Outline

• Celebrate Accomplishments
  ▪ Mission Milestones

• Committed to Improving
  ▪ Inspiring Future Leaders
  ▪ Research and Analysis Initiatives

• Research Program Update
  ▪ Research & Analysis, Technology, Fellowships
  ▪ ROSES-2020 Updates, including COVID-19 impacts

• Missions Program Update
  ▪ COVID-19 impact
  ▪ Operating Missions
  ▪ Webb, Roman, Explorers

• Planning for the Future
  ▪ FY21 Budget Request
  ▪ Project Artemis
  ▪ Supporting Astro2020
  ▪ Creating the Future
NASA Events at the 236TH MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY VIRTUALLY ANYWHERE 1 – 3 JUNE 2020

Monday, June 1
115 NASA Town Hall – 1:40 pm EDT; Annie Jump Cannon Meeting Room

Tuesday, June 2
201 Dual-Anonymous Peer Review for NASA Astrophysics Proposals – 11:00 am EDT Annie Jump Cannon Meeting Room
216 STScI Town Hall – 1:40 pm EDT; Annie Jump Cannon Meeting Room

Wednesday, June 3
315 NASA-NSF Exoplanet Observational Research (NN-EXPLORE) Program at the WIYN Observatory – 2:50 pm EDT; Maria Mitchell Room

Monday, June 1 – Wednesday, June 3
Visit the NASA Virtual Booth in the Exhibit Hall
Exhibit webinars 10 times daily at
11:00, 11:30, 12:00, 1:30, 2:00, 2:30, 3:00, 3:30, 4:00, 6:00 EDT
NASA Astrophysics Division

Division Director
- Paul Hertz, Astrophysics Division Director
- Jeff Volosin, Astrophysics Division Deputy Director

Program Executives
- E. Lucien Cox, SOFIA, GUSTO, XRISM
- Shahid Habib, COR, ExEP, PCOS ARIEL, Athena, Euclid, LISA
- Jeff Hayes, Astrophysics Operating Missions
- David Jarrett, Roman
- Mark Sistilli, Explorers Program IXPE, SPHEREx Balloons

Cross Cutting
- Eric Smith, Chief Scientist, Webb
- Jeanne Davis, Assoc Dir for Flight, ASM Program Manager
- Mario Perez, Chief Technologist, SAT, RTF
- Lisa Wainio, Information Manager, Public Affairs Liaison

Administrative Support
- Kelly Johnson, Administrative Assistant
- Mathew Riggs, Administrative Assistant
- Jackie Mackall, Program Support Specialist
- Ingrid Farrell, Program Support Specialist

Program Scientists
- Dominic Benford, APRA Lead, Roman
- Valerie Connaughton, APRA (High Energy), XRISM
- Dan Evans, PCOS Program, NICER Dual Arion.PR
- Michael Garcia, APRA (UV/Optical), CubeSats/SmallSats, Hubble, Athena
- Thomas Hams, APRA (CR, Fund. Phys.), Rockets/Balloons
- Hashima Hasan, Education/Comms, Citizen Science, Archives
- Douglas Hudgings, ExEP Program, ADAP Lead, TESS, ARIEL
- Stefan Immler, Astrophysics Research Program Manager, Chandra, XMM
- Patricia Knezeck, Hubble Fellows, SOFIA
- William Latter, APRA (Lab Astro), Spitzer, SPHEREx, Fermi
- Pamela Marcum, Exoplanet Research Program (XRP)
- Aki Roberge, ASMP, Roman
- Rita Sambruna, GSFC, (on detail)
- Evan Scannapieco, ATP / TCAN Lead, FINNEST, Swift
- Kartik Sheth, COR Program
- Linda Sparke, Astrophysics Explorers Program
- Eric Tollestrup, APRA (IR/Submm), Euclid, IXPE

Astrophysics Program Abbreviations: ASM – Astrophysics Strategic Missions; COR – Cosmic Origins; ExEP – Exoplanet Exploration Program; PCOS - Physics of the Cosmos

June 1, 2020
Join the Team at NASA Headquarters

One or more program scientists will be hired this summer

Job opening starting June 15 (planned) for 5 days at https://usajobs.gov

Due to hiring authority used, applications will only be accepted during a 5-day window

AAS Job Register: https://jobregister.aas.org/ad/8d061472

Work as part of a diverse and agile team whose core values include excellence, integrity, transparency, teamwork and a growth mindset toward stewarding the nation’s space-based astrophysics program

NASA encourages applications from candidates with non-traditional career paths, or individuals who are at earlier stages of their careers may have demonstrated experience in different ways.

Candidates are encouraged to contact NASA so they can make a well informed decision on submitting an application during the very short (5 day) window when the job opportunity will be open for applications

Questions about this anticipated opening for an Astrophysics Program Scientist at NASA Headquarters may be directed to Eric Smith, Chief Scientist, Astrophysics Division, eric.p.smith@nasa.gov
NASA Astrophysics
Celebrate Accomplishments
NASA Science Plan Released


- Implement recommendations of Decadal Surveys in concert with national priorities and needs through creative partnership models that go beyond traditional ways of developing and executing missions
- Challenge assumptions about what is technically feasibly and enable revolutionary scientific discovery through a deliberate focus on innovation, experimentation, and cross-disciplinary research
- Create a more collaborative culture within SMD and across science community, encouraging diversity of thought, sharing best practices, and informed risk-taking to improve operations
- Develop future leaders and inspire learners of all ages through new opportunities and hands-on experiences
Hubble Space Telescope at 30: Awesome Stories and Innovation", Jennifer Wiseman, Senior Project Scientist (GSFC), AAS webinar: Monday June 1 @ 2:00 pm EDT, Exhibit Hall

Next for Hubble?", Rachel Osten (STScI), AAS Wednesday June 3 @ 2:00 pm EDT, Exhibit Hall

https://www.nasa.gov/content/hubbles-30th-anniversary
What did Hubble see on your birthday?

[Images of various astronomical objects and figures, each labeled with a name or object, such as Galileo, Edwin Hubble, S. Chandrasekhar, Lyman Spitzer, Arthur Compton, James Webb, Nancy Grace Roman, Vera Rubin, and Jupiter.]

https://www.nasa.gov/content/goddard/what-did-hubble-see-on-your-birthday
After 16.5 yrs of science exploration on the infrared cosmic frontier as one of NASA’s Great Observatories, Spitzer ended its mission on Jan 30, 2020, 2:30 PST.

Engineering feats extended mission life post-cryo in 2009 and overcame challenges due to Spitzer’s increasing distance from Earth.

