SPACE STUDIES BOARD

**SPACE STUDIES BOARD**

Fall Meeting – 179th Meeting – November 6-8, 2019
**Beckman Center of the National Academies of Sciences, Engineering and Medicine**
Huntington Room, 100 Academy Way, Irvine CA

# AGENDA

## WEDNESDAY, NOVEMBER 6, 2019

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| ***7:30 AM*** | ***Carpools leave from hotel lobby*** |
| ***7:45 AM*** | ***Working Breakfast Available in the Beckman Dining Room*** |
| ***8:30 AM*** | ***Committee Meets in Executive Session*** |
| ***9:15 AM*** | ***Break*** |

**OPEN SESSION**

