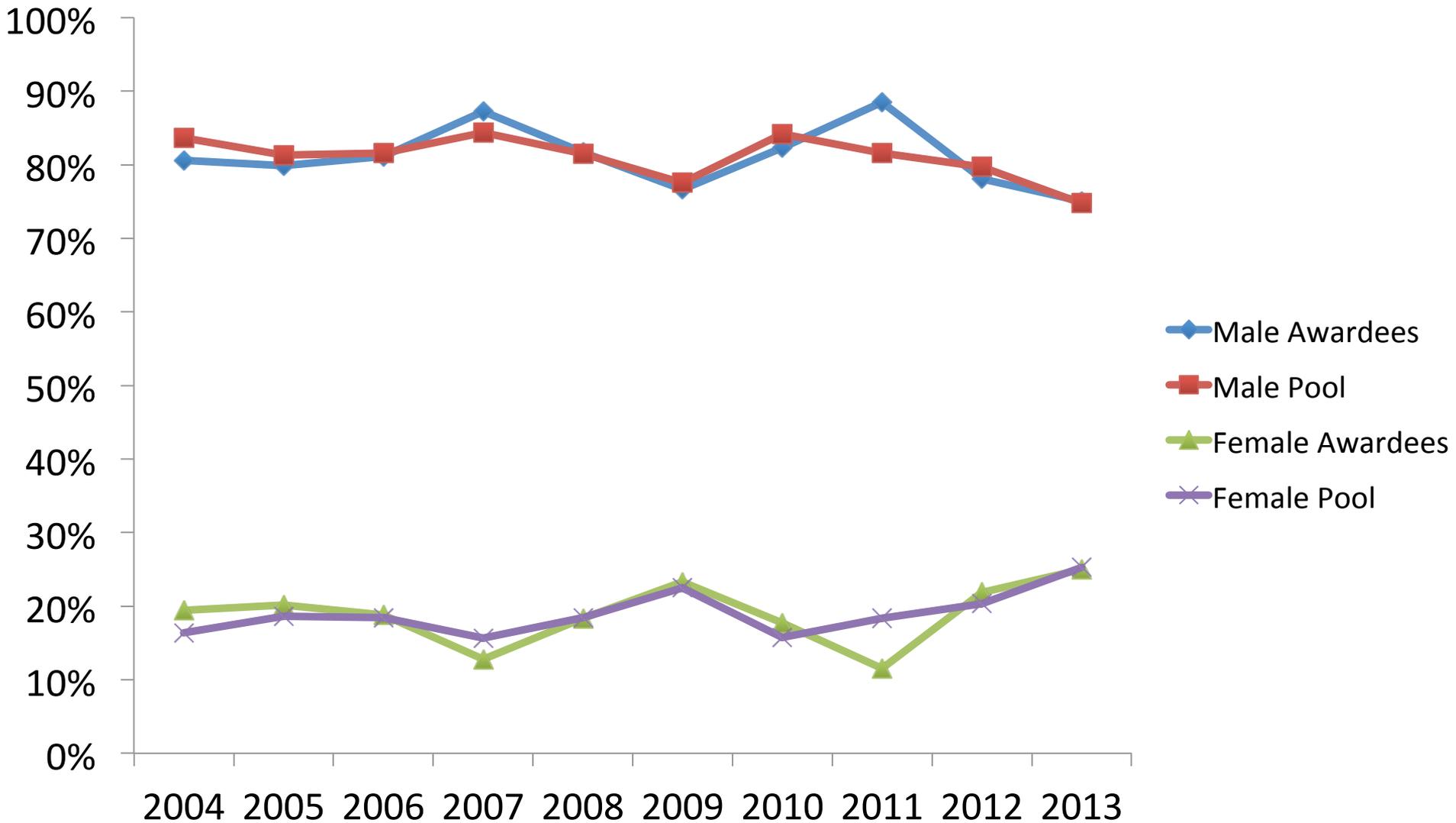


Proposal Success Rate, %





Submissions and Awards by Gender





Multiple Submissions in 5 Yr

