The National Academies of
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DIVISION ON ENGINEERING AND PHYSICAL SCIENCES
SPACE STUDIES BOARD

Committee on Planetary Protection

Space Science Week 2021
March 23-25, 2021
Virtual Meeting
ALL TIMES IN US EASTERN DAYLIGHT TIME (UTC-4:00)

This agenda is a draft, subject to change, and was last updated on 3/24/2021 3:38 PM

AGENDA

TUESDAY, MARCH 23, 2021

Meeting Open to the Public
Livestreaming Link: https://livestream.com/accounts/7036396/events/9569460

Space Science Week Plenary Session

Opening Session: Introductions and NASA Science Program Update

11:00 AM	**Welcome**	***Dr. Margy Kivelson, SSB Chair***
11:05 AM	**NASA Science Mission Directorate Introduction** (40 minute presentation)	***Dr. Thomas Zurbuchen, Assoc. Administrator, SMD, NASA***
11:45 AM	**Panel 1: NASA Science Mission Directorate Division Directors** (7 minute presentation each and 25 minute discussion)	
	Moderator:	***Dr. Margy Kivelson, SSB Chair***
	Panelists:	***Dr. Karen St. Germain, Director, Earth Science Division, SMD, NASA*** ***Dr. Nicola Fox, Director, Heliophysics Division, SMD, NASA*** ***Dr. Lori Glaze, Director, Planetary Science Division, SMD, NASA*** ***Dr. Paul Hertz, Director, Astrophysics Division, SMD, NASA*** ***Dr. Craig Kundrot, Director, Biological and Physical Sciences Division, SMD, NASA***
12:45 PM	*Break* (30 minute break)	
1:15 PM	**Address from NASA Acting Administrator**	***Dr. Steve Jurczyk, Acting Administrator, NASA***

1:45 PM	**The Perils of Complacency: America at a Tipping Point in Science and Engineering** (40 minute presentation followed by a 20 minute discussion)	***Mr. Norm Augustine, Chairman and CEO (ret.), Lockheed Martin Corporation / Dr. Neal Lane, Professor Emeritus, Baker Institute for Public Policy, Rice University***
2:45 PM	*Break* (20 minute break)	

Space Science from an International Perspective: Achievements during the Year of Pandemic

3:05 PM	**ESA Science Highlights** (10 minute presentation)	***Dr. Günther Hasinger, Director of Science, ESA***
3:15 PM	**ESA Science Program Strategy** (10 minute presentation)	***Dr. Fabio Favata, Head, Strategy, Planning, and Coordination Office; Directorate of Science ESA***
3:25 PM	**ESA Earth Observation Perspective** (10 minute presentation)	***Dr. Maurice Borgeaud, Head, Earth Observation Department, ESA***
3:35 PM	**ESA Exploration Science** (10 minute presentation)	***Dr. David Parker, Director, Human and Robotic Exploration, ESA***
3:45 PM	*Break* (10 minute break)	
3:55 PM	**Russian Space Research Institute Perspective** (10 minute presentation)	***Dr. Lev Zelenyi, Scientific Advisor, Russian Space Research Institute (IKI)***
4:05 PM	**Chinese National Space Science Center (NSSC) Perspective** (10 minute presentation)	***Dr. Chi Wang, Director-General, NSSC, Chinese Academy of Sciences***
4:15 PM	**Japanese Aerospace Exploration Agency (JAXA) Perspective** (10 minute presentation)	***Dr. Masaki Fujimoto, Deputy Director General, JAXA***
4:25 PM	**Round-Table Discussion with International Space Science and Exploration Leaders** (35-minute discussion)	
5:00 PM	*Plenary Session Adjourns*	

Public Session

Meeting Open to the Public
Livestreaming Link: https://livestream.com/accounts/7036396/events/9569460

5:30 PM **Keynote Space Science Week Public Lecture**
"Climate Change as seen from Space"
Dr. Gavin Schmidt
Acting Senior Climate Advisor, NASA-HQ / Director, Goddard Institute of Space Studies, NASA

Public Lecture Abstract
We have been observing the climate system from space since the 1960s, and more comprehensively since 1979. Over that time trends in many variables such as temperature, sea ice, gravity, ozone, clouds, and sea level, have been detected and through the use of sophisticated climate models, attributed fully or partially to anthropogenic influences on the climate system. More recently, we have successfully started to attribute the frequency and intensity of some classes of extreme events (such as heat waves, drought, coastal flooding and intense precipitation) to those same anthropogenic drivers. I will discuss the unique perspective on climate through all manner of space-borne observations and the emerging science of extreme event attribution, and what the next decade might hold.

