

Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers: Panel on Human and Biological Science

Meeting No. 2

August 25-27, 2025

Hybrid Meeting

NAS Building, Room 120, 2101 Constitution Avenue NW, Washington, DC 20418

ALL TIMES IN US EASTERN DAYLIGHT TIME (UTC-4:00)

MONDAY, AUGUST 25, 2025

OPEN SESSION

- | | | |
|----------|---|---|
| 09:30 AM | Welcome and Overview of the Meeting | Dr. Ron Turner
Chair, Panel on Human and Biological Science |
| 09:30 AM | Extravehicular Activities (EVA) for human enabled science on the moon.
(30-minute presentation and 30-minute discussion) | Dr. Bonnie Dunbar
Professor, Texas A & M |
| 10:30 AM | <i>Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research Decadal Survey for 2023-2032 - Overview of plant research in space and Bioregenerative Life Support Systems (BLSS)</i>
(45-minute presentation and 45-minute discussion) | Dr. Sarah Wyatt
Member, BPS Decadal Survey |
| 12:00 PM | <i>Break</i> | |
| 01:00 PM | Human-Robotic Interaction for Human Enabled Science on the Moon
(30-minute presentation and 30-minute discussion) | Dr. Stephen Robinson
Professor, UC Davis |
| 02:00 PM | Panel Discussion | |
| 02:30 PM | <i>Break into Closed Session</i> | |

TUESDAY, AUGUST 26, 2025

OPEN SESSION

- | | | |
|----------|---|---|
| 09:00 AM | Challenges the lunar environment poses to human operations and how that varies away from the poles | Dr. Jim Head
Professor, Brown University |
| 10:15 AM | <i>Break</i> | |
| 10:30 AM | Environmental Control and Life Support System (ECLSS) and Extravehicular Activities (EVA) for human enabled science on the moon. | Dr. Andrew Abercromby
Principal Consultant, X-3PO |

Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers: Panel on Human and Biological Science
August 25-27, 2025

12:00 PM *Working Lunch for Panel Members*

01:00 PM Panel on Lunar Lava Tubes

Overview of Lunar Lava Tubes

Introduction to Lunar Lava Tubes: What they are and what science they offer.

How could future human missions support exploration and ultimately benefit from them.

Mission Example: Moon Diver

Mission Example: Pit Circumnavigation

(20-minute presentation each and 40-minute discussion)

Dr. Pascal Lee
Chairman, Mars Institute

Dr. Penny Boston
Portfolio Scientist, NASA AMES

Dr. Laura Kerber
Research Scientist, JPL

Dr. Red Whittaker
Research Professor, Carnegie Mellon University

03:30 PM *Break*

IMPORTANT NOTES

Members of the General Public:

- Remote access will be provided through a live stream on Vimeo. This will also be publicly available and posted on the Board website. You do not need to register.

Thank you all for your cooperation, and we look forward to a successful meeting.

Statement of Task

Panel on Human and Biological Science

The Panel on Human and Biological Science will gather information and identify and articulate the science objectives related to biology and human health and physiology in space that would be most enabled by human explorers on the moon. Using NASA's 2022 Moon to Mars Objectives, the National Academies report *Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023-2032*, and other gathered information, the panel will:

- Identify key science objectives within biology and human health and physiology in space that can or must be done by human explorers on the lunar surface;
- Specify the key measurements, either in situ or via returned samples, needed to achieve these key science objectives and why human explorers would enable those measurements (as opposed to robotic assets);
- Detail any pre-placed assets (e.g., tools, mobility devices, robotic hardware, and equipment delivered to the lunar surface prior to human landing) that would be either necessary or enabling of these key measurements; and
- Prioritize potential non-polar landing sites or characteristics of landing sites that would be most enabling of these key science objectives and measurements

This panel is one of four operating under the aegis of “Key Non-Polar Destinations Across the Moon to Address Decadal-level Science Objectives with Human Explorers” and its steering committee. The panel will provide the steering committee with its findings and a science traceability matrix outlining each potential non-polar landing site (or characteristics of landing sites) and the science objectives it would enable. The panel will not produce recommendations as part of its input to the project’s Steering Committee.