National Aeronautics and Space Administration

2025 Space Science Week

Planetary Protection Research C.15 Solicitation Prioritization Areas

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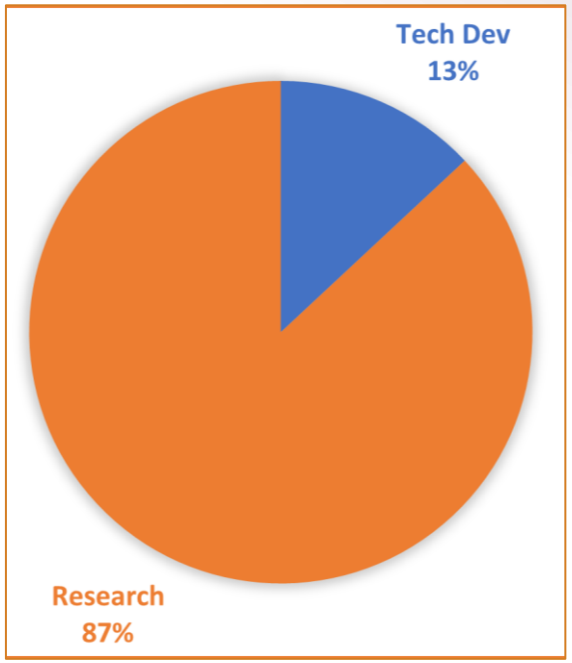
Planetary Protection Research (PPR)

- Portfolio supports mission-enabling and capability-driven research required to improve NASA's understanding of the potential for both forward and backward contamination; and improve methods and technologies for accurate, efficient, and effective minimization of biological contamination for outbound spacecraft and return samples
- Programmatic priorities:
  - Planetary conditions controlling transport
  - Detection and classification of terrestrial microbes
  - Predictions of bioburden levels
  - Deep space environment impact on contaminants
  - Improving ways to meet planetary protection requirements
  - Measuring bioburden survival or inactivation
- Solicited Annually in ROSES: **C.15/Planetary Protection Research**
  - Dual Anonymous Peer Review (DAPR), No Due Date (NoDD)
- Typically select ~4-8 proposals per year (~$1.5M per year)
- PPR Program Scientist: David J. Smith (hq-ppr@mail.nasa.gov)

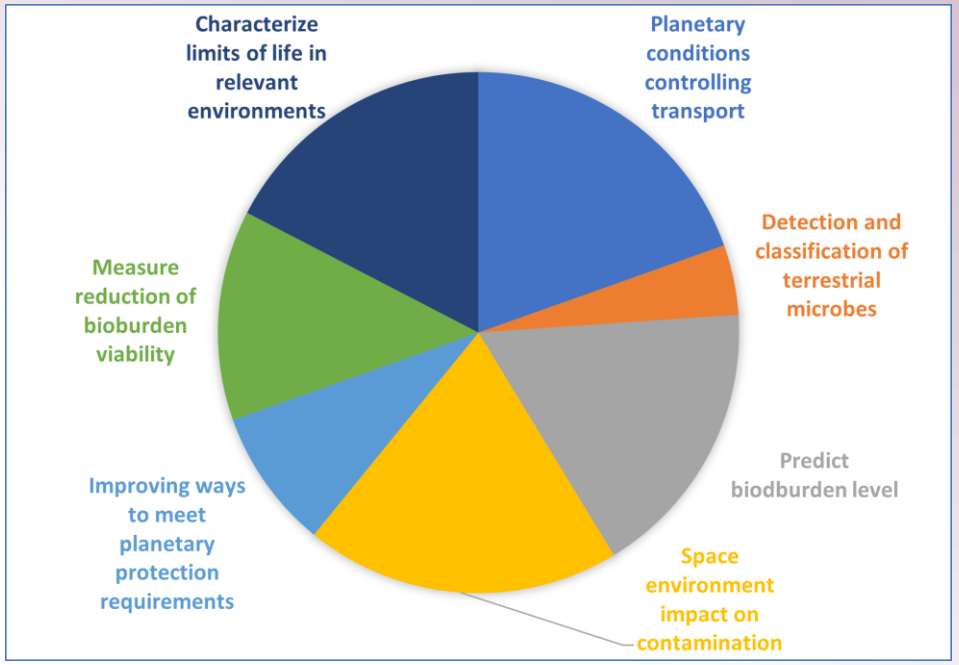
PPR Portfolio Balance

PPR mostly supporting fundamental research (with some tech development)