Speaker Bio
Gavin Schmidt is the acting Senior Advisor on Climate at NASA and Director of the Goddard Institute for Space Studies. His research covers climate changes in past, present and future climate mostly using the GISS Earth System Model. He was the author with Josh Wolfe of "Climate Change: Picturing the Science" in 2009 and, in 2011, was the inaugural recipient of the AGU Climate Communication Prize. His 2014 TED talk has been seen more than a million times. He is a fellow of the AGU and AAAS.

WEDNESDAY, MARCH 24, 2021

Committee on Planetary Protection Meeting

OPEN SESSION

Meeting Open to the Public
Livestreaming Link: https://www.youtube.com/watch?v=FeuJ0TBt_50

11:00 AM	**Welcome and Introductions**	***Mr. Joseph K. Alexander, CoPP Co-Chair / Dr. Amanda Hendrix, CoPP Co-Chair***
11:05 AM	**NASA Planetary Protection and the CoPP Statement of Task for a Mars Report** (30 minute presentation & 15 minute discussion period)	***Dr. Lisa Pratt, Office of Planetary Protection, Office of Safety and Mission Assurance, NASA-HQ***
11:50 AM	**Introduction to Mars Astrobiology** (20 minute presentation & 10 minute discussion period)	***Dr. Chris McKay, Senior Scientist, Space Science and Astrobiology, NASA-Ames***
12:20 PM	*Break* (40 minute break)	
1:00 PM	**Prior Planetary Protection Reports and Mars Architecture** (25 minute presentation & 10 minute discussion period)	***Dr. Scott Hubbard, Adjunct Professor, Dept. of Aeronautics and Astronautics, Stanford U.***
1:35 PM	**Roundtable Discussion with Invited Speakers and Committee** (25 minute discussion)	
2:00 PM	*Break* (15 minute break)	
2:15 PM	**Perspective of the Planetary Protection Independent Review Board (PPIRB)** (20 minute presentation & 10 minute discussion period)	***Dr. Christopher House, Professor, Dept. of Geosciences, Penn State***
2:45 PM	*Meeting Adjourns to Closed Session (or at a time at the discretion of the Co-Chairs)*	

THURSDAY, MARCH 25, 2021

Committee on Planetary Protection Meeting

OPEN SESSION

Meeting Open to the Public

Livestreaming Link: ***https://livestream.com/accounts/7036396/events/9592388***

11:00 AM	**Reconvening Remarks and Summary of Day 1**	***Mr. Joseph K. Alexander, CoPP Co-Chair / Dr. Amanda Hendrix, CoPP Co-Chair***
11:05 AM	**Planetary Protection Concerns in Mars Exploration** (20 minute presentation & 10 minute discussion period)	***Dr. John Rummel, Principal Partner, Friday Harbor Partners LLC***
11:35 AM	**Astrobiology Strategy on Mars** (20 minute presentation & 10 minute discussion period)	***Dr. Penelope Boston, Senior Advisor for Science Integration, NASA-Ames***
12:05 PM	*Break* (40 minute break)	
12:45 PM	**Martian Recurring Slope Lineae and Planetary Protection** (20 minute presentation & 10 minute discussion period)	***Dr. Alfred McEwen, Professor, Lunar and Planetary Laboratory, U. of Arizona***
1:15 PM	**Discussion of Mars Landing Site Selection** (20 minute presentation & 10 minute discussion period)	***Dr. Matthew Golombek, Landing Site Scientist, JPL/CalTech***
1:45 PM	**Roundtable Discussion with Invited Speakers and Committee** (30 minute discussion)	
2:15 PM	*Meeting Adjourns to Closed Session (or at a time at the discretion of the Co-Chairs)*	

The following information is provided for any members of the general public who may be in attendance:

This meeting is being held to gather information to help the committee in its charge. This committee will examine the information and material obtained during this, and other public meetings, in an effort to inform its work. Although opinions may be stated and lively discussion may ensue, no conclusions are being drawn nor will recommendations be made. Observers who draw conclusions about the committee's work based on this meeting's discussions will be doing so prematurely.