Spitzer Space Telescope

Spitzer enabled discovery near and far, to the edge of the universe, yielding 8,800+ refereed papers.

- First detection of light from an exoplanet
- First detection of molecules in exoplanet atmospheres
- Measurement of star formation history of the Universe to z>2, looking back >10 Gyr
- Measurement of the stellar mass of the Universe to z>8, looking back ~13 Gyr

www.spitzer.caltech.edu/final-voyage
"Your Next Flagship: the Roman Space Telescope", led by Dominic Benford, Roman Program Scientist, AAS webinar: Monday June 1 @ 3:30 pm EDT, Exhibit Hall
Operating Missions & Data Archives: All performing nominally
  Except SOFIA, which is currently not flying

R&A: NASA continues to solicit, review, select, and fund ROSES
  and GO proposals through telework and virtual reviews
    OMB has provided Agencies with flexibilities to better support proposers and
    grantees, including soft money researchers and early career researchers
    ADAP-21 is cancelled, ADAP-20 is doubled
    XRP and TCAN proposal due dates are delayed

Missions in development: Each project is impacted differently
    Project teams are doing as much as they can virtually right now
    James Webb Space Telescope continues to be a priority
    Work on NASA missions is being restarted safely at NASA Centers on a
    case-by-case basis
    Many of NASA’s contractors and partners have continued to work
NASA Astrophysics
Committed to Improving
BUILDING AN EXCELLENT WORKFORCE

ASSURE DIVERSITY OF MISSION PEER REVIEW PANELS

CODE OF CONDUCT FOR SMD-SPONSORED CONFERENCES

DUAL-ANONYMOUS PEER REVIEW

CODE OF CONDUCT & IMPLICIT BIAS TRAINING FOR ROSES PANELS

WEBINAR BY THOMAS ZURBUCHEN ON WRITING SUCCESSFUL MISSION PROPOSALS

NEW AWARD TERMS AND CONDITIONS FOR GRANTS

PROPOSAL WRITING WORKSHOPS AT CONFERENCES

ASTRO2020 STATE OF THE PROFESSION

Excellence through Diversity

Research shows that excellence of teams and diversity go hand-in-hand, especially in innovative activities.

Excellent teams require diverse opinions and perspectives, and foster a sense of community by encouraging healthy behavior through actions.

Team size should match the work required and the skills needed.

Teams should be built with diversity in mind from the beginning, not as an afterthought.

Change is hard. It happens incrementally, but it is important that we do what we can right now to tackle these issues.
Inspiring Future Leaders

Achieve excellence by relying on diverse teams, both within and external to NASA, to most effectively perform SMD’s work

Attract and retain talent by promoting a culture that actively encourages diversity and inclusion and removes barriers to participation

Encourage development of future leaders, including the next generation of mission principal investigators, through targeted outreach and hands-on opportunities

Support early-career scientists to build careers working with NASA

Engage the general public in NASA Science, including opportunities for citizen scientists
Mission PI Development

Seek to increase the diversity of mission principal investigators and develop the next generation of mission leaders to ensure that new ideas and mission concepts are brought forward.

NASA Science has:

- Developed a consolidated PI resources webpage at https://science.nasa.gov/researchers/new-pi-resources, which also includes SMD presentation on lessons learned from past selections.
- Introduced a pre-reviews of mission peer review panels to ensure diversity and reduce conflicts of interest.
- Included career development positions and associated evaluation criteria as part of AOs.
- Held first “PI Launchpad”.
- Hosted “So You Think You Want To Be A NASA Mission PI” town halls.

First PI Launchpad

Aimed at researchers and engineers who would like to submit a NASA space mission proposal in the next few years but don’t know where to start. 

https://science.nasa.gov/researchers/pi-launchpad
Nancy Grace Roman Technology Fellows

2019:
Regina Caputo, NASA GSFC (cosmic rays/gamma-ray)
Sarah Heine, MIT (optics and gratings for polarimeters)
Gregory Mace, UT Austin (optics and spectroscopy)

2018:
Manel Errando, Washington University, St. Louis
Adam McCaughan, NIST/Boulder
Varun Verma, NIST/Boulder

2017:
Abigail Vieregg, University of Chicago
Omid Noroozian, NRAO

2016:
Erika Hamden, California Institute of Technology
Daniel Cunnane, NASA Jet Propulsion Lab
Eric Schindhelm, Southwest Research Institute

2015:
John Conklin, University of Florida
Brian Fleming, University of Colorado
Tyler Groff, Princeton University

2014:
Not solicited

2013:
Cullen Blake, University of Pennsylvania
Kevin France, University of Colorado

2012:
Judd Bowman, Arizona State University
Michael McElwain, NASA GSFC
Randall McEntaffer, University of Iowa
2020 NASA Hubble Fellows

How does the universe work? Einstein Fellows

How did we get here? Hubble Fellows

Are we alone? Sagan Fellows

http://www.stsci.edu/stsci-research/fellowships/nasa-hubble-fellowship-program/2020-nhfp-fellows
Fellows are asking for the assurance of parental leave and the option of saving for their eventual retirement with the assistance of their employer.

- Fellows who are employees of their host institutions typically have these benefits.
- Stipendiary fellows do not receive employee benefits even though the NHFP is willing to pay the full cost of the employee benefits package.

The Space Telescope Science Institute (STScI) has approved a change to the requirements for NHFP host institutions.

- Starting with academic year 2022-2023, host institutions must offer their NHFP Fellows the opportunity to be employees. Employee status is being required to afford NHFP Fellows the same leave, vacation, retirement and health benefits (as applicable) given by these institutions to their postdoctoral fellows hired on grants or contracts as employees.

Direct any questions or comments on this policy to nhfp@stsci.edu
NASA Earth and Space Science Fellowship (NESSF) program name changed to Future Investigators in NASA Earth and Space Science and Technology (FINESST) in 2019 to more accurately capture the nature of awards.
Dual Anonymous Peer Review

- SMD is strongly committed to ensuring that review of proposals is performed in an equitable and fair manner that reduces the impacts of any unconscious biases [next chart]

High-Risk/ High-Impact (HR/Hi)

- To reinforce SMD’s interest in High-Risk/High-Impact research, a special review process will be implemented in ROSES 2020 to review and select HR/Hi proposals

Proposal Selection Metrics for ROSES 2018

- Overall, just under 50% of selections featured new PIs
- Majority of division selection rates were between 25 – 30%, and we are continuing to evaluate
NASA is strongly committed to ensuring that the review of proposals is performed in an equitable and fair manner that reduces or eliminates unconscious bias.

To this end, motivated by a successful pilot program conducted for the Hubble Space Telescope, all Astrophysics General Observer / General Investigator (GO/GI) proposals will be evaluated using dual-anonymous peer review.

In addition, the NASA Science Mission Directorate will conduct pilot programs in dual-anonymous peer review for non-GO/GI ROSES program elements in 2020.

- One ROSES program element from each Division will be conducted in 2020 using dual-anonymous peer review.
- Proposals submitted to the Astrophysics Data Analysis Program and the Habitable Worlds Program in 2020 will be evaluated using dual-anonymous peer review.

Dual Anonymous Peer Review
Special Session
Tuesday June 2 @ 11:00 am EDT
Annie Jump Cannon Meeting Room

https://science.nasa.gov/researchers/dual-anonymous-peer-review
## Rollout of Dual-Anonymous Reviews

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<td>Chandra Cycle 23</td>
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Strategic Data Management

- SMD will be implementing changes to enable open data, open source code, and open model
- Informed by community input through multiple workshops, RFI, and NASEM reports
- Recognize that this will be a step wise process with the first changes coming in ROSES 2020 and upcoming Senior Reviews
- Periodic evaluation to ensure effectiveness and consistency with current best practices
- Additional information on SMD's data activities is available at: https://science.nasa.gov/researchers/science-data
Why Volunteer to Serve on a NASA Peer Review Panel?

Personal professional development:
- See how the whole review process works
- Learn what constitutes excellent proposals
- Network with your professional colleagues and NASA scientific staff

Institutional achievement:
- Improve at competing for NASA money
- Increase knowledge of NASA’s educational programs and research technology

Investment in the future:
- Help select the most transformative science
- Ensure that all proposals receive a fair and competent review

Sign up to be a panel reviewer:
https://science.nasa.gov/researchers/volunteer-review-panels
Keep Informed about NASA

NSPIRES mailing list – information about NASA solicitations
https://nspires.nasaprs.com/

Cosmic Origins mailing list, Exoplanet Exploration mailing list, Physics of the Cosmos mailing list – information about NASA missions and science
https://exoplanets.nasa.gov/exep/exopag/announcementList/
https://pcos.gsfc.nasa.gov/pcosnews-mailing-list.php

NASA Astrophysics Federal Advisory Committees
  Astrophysics Advisory Committee (APAC)
  https://science.nasa.gov/researchers/nac/science-advisory-committees/apac
  NAS Committee on Astronomy and Astrophysics (CAA)
  http://sites.nationalacademies.org/bpa/bpa_048755
  Astronomy and Astrophysics Advisory Committee (AAAC)
  https://www.nsf.gov/mps/ast/aaac.jsp

Sign up to be a panel reviewer:
https://science.nasa.gov/researchers/volunteer-review-panels
NASA Astrophysics Research Program Update
Astrophysics Research by the NUMBERS

R&A PROGRAMS
>1,000 Proposals Received
26% Success Rate
~$100M Awarded Annually

TECHNOLOGY DEVELOPMENT
~$140M Invested Annually

CUBESATS
6 Current Programs
~1 Launch Per Year

NEW PIs
>180 Per Year in R&A Prog
>120 Per Year in GO Prog

SOUNDING ROCKETS
9 Current Programs
3-4 Launches Per Year

GO PROGRAMS
>2,000 Proposals Received
19% Success Rate
~$70M Awarded Annually

BALLOONS
18 Current Programs
3-6 Launches Per Year
• R&A research funding increases by 54% over 17 years.
Astrophysics Community Funding

- R&A Programs
- SAT (technology)
- Postdoc Fellows
- GO Programs

$Millions per year

FY09 | FY11 | FY13 | FY15 | FY17 | FY19 | FY20 | FY21 | FY23
ROSES-2020 Program Elements

**Supporting Research and Technology**
- Astrophysics Research & Analysis (APRA), includes Lab Astro equipment
- Strategic Astrophysics Technology (SAT) Canceled this year
- Roman Technology Fellowships (RTF)
- Astrophysics Theory Program (ATP) (biennial, not this year)
- Theoretical and Computational Astrophysics Networks (TCAN) (triennial, this year)
- Exoplanet Research Program (XRP) (cross-div)
- Topical Workshops, Symposia, and Conferences (TWSC)

**Data Analysis**
- Astrophysics Data Analysis (ADAP)
- GO/GI programs for:
  - Fermi
  - Swift
  - NuSTAR
  - TESS
  - NICER

**Mission Science and Instrumentation**
- Sounding rocket, balloon, cubesat, and ISS payloads solicited through APRA
- XRISM Guest Scientists
- LISA Preparatory Science
- Astrophysics Explorers U.S. Participating Investigators (triennial, this year)
- Astrophysics Pioneers

**Separately Solicited**
- GO/GI/Archive/Theory programs for:
  - Chandra
  - Hubble
  - SOFIA
  - Webb
- NASA Hubble Fellowship Program
- NASA Postdoctoral Program
- FINESST Graduate Student Research Awards

**New in ROSES-2020:**
- SAT canceled in anticipation of the 2020 Decadal Survey
- Lab Astro equipment in APRA (see separate slide)
- Exoplanet Research Program consolidates exoplanet proposals (see separate slide)
- Astrophysics Pioneers (see separate slide)
- Astrophysics participates in cross-divisional TWSC
- XRISM Guest Scientist Program (one time)
- LISA Preparatory Science (one time)
- Astrophysics Explorers U.S. Participation Investigators (APEX USPI)
- Data Management Plan will be evaluated as part of the intrinsic merit of proposals
SMD is finalizing a process to provide limited adjustments to existing grants. Not all grants can be made whole, however:

- The focus will be on mitigating the impacts of the COVID-19 epidemic on the most vulnerable of us: graduate students, post-docs, and early career researchers in soft money positions.
- SMD does not want the COVID-19 epidemic to massively derail the careers of future leaders.
- Details will be made public by the end of June.

SMD is considering options for helping SMD-funded, recently graduated PhDs and post-docs whose appointments are ending to weather the expected freeze in hiring by many research institutions.

Review panels have all been converted to virtual events and are functioning well albeit in many cases taking longer than originally planned.

This will be the norm until at least September.
R&A Accommodation due to COVID-19

OMB has issued guidance; NASA has instituted a number of grant administration flexibilities to ease the burden on grant recipients during the COVID-19 emergency.

- Allows NASA to remove barriers for faster funding of grantees
- Allows for paying soft-money researchers as well as graduate students, post-docs, and other lab staff during the COVID-19 epidemic, if the institution’s own policies allow for it
- Allows for institutions to charge restart costs to their grants
- Provides agencies flexibility with regard to the submission of proposals, including accepting late proposals

FAQs to help you navigate:

- NASA FAQ on Grants and Research during the COVID-19 Epidemic: [https://www.nssc.nasa.gov/grants](https://www.nssc.nasa.gov/grants)

Watch the NSPIRES email lists for up-to-the-minute changes in due dates or policies
R&A Accommodation due to COVID-19

R&A management at NASA HQ continues via telework

No ROSES-20 astrophysics solicitations have been canceled due to COVID-19

ADAP will not be offered in 2021 to reduce the community workload next year as we recover from the impacts of COVID-19

Two ROSES-20 solicitations (TCAN, ADAP) have moved proposal due dates into late June to provide proposers additional preparation time

Five Astrophysics R&A peer reviews have already been conducted as virtual reviews since March, with no adverse effect on quality of reviews

All peer reviews until at least September are being conducted virtually
ADAP will not be offered in 2021 to reduce the community workload next year as we recover from the impacts of COVID-19: focus our efforts without reducing opportunity space

- All of the funding planned for selections in both 2020 and 2021 will be committed in 2020 – no reduction in funding to the community
- The number of selected proposals will approximately double
- This allows more awardees to be assured of funding this year
- This reduces the work for both NASA and the community without reducing the opportunity space for community funding
- No change to plan for ADAP to be dual anonymous this year

Proposals due June 30, 2020

Community comment is sought

- COPAG conducted a survey ([https://forms.gle/hyrxTzHi8z5UCQGP8](https://forms.gle/hyrxTzHi8z5UCQGP8) by June 5)
- APAC will discuss at their June 23-24 meeting
Lab Astro Equipment Initiative

Updating and maintaining existing laboratories is a critical need:

- New science requires new and improved laboratory systems.
- The number, complexity, and energy range of NASA lab astro programs and their associated data needs continue to grow.

Starting in ROSES-20, a new Lab Astro Equipment Initiative provides additional funding to support lab equipment proposals.

- This initiative is not intended to support building of new complete labs. The goal is to:
  - Enable new science with new equipment
  - Replace and/or upgrade failing equipment

- Proposals that request Lab Astro equipment upgrades can be submitted through APRA with proposals due on December 17
  - ROSES-20 D.3 APRA will be amended within the next few weeks
Exoplanet Research Program Consolidation

Purpose: combine skills and disciplines from across divisional boundaries and scientific cultures to make the most impact upon strategic and solicited exoplanet science

- Starting in ROSES-20, the scope of Astrophysics ROSES Appendix D is changing to exclude exoplanet research elements from ADAP, ATP, and the Lab Astro component of APRA. Technology development within APRA will not be affected.
- Historical levels of APD exoplanet research funded through ADAP, ATP, and APRA will be maintained, but distributed through XRP.
- In addition to Planetary Science Division, Heliophysics Division and Earth Science Division are now financial partners in XRP, increasing the total funding available to the program.
- As a result, the funding allocation for XRP increases substantially

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Citizen Science

Citizen Science (CS) is a form of open collaboration in which individuals participate voluntarily in the scientific process.

Current projects at https://science.nasa.gov/citizenscience

Proposers to any ROSES program element may incorporate citizen science and crowdsourcing methodologies into proposals, where such methodologies advance the proposed investigation.

NASA Citizen Science Community Workshop series online every other Wednesday until September 30, 2020, at https://nasacitsci2020.gmri.org/home

NASA’s Astrophysics, Heliophysics, and Planetary Science Divisions will release a joint ROSES-20 program element for a Citizen Science Seed Funding Program to fund prototyping of citizen science projects relevant to the three Divisions.
NASA Astrophysics CubeSats

The Astrophysics Division is investing approximately $5M per year in a CubeSat initiative.

- **HaloSat**, PI: Phil Kaaret, U. Iowa
- **Science Objectives**: HaloSat is mapping soft X-ray oxygen line emission across the sky in order to constrain the mass and spatial distribution of hot gas in the Milky Way.
- **Technologies**: BCT S/C, COTS detectors, collimators with no optics.
- **Deployed**: Jul 13, 2018, from ISS

CubeSat proposals may be submitted to APRA, due date December 17
Astrophysics CubeSats in Development

- **CUTE, PI:** Kevin France, CU
  - **Science Objectives:** The Colorado Ultraviolet Transit Experiment (CUTE) will take medium resolution UV spectra of 14 hot Jupiters during transit, in order to measure atmosphere being ablated away.
  - **Technologies:** BCT S/C, COTS telescope and camera.
  - **Launch:** 2021 on LandSat-9

- **BurstCube, PI:** Jeremy Perkins (GSFC)
  - **Science Objectives:** Rapid localizations for LIGO/Virgo detections with short GRBs; Search of g-ray transients.
  - **Technologies:** Dillingr derived bus, Fermi-GBM like detectors.
  - **Launch:** Fall 2021

- **SPRITE, PI:** Brian Fleming, CU
  - **Science Objectives:** Determine ionization rate of IGM from galaxies and AGN, trace feedback within galaxies driven by star-forming regions, using low-resolution imaging UV spectrograph.
  - **Technologies:** in house S/C, UV coatings, next-gen MCP.
  - **Launch:** Fall 2022

- **BlackCat, PI:** Abe Falcone, Penn St.
  - **Science Objectives:** GRB/Transient detection in 0.2-20keV with coded mask.
  - **Technologies:** CMOS x-ray CCD
  - **Launch:** FY2024
Astrophysics Pioneers

The FY21 President’s Budget Request contains a new initiative for Astrophysics – Astrophysics Pioneers: A new class of small missions.

Fills the gap between existing ROSES investigations (<$10M for APRA) and existing Explorers MO investigations (<$35M for SmallSats).

- Includes SmallSats, Large CubeSats (> 6U), CubeSat constellations (all as rideshare/secondary payloads), major balloon missions, and ISS attached payloads with a $20M cost cap, not including launch.

- Managed as Research and Analysis projects with enhanced oversight, defined gates, and light touch management from NASA, rather than flight project processes appropriate for a SMEX.

- NASA will no longer solicit ISS attached payloads within APRA.
- NASA will no longer solicit balloon payloads within Explorers MO.

Draft released May 14, Comments due June 15 via email to Michael.R.Garcia@nasa.gov.
## Astrophysics Technology Program Elements

### Technology Inception & Experimentation
**APRA/RTF**
- 46 projects awarded in 2019
- Solicitations planned in FY20, delayed 9 months
- Average award: $600K (3-5 years)
- Average selection rate: 28%
- Portfolio:
  - Supporting 19 Balloons and 10 Sounding Rocket Payloads
  - Detectors across wavelengths
  - Mirrors, coatings and gratings
Total: $50 M per year

### Technology Maturation
**SAT & ISFM**
Unified solicitation and selection starting in FY19 for the three Astrophysics themes. Portfolio has 49 active projects for a total of $28 M per year.
- 12 new projects awarded in FY19
- Next solicitation planned in FY20, currently TBD
- Average award: $1.6M (3 years)
- Average selection rate: 30% (in FY19, historically is 29%)

### Directed Technologies
- Roman Coronagraph
- Exoplanets Probes: Exo-C & Exo-S
- LISA
- Athena
- Euclid
- NN-Explore – NEID
- SmallSats and CubeSats
Total: $85 M in FY19

### Pre-Decadal Initiatives
- In-Space Assembled Telescope (iSAT)
- Coronagraph and UltraStable Testbeds
- Starshade Technology
- Four Large Mission Concepts – Technology Roadmaps
- Ten Probe Mission Concepts
- Segmented Mirror Telescope Program (STMP)
Total: $25 M in FY19
Astrophysics Technology Program Elements

- 46 projects awarded in 2019
- Solicitations planned in FY20, 9 months
- Average award: $600K (3-5 years)
- Average selection rate: 28%
- Portfolio:
  - Supporting 19 Balloons and 10 Sounding Rockets Payloads
  - Detectors across wavelengths
  - Mirrors, coatings and gratings
  Total: $50 M per year

Directed Technologies Pre-Decadal Initiatives
- In-Space Assembled Telescope
- Coronagraph and UltraStable Testbeds
- Large Mission Concepts
- Ten Probe Mission Concepts
- Segmented Mirror Telescope Program (STMP)
Total: $25 M in FY19
Integrated Strategic Technology Portfolio


Database of Astrophysics technology projects: [http://www.astrostrategictech.us/](http://www.astrostrategictech.us/)
Coronavirus (COVID-19) Response – Missions

- Missions in operation continue nominally
  - Most MOC and SOC staff working virtually
  - SOFIA currently grounded, but planned maintenance has resumed
  - Space Communications Program continues to support uplinks/downlinks and has a plan in place if local conditions at network sites affect communications capabilities

- Missions in development are doing as much as they can virtually right now
  - Suspended most hands-on work within NASA, including suborbital research
  - Work is being restarted at NASA Centers on a case-by-case basis when it can be done safely
  - Many of NASA’s contractors and partners have continued to work safely

- Prioritizing Mars 2020 as it is close to launch
  - James Webb Space Telescope also continues to be a priority
  - Although the NASA portion of the NASA/NGSS team returned home mid-March, and I&T at NGSS had reduced shifts, NASA staff have now returned to NGSS and two shifts will be started soon; Observatory I&T continues making progress
<table>
<thead>
<tr>
<th>Mission</th>
<th>Launch Year</th>
<th>Type</th>
<th>Operations</th>
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</thead>
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<tr>
<td>Hubble</td>
<td>1990</td>
<td>NASA Strategic Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>Chandra</td>
<td>1999</td>
<td>NASA Strategic Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>XMM-Newton</td>
<td>1999</td>
<td>ESA-led Mission</td>
<td>Operations Nominal (ESA)</td>
</tr>
<tr>
<td>Spitzer</td>
<td>2003</td>
<td>NASA Strategic Mission</td>
<td>Mission Complete!</td>
</tr>
<tr>
<td>Gehrels Swift</td>
<td>2004</td>
<td>NASA MIDEX Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>Fermi</td>
<td>2008</td>
<td>NASA Strategic Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>Kepler</td>
<td>2009</td>
<td>NASA Discovery Mission</td>
<td>Mission Complete!</td>
</tr>
<tr>
<td>NuSTAR</td>
<td>2012</td>
<td>NASA SMEX Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>SOFIA</td>
<td>2014</td>
<td>NASA Strategic Mission</td>
<td>Operations Suspended</td>
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<td>ISS-NICER</td>
<td>2017</td>
<td>NASA Explorers Miss. of Oppty</td>
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<tr>
<td>TESS</td>
<td>2018</td>
<td>NASA MIDEX Mission</td>
<td>Operations Nominal</td>
</tr>
<tr>
<td>Data Archives</td>
<td></td>
<td></td>
<td>Operations Nominal</td>
</tr>
</tbody>
</table>
TESS
Transiting Exoplanet Survey Satellite
https://tess.gsfc.nasa.gov

Observation Sector 25
Orbit 57: May 14 - May 26
Orbit 58: May 27 - June 8

47 confirmed planets
1837 planet candidates

280 publications submitted, 214 peer-reviewed
(53% exoplanets, 47% astrophysics)

Last update: May 22, 2020

Four-planet system orbiting a bright Sun-like star
HD 108236 (TOI-1233)

Brightest sun-like star to host 4 transiting planets. Three outer planets are among the best JWST sub-Neptunes for spectroscopy:

Transmission Spectrum Metric
TSM

High TSM = great JWST target

Daylan et al. (under review)

Daylan et al. (2020)
SOFIA began its extended mission in October 2019, and suspended flight operations in March 2020 due to COVID-19. SOFIA Project has implemented major initiatives to improve scientific productivity and impact.

- Legacy programs are a larger fraction of the total observing time.
- Two legacy programs scheduled in Summer 2020 from New Zealand.
- Joint project and synergies implemented with other NASA missions and observatories:
  - Mapping water on Moon in support of VIPER/Artemis mission
  - SOFIA Cycle 9 to support JWST ERS programs
  - Joint Hubble-SOFIA pilot demonstration program (exploring)
  - Joint Green Bank Observatory – SOFIA proposals (under final review)
- More strategic use of the Director’s Discretionary Time
  - e.g., recent Betelgeuse observing campaign using four SOFIA instruments; Moon pilot legacy program
- Higher program completion rate by moving to a two-year scheduling cycle; potentially increasing observing opportunities

"Community Update", led by Margaret Meixner, Director of SOFIA Science Mission Operations, AAS webinar: Tuesday June 2 @ 3 pm EDT.
Launch dates are current project working dates; Agency Baseline Commitment launch date could be later; impacts of COVID-19 not yet known
The James Webb Space Telescope

2020 Accomplishments

- Work continuing at Northrop, but at lower efficiency due to social distancing practices required by COVID19 response.
- Completing deployment test in preparation for Observatory-level environmental tests
- Conducted several mission rehearsals at the mission operation center (STScI)

2020 Remaining Plans

- After coming out of COVID19 response restrictions project will formally evaluate schedule
- Observatory-level environmental testing
- Post Observatory-level environmental testing deployments
- Additional mission rehearsals at STScI
- Release of Cycle 1 General Observer call
Webb Final Assembly

- No schedule for Webb Cycle 1 GO/AR proposals has been announced.
- An update on the schedule will be announced in mid- to late-July.
- At least 12 weeks notice of the proposal deadline will be provided.

The fully assembled and folded observatory at Northrop Grumman, Space Park (May 2020). This is the configuration that Webb will be in when it is mated to the Ariane 5 launch vehicle in 2021. After environmental testing in this configuration it undergoes one more set of deployment testing (primary mirror and sunshield) before a final fold back into this configuration.
Roman Space Telescope
(formerly Wide-Field Infrared Survey Telescope)

Confirmed and entered Phase C on Feb 28, 2020


*Roman* is fully funded in FY20

2020: Flight hardware being developed: mirror being figured, detectors being fabricated, spacecraft subsystems being delivered, coronagraph demo unit in testbed

2021 – Complete Critical Design Reviews

c.2026 – Launch


*Roman* field-of-view is 100× *Hubble* field-of-view

*Roman* is 100 to 1500 times faster than *Hubble* for large surveys at equivalent area and depth

“Your Next Flagship: the Roman Space Telescope”, led by Dominic Benford, Roman Program Scientist, AAS webinar: Monday June 1 @ 3:30 pm EDT, Exhibit Hall
Roman will impact almost every area of astrophysics for almost every astronomer.
Roman Update

On February 28, 2020, Roman passed the Confirmation Review (KDP-C) and was approved by the Agency Program Management Council to begin implementation (Phase C in NASA terminology)

Only change is Coronagraph Technology Demonstration Instrument (CGI) programmatic status

- CGI is being managed like other SMD technology demonstration projects (Mars Helicopter, Deep Space Optical Communications)

Roman has an expected development cost of $3.2 billion. Including the cost of five years of operations and science, and CGI ($334M), brings the maximum cost of Roman to $3.934 billion.

Cost and schedule commitments are unchanged since initial confirmation in 2018 (KDP-B or Phase B in NASA terminology)

COVID-19 update:

- Currently limited on-site work is taking place at GSFC and JPL per NASA Framework
- Work continues at several contractors, consistent with local situations
Roman Hardware Progress

**Telescope**
- Primary Mirror - Full Tool Polish (5/19)
- Secondary Mirror
- Aft Metering Structure

**Instruments**
- Teledyne H4RG
- Detector readout custom ASIC chip
- F158 Filter
- Photon Counting CCD
- Prism assembly
- Deformable Mirrors
**Roman is for You**

All *Roman* observing time is available through open processes

- Major Legacy Surveys defined using a community-driven open process in the coming year
- Key Projects – science investigations using these surveys – will be openly competed
- *Roman* observing time also available for GO projects using *Roman*’s unique wide-field imaging, spectroscopic, and time domain capabilities
- All data will be available to the community with no period of limited access

*Roman* observing program will be based on community input

- NASA and STScI have convened community groups to provide input on balance among observing programs and on trades during development, integration, and test

*Roman* General Observers / Archival Researchers Program

- Use *Roman* for conducting wide-field infrared surveys of the universe
- Use data from *Roman* Legacy Surveys for compelling astrophysics investigations
- Calls for proposals to be issued before launch and subsequently

*Roman* Coronagraph Participating Scientist Program

- Develop observing plans for demonstrating coronagraph capabilities
- Work with instrument team to process data from tech demo observations
- Call for proposals anticipated in the coming year
Astrophysics Explorers in Competitive Phase A

Small Explorers

ESCAPE
PI: K. France, U Colorado
Do extreme ultraviolet stellar flares zap atmospheres of exoplanets in the habitable zone?

COSI
PI: J. Tomsick/UC Berkeley
MeV gamma-rays trace Milky Way’s supernova activity, positron production; polarization in gamma-ray bursts

Missions of Opportunity

Dorado
PI: B Cenko/GSFC
Two 12U CubeSats watch for UV light when neutron stars merge

LEAP (on ISS)
PI: M. McConnell/ U New Hampshire
Polarization of gamma-ray bursts sheds light on jet structure

Explorers Policy Update

NASA establishes partnerships with international space agencies to advance its strategic objectives in science

PI proposed partnerships have not been an effective manner of establishing NASA contributions to partner-led missions

• These are “Partner Mission of Opportunity” (PMO) proposals
• Over the past 10 years, we received 17 PMO proposals, selected only 3 for Phase A, and downselected only 1 for flight (ARIEL)
• Of those 3, all could have been initiated strategically instead of PI-proposed
• Of the other 14, most could have been declined without receiving a proposal
• We have concluded that the PMO process is not a successful or efficient process for establishing partnerships

SMD will no longer solicit PMO proposals

• SMD will still allow PI-led Explorers missions to be proposed that include a partner contribution, generally limited to be <1/3 of the mission per the AO

SMD will continue to seek community input on potential partnerships
NASA Astrophysics
Planning for the Future
NASA Astrophysics Program Summary

Supporting Research & Technology
- **R&A**: ADAP, ATP, XRP, SmallSat Studies, Suborbital & CubeSat Projects
- **Technology**: APRA, SAT, RTF, Future flagship technologies
- **Research support**: Balloon project, Astrophysics archives

Operating Missions
- **Explorers**: Gehrels Swift, NuSTAR, NICER, TESS
- **International Partnerships**: XMM-Newton
- **Strategic Missions**: Hubble, Chandra, Spitzer, Fermi, Kepler, SOFIA

Missions in Development or Under Study
- **Explorers**: IXPE, GUSTO, SPHEREx
- **International Partnerships**: Euclid, XRISM, ARIEL, Athena, LISA
- **Strategic Missions**: Webb, Roman
FY20 appropriation for NASA Astrophysics (including Webb Telescope) is $1.73B; up by $233M from FY19 appropriation and by $532M from FY20 President’s Budget Request

Fully funds Webb for replan to March 2021 launch date

Fully funds Roman (WFIRST), including the coronagraph technology demonstration instrument, through KDP-C and into Phase C

Specifies funding levels for Hubble, SOFIA, and the Astrophysics Research Program

Provides adequate funding to continue with the rest of the planned Astrophysics programs and projects including:
Operating missions with GO programs as planned following the Senior Review
Development of Explorers missions (IXPE, GUSTO, SPHEREx) and international contributions (Euclid, XRISM, ARIEL, Athena, LISA)
Initiation of Phase A studies for selected SMEX and MO proposals from the 2019 Announcement of Opportunity
Continued technology development for the future
Quick Summary
Community support: 20%
Operating missions: 12%
Building missions: 64%
Management: 4%

$1.73 BILLION
FY20

RESEARCH
(ADAP, APRA, ATP, ETC.)
6%

TECHNOLOGY
(SR&T, ATHENA, LISA, ETC.)
5%

INFRASTRUCTURE
(BALLOON PROGRAM, ARCHIVES, ETC.)
4%

OP. MISSIONS
(INCL. GO PROGRAMS)
17%

EXPLORERS
DEVELOPMENT
10%

WEBB
DEVELOPMENT
25%

ROMAN
DEVELOPMENT
29%

MANAGEMENT
INCL. STEM ACTIVATION
4%

4%
FY21 Budget Agency Highlights

• One of the strongest budgets in NASA’s history, investing more than $25 billion dollars for America’s future in space; represents an increase of about 12% over last year’s request

• Keeps the agency on track to land the first woman and the next man on the Moon by 2024 and enables development of more than 15 science missions (including lunar, Mars, and Heliophysics) that inform Artemis work

• Provides valuable precursor experience for human exploration of Mars with bold new missions such as Mars Sample Return and Ice Mapper

• Implements a balanced and integrated science program with over 40 missions in formulation and development in FY 2021, including over 25 small missions

• Advances compelling science with priorities identified by the National Academies’ decadal surveys including the James Webb Space Telescope, Europa Clipper, IMAP, and the first Earth Science Designated Observables mission

• Executes innovative partnerships with commercial and international partners; including through our Commercial Lunar Payload Services initiative, our industry partners will begin in 2021 to deliver science and tech payloads to virtually anywhere on the Moon, including the poles and far side
Cost Performance of Recently Launched Missions

<table>
<thead>
<tr>
<th>NASA Science is providing reliable cost estimates for its missions, contributing to program stability</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Mission</th>
<th>KDP-C Baseline</th>
<th>Actual/Estimated</th>
<th>Actual vs. Original</th>
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<tr>
<td>NuSTAR</td>
<td>109.9</td>
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<tr>
<td>Landsat 8</td>
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<td>IRIS</td>
<td>140.7</td>
<td>143.0</td>
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<tr>
<td>LADEE</td>
<td>168.2</td>
<td>188.2</td>
<td>12%</td>
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<tr>
<td>MAVEN</td>
<td>567.2</td>
<td>472.0</td>
<td>-17%</td>
</tr>
<tr>
<td>GPM</td>
<td>555.2</td>
<td>484.3</td>
<td>-13%</td>
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<tr>
<td>OCO-2</td>
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<td>320.3</td>
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<tr>
<td>SMAP</td>
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<tr>
<td>MMS</td>
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<td>875.3</td>
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<td>Astro-H</td>
<td>44.9</td>
<td>71.2</td>
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<tr>
<td>OSIRIS-REx</td>
<td>778.6</td>
<td>620.8</td>
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<td>CYGNSS</td>
<td>151.1</td>
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<td>SAGE-III</td>
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<td>Total</td>
<td>7898.7</td>
<td>7652.8</td>
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</table>
Astrophysics FY21 Budget Request

Supports Webb launch in 2021
Maintains decadal cadence of four AOs per decade for Astrophysics Explorers and Missions of Opportunity
Maintains healthy research program including CubeSats, suborbital missions, technology development, data analysis, theoretical and computational investigations, and laboratory astrophysics
Initiates new class of Astrophysics Pioneers: SmallSats and major balloon missions with reduced management overhead compared to traditional Astrophysics Explorers
Extends operating missions beyond FY20 with GO programs following 2019 Senior Review
Supports formulation of a probe mission as early as 2022
Supports mission concept studies and technology investments to implement Astrophysics Decadal Survey priorities starting in 2022
Terminates SOFIA due to high operating costs and lower science productivity to date
Given its significant cost and competing priorities within NASA, provides no funding for Roman Space Telescope
Humans Return by 2024

LRO: Continued surface and landing site investigation

Artemis I: First human spacecraft to the Moon in the 21st century

Artemis II: First humans to orbit the Moon in the 21st century

Artemis Support Mission: First high-power Solar Electric Propulsion (SEP) system

Artemis Support Mission: First pressurized module delivered to Gateway

Artemis Support Mission: Human Landing System delivered to Gateway

Artemis III: Crewed mission to Gateway and lunar surface

Large-Scale Cargo Lander - Increased capabilities for science and technology payloads

Commercial Lunar Payload Services - CLPS-delivered science and technology payloads

Early South Pole Mission(s) - First robotic landing on eventual human lunar return and In-Situ Resource Utilization (ISRU) site

Volatiles Investigating Polar Exploration Rover - First mobility-enhanced lunar volatiles survey

Lunar Terrain Vehicle - Increased astronaut mobility with unpiloted rover

Humans on the Moon - 21st Century
First crew leverages infrastructure left behind by previous missions

LUNAR SOUTH POLE TARGET SITE

2020 2024
Astrophysics and Artemis

All science opportunities enabled by Project Artemis will include astrophysics

Commercial Lunar Payload Services (CLPS)
  - All payload calls include astrophysics; two astrophysics payloads selected
    - Internal NASA call: Low-frequency Radio Observations from the Near Side Lunar Surface instrument (PI: Robert MacDowall, GSFC); manifest through CLPS Task Order 2 on Intuitive Machines Lander for NET October 2021
    - ROSES call: Next Generation Lunar Retroreflectors (PI: Douglas Currie, University of Maryland); to be manifest through CLPS Task Order 19D for ~2022

Astrophysics Explorers 2019 Missions of Opportunity
  - 2019 AO included opportunities enabled by Project Artemis.
  - Future calls will solicit proposals that leverage Artemis capabilities, such as Gateway as a platform and cis-lunar communications infrastructure, to conduct compelling astrophysics investigations.

Most important criterion for all proposals that leverage Artemis remains the astrophysics science merit.
Why Astrophysics?

How did our universe begin and evolve?

How did galaxies, stars, and planets come to be?

Are we alone?

Enduring National Strategic Drivers

Astrophysics is humankind's scientific endeavor to understand the universe and our place in it.
Astrophysics Strategic Planning

To be updated in 2020 (per GPRAMA)

Astro2020 Decadal Survey underway

2018 update includes:
- Independent reviews of Webb & WFIRST
- Planning for 2020 Decadal Survey

https://science.nasa.gov/astrophysics/documents
Astrophysics

Decadal Survey Missions

1972 Decadal Survey
Hubble

1982 Decadal Survey
Spitzer

1991 Decadal Survey
Chandra

2001 Decadal Survey
JWST

2010 Decadal Survey
WFIRST
Astro 2020
Decadal Survey on Astronomy and Astrophysics

The National Academies of Sciences
Engineering
Medicine
Decadal Survey Goal

NASA’s highest aspiration for the 2020 Decadal Survey is that it be ambitious

- The important science questions require new and ambitious capabilities
- Ambitious missions prioritized by previous Decadal Surveys have always led to paradigm shifting discoveries about the universe
BALANCED MISSION PORTFOLIO

FLAGSHIP
National priority, civilization scale science

LARGE
High priority, low risk

MEDIUM
Medium priority with moderate risk

SMALL
Focused, higher risk with limited budget

CLASS A
Great Observatory

CLASS B
Probe

CLASS C
MIDEX

CLASS D
SMEX
+ SmallSats (Class D Tailored)
Suborbital-class (Research Class)

GREAT SCIENCE
Medium Mission Concepts (Probes)

Probes are strategic missions that have had a strong impact on astrophysics, either through a focused investigation or as a broadly-capable observatory.

NASA funded probe studies are available at https://science.nasa.gov/astrophysics/2020-decadal-survey-planning

NASA's independent assessment of probe studies by the Probes Cost Assessment Team (PCAT) is available at https://science.nasa.gov/astrophysics/2020-decadal-survey-planning

Options for 2020 Decadal Survey

- Do not recommend a medium mission in Astro2020
- Recommend specific probe(s) as medium-size strategic missions
- Recommend several specific science concepts for an AO (similar to New Frontiers)
- Recommend an unconstrained AO (i.e., Super-Explorer)
Probe (Medium Mission) Concepts

Probes are strategic missions that have had a strong impact on astrophysics, either through a focused investigation or as a broadly-capable observatory.

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Why Flagships

Flagships enable paradigm shifting science
Flagships drive US capabilities and contribute to US leadership
Flagships create stakeholder support that drives the NASA budget

“NASA should continue to plan for large strategic missions as a primary component for all science disciplines as part of a balanced program.”
– Powering Science: NASA's Large Strategic Science Missions (NASEM, 2017)
Flagship Fraction of Astrophysics Budget

All dollars inflated to FY18$. Development only, no ops.

- Large mission fraction (left scale)
- Inflation adjusted Astrophysics budget (right scale)
- Current planning budget (without Roman beyond FY19)
- What if Roman is funded as needed on top of FY20 President’s Budget Request?
Large Mission Concepts

“NASA should ensure that robust mission studies that allow for trade-offs (including science, risk, cost, performance, and schedule) on potential large strategic missions are conducted prior to the start of a decadal survey. These trade-offs should inform, but not limit, what the decadal surveys can address.” – Powering Science: NASA’s Large Strategic Science Missions (NASEM, 2017)

Links to the concept study reports are posted at
https://science.nasa.gov/astrophysics/2020-decadal-survey-planning
and at https://www.greatobservatories.org/
NASA's independent assessment by the Large Mission Concept Independent Assessment Team (LCIT) is available at https://science.nasa.gov/astrophysics/2020-decadal-survey-planning

Links to the concept study reports are posted at https://science.nasa.gov/astrophysics/2020-decadal-survey-planning and at https://www.greatobservatories.org/
NASA Astrophysics Budget

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<th>FY28</th>
<th>FY30</th>
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<tr>
<td>$0.9B</td>
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</tr>
</tbody>
</table>

* Does not include FY20 appropriation
Decadal Survey Goal

NASA’s highest aspiration for the 2020 Decadal Survey is that it be ambitious

- The important science questions require new and ambitious capabilities
- Ambitious missions prioritized by previous Decadal Surveys have always led to paradigm shifting discoveries about the universe

If you plan to a diminishing budget, you get a diminishing program

- Great visions inspire great budgets

Carpe Posterum
The Future

This is an exciting time for Astrophysics – we are pursuing the answers to the biggest questions

- How did the universe begin and evolve?
- How did galaxies, stars, and planets come to be?
- Are we alone?

Astrophysics is multiwavelength and multimessenger

- NASA has 10 operating astrophysics missions*
- NASA is developing 10 astrophysics missions* and studying 4 for downselect

The community will select NASA’s future observatories through the 2020 Decadal Survey and through peer review of competed missions (like Explorers)

NASA is ready to realize the community’s priorities

* includes partner-led missions
Slides posted at
http://science.nasa.gov/astrophysics/documents
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</table>
SMD Organization Chart

Associate Administrator (AA)
- Thomas Zurbuchen

Deputy AA
- Sandra Connelly

Deputy AA - Programs
- Maya Montrose

Deputy AA - Research
- Michael New

Deputy AA - Exploration
- Ben Bussey

Chief Scientist
- Eric Smith

Assistant Deputy AA - Management
- Karen Flynn

Policy Branch
- Chief: Jens Feeley

Deputy AA - Management
- Dan Woods

Resource Management Division
- Director: Holly DeGrange
- Deputy: Kevi Worf

Science Engagement & Partnerships Division
- Director: Kristen Emslie

Administration Branch
- Chief: Ellen Gersten

Earth Science Division
- Director: Karen St. Germain
- Deputy: Sandra Cauffman

Joint Agency Satellite Division
- Director: John Lee
- Deputy: John Gagovian

Heliophysics Division
- Director: Nicky Fox
- Deputy: Peg Luce

Planetary Science Division
- Director: Lori Glaze
- Deputy: Eric Lissun

Astrophysics Division
- Director: Paul Hertz
- Deputy: Jeff Volosh

James Webb Space Telescope Program Office
- Director: Greg Robinson
- Program Scientist: Eric Smith
- Project Manager (GSFC): Bill Ochs

NASA Management Office
- Director: Marcus Watkins
- Deputy: Andrea Razzaghi

Mars Sample Return Program
- Director: Jeff Gramling

Notes:
- Acting
- ** Reports to GSFC

Updated: June 1, 2020

- Embeds / POCs
- Chief Engineer: Mike Jodoin
- Deputy Chief Engineer: David Coote
- Safety & Mission Assurance: Pete Pannet
- General Counsel: Dawn Oliver
- Legislative & Intergovernmental Affairs: Gabriel Adler
- International & Interagency Relations: Gigi Kirkham
- Public Affairs: Grey Hataianne