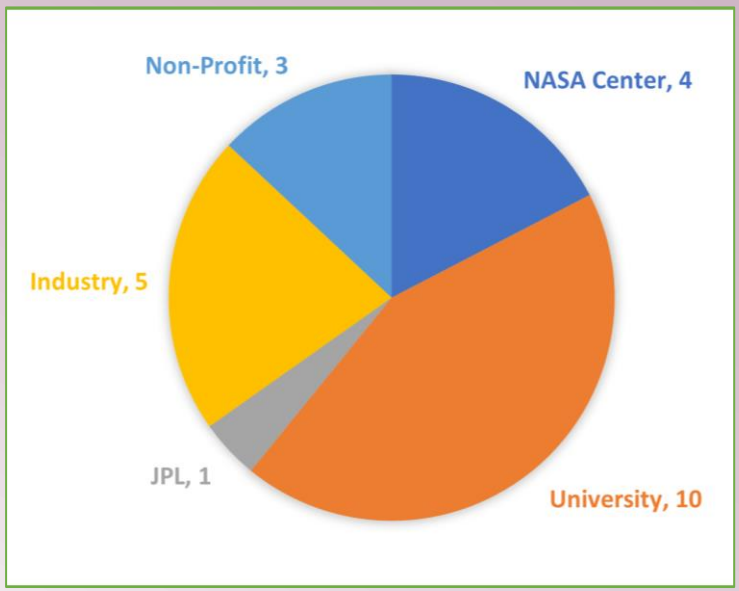
# of Current Awards Binned by Type of Work

PPR awards are distributed across prioritized research areas



# of Current Awards Binned by Research Target Area

PPR work is occurring at a variety of institutions



# of Current Awards Binned by Institution Type (PI)

PPR Changes in ROSES-25

PPR Solicitation (C.15) Priorities in ROSES-25

Image credit: American Society for Microbiology

Main Changes:

- Priorities no longer rank-ordered
- Now six total program priorities (down from seven)
- Explicitly allowing for research related to organic contamination

- ❑ Planetary conditions controlling transport
- ❑ Detection and classification of terrestrial microbes
- ❑ Predictions of bioburden levels
- ❑ Deep space environment impact on contaminants
- ❑ Improving ways to meet planetary protection requirements
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PPR-25 Not Intended for Technology or Hardware Development