Furthermore, individual committee members often engage in discussion and questioning for the specific purpose of probing an issue and sharpening an argument. The comments of any given committee member may not necessarily reflect the position he or she may actually hold on the subject under discussion, to say nothing of that person's future position as it may evolve in the course of the project. Any inference about an individual's position are therefore also premature.

NOTES FOR PRESENTERS

If your presentation contains unpublished data, ITAR controlled and/or other sensitive information, please be aware that the open sessions at the meeting may be recorded and/or webcast. Presentation materials given to the committee may be posted on a publicly accessible website. Please edit your presentations accordingly.

Mac users should assume that their presentation will be displayed via one of the NASEM's PCs. If your presentation is graphics heavy and best displayed via your own laptop, you should also bring a plain-vanilla pdf version of your presentation with you. The audience in the meeting room will see your presentation via your laptop and we will webcast the pdf file.

At some point a staff member will be asking you to sign a consent form allowing us to use your presentation, specifically to post it on our website.

STATEMENT OF TASK

Task Initiated on 22 February 2021

The Committee on Planetary Protection (CoPP) shall write a report that identifies criteria for determining locations or regions on Mars that are potentially suitable for missions of less restrictive bioburden than the current requirements for Category IV. The report shall also illustrate the use of those criteria by identifying some potentially acceptable locations that meet those criteria and are suitable for reduced bioburden criteria. Additionally, the report shall consider the appropriateness of mission activities that occur beneath the Martian surface in these locations and how deep such mission activities should be allowed.

The CoPP shall determine whether the following criteria are necessary and sufficient to determine if a location on Mars is appropriate for missions with lower bioburden requirements than the current Category IV and provide methods a mission could use to show it meets the criteria. If the following criteria are not sufficient, the CoPP shall provide those that are deemed necessary.

Criteria might include:

- Temperatures at the landing site and locations of mission activities are below -25°C, or water activity is less than 0.5 (Note: water activity = water vapor pressure of a solution/vapor pressure of pure water),
- Mission activities will go no deeper than a certain distance below the surface,
- Landed spacecraft are not capable of melting the regolith, and
- Proposed landing and/or mission activity sites do not contain geomorphological characteristics of flowing water, such as recurring slope lineae, etc.

Methods to show that the above criteria are met might include:

- Observational data from orbiters, landers, rovers, and Earth-based observation;
- Modeling based on the most up-to-date knowledge of the Martian environment and its processes.

In determining criteria for locations on Mars, the CoPP shall also consider whether mission activities need to be constrained to an area of a specific diameter, including off-nominal operation margins.

Finally, the CoPP shall briefly comment on whether these locations may be suitable for an eventual human exploration mission. While this report should primarily focus on robotic missions, NASA would like to know the CoPP's views on whether these criteria may be useful (although likely not sufficient) when considering how human missions can be carried out without large-scale biological contamination of Mars.

The committee must consider the views of the broad community of stakeholders, including Mars and astrobiological scientists, government agencies dealing with spaceflight and exploration, and the aerospace industry, including emerging commercial entities.

TENTATIVE SCHEDULE FOR REPORT COMPLETION (AT PROJECT INITIATION)

March 2021	Task Initiation and Kick-Off Meetings
March – June 2021	Committee Virtual Meetings to Discuss Task, Gather Information and Input from Experts, Discuss, Deliberate, and Draft Report
1 July 2021	Target Draft Report Completion Date; Send Draft Report to Reviewers
15 July 2021	Reviews Due from Reviewers
25 August 2021	Target Date for Response to Review Submission to DEPS Report Review Officer
8 September 2021	Target Signoff Date
15 September 2021	Approved Report to DEPS Editor
22 September 2021	Deliver Report to NASA in Prepublication Format