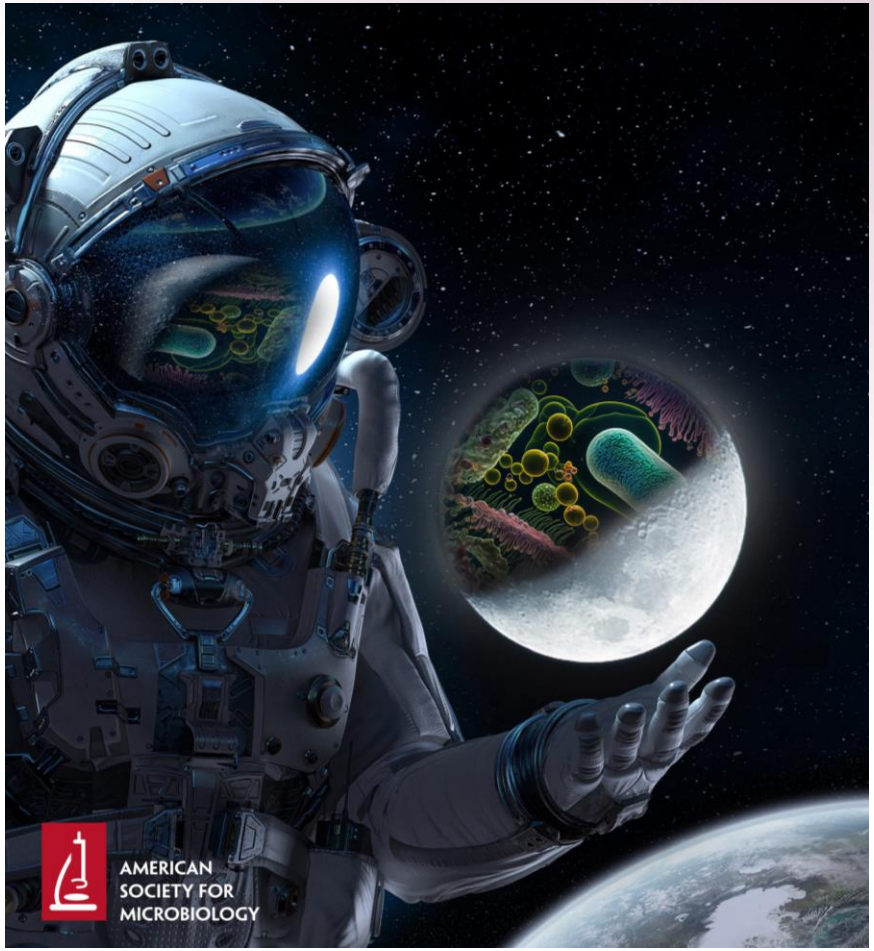


Image credit: American Society for Microbiology

Main Changes:

- Proposals using commercial-off-the-shelf (COTS) hardware will be allowed; however, proposals for technology development and maturation should be submitted to other NASA programs in PESTO such as Planetary Instrument Concepts for the Advancement of Solar System Observations (PICASSO/C.12) or Maturation of Instruments for Solar System Exploration (MatISSE/C.13) for proposals pertaining to planetary protection instruments, sampling and measurements.
- Technology proposals not related to instrumentation can consider STMD's Space Technology Research Grants Program (STRGP) and the NASA Small Business Innovation Research / Small Business Technology Transfer (SBIR/STTR) Program.

PPR-25 Encouraging Use of NASA Open Science Assets

Image credit: American Society for Microbiology

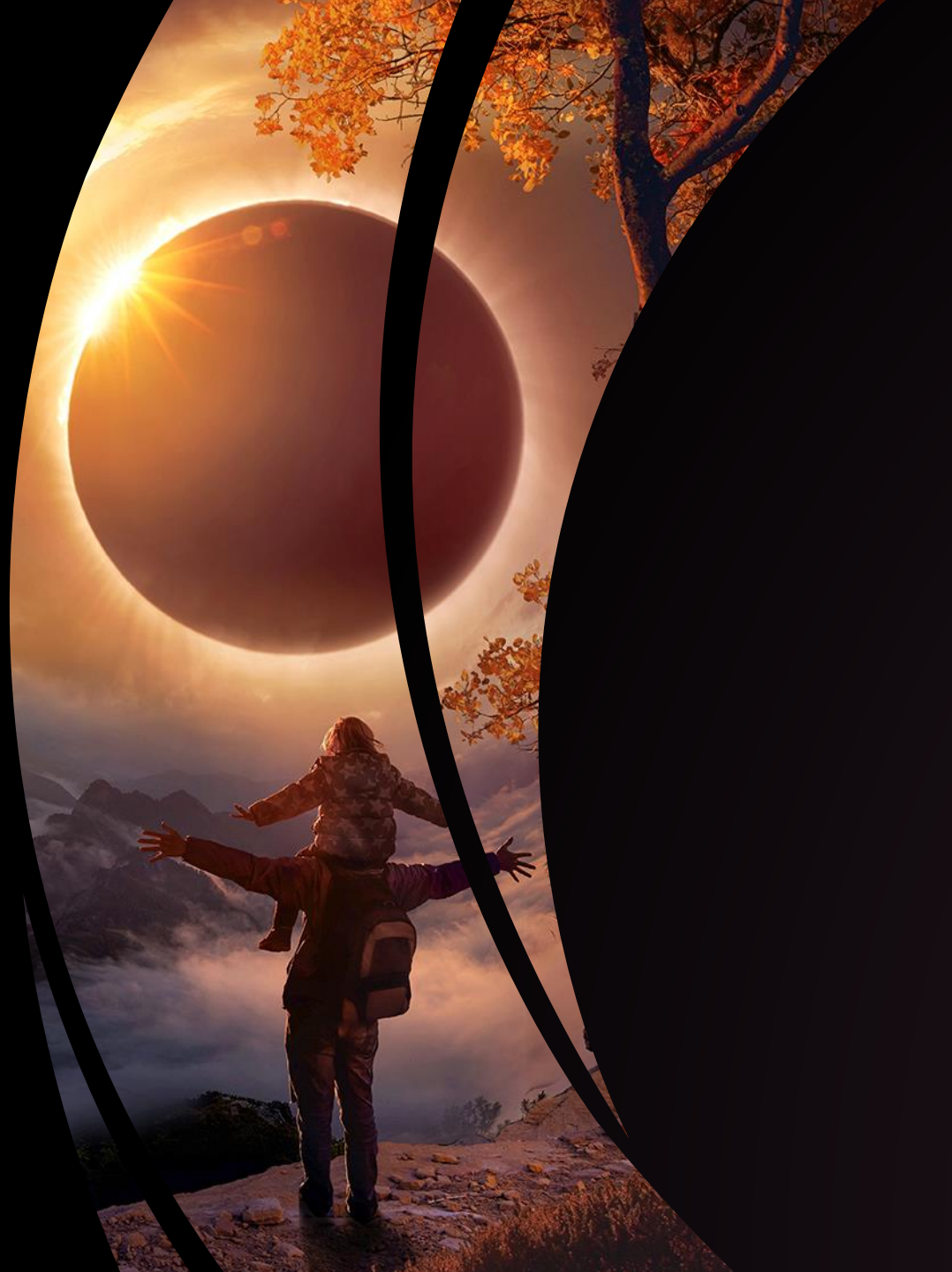
Main Changes:

- Proposals generating biological data are expected to utilize NASA's Open Science Data Repository (see SPD41A).
- Proposals requesting or producing biological specimens (from collections or experiments) are expected to utilize NASA's Biological Institutional Scientific Collection (NBISC), specifically the Space Microbial Culture Collection (SMCC).
  - Aiming to have ~8,000 spaceflight isolates from JPL ingested into SMCC starting in FY25, made available for community use (along with pertinent metadata)
    - M2020
    - Viking
    - Odyssey
    - MER
    - MSL
    - Insight
    - Europa Clipper

PPR-25 a No Due Date (NoDD) Program

Image credit: American Society for Microbiology

- Several program elements in ROSES do not have a fixed due date. Proposals to these programs may be submitted at any time during the open period of ROSES.
- A goal of No Due Date (NoDD) is to provide flexibility in proposal submission (for individuals and AORs) and to expand potential reviewer pool.
- Appendix C (Planetary Science) has long had restrictions on submission of "duplicate" proposals and "resubmissions“; those rules still apply to NoDD programs.
- After 4 years of implementation in Appendix C (Planetary Science) for a subset of ROSES programs, NoDD outcomes are currently being evaluated by NASA PSD.
  - C.15/PPR is in next wave of NoDD expansion
  - We welcome community feedback on this change



Thank You!

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PPR Programmatic Priorities (from C.15)

It should be noted that the evolving planetary protection requirements of NASA's programs may affect the priorities for funding among these areas.

1. *Model or experimentally measure planetary environmental conditions and transport processes that could permit mobilization of spacecraft-associated contaminants to locations in which Earth organisms might thrive.*
2. *Develop or adapt modern molecular analytical methods to rapidly detect, classify, and/or enumerate Earth microbes carried by spacecraft (on surfaces and/or in bulk materials, especially at low densities) before, during, and after assembly and launch processing.*
3. *Model to understand and predict biological and organic contamination sourcing, transport, survival, and burden level of spacecraft, for both forward and backward contamination.*
4. *Model or experimentally measure space environmental conditions and spacecraft designs that could permit a decrease in biological contamination of spacecraft during the journey (e.g. bioburden credits) to the target destination with emphasis on reduction of organisms currently surviving under cleanroom conditions.*
5. *Identify and provide proof-of-concept on new or improved methods, designs, technologies, techniques, and procedures to support planetary protection requirements for outbound and return sample missions.*
6. *Experimentally measure reduction in viability of hardy terrestrial organisms, including viruses, exposed to high temperatures (e.g. 200 to 500 degrees centigrade) for short periods of time (e.g. seconds to minutes).*
7. *Characterize the limits of life in laboratory simulations of relevant planetary environments or in appropriate Earth analogs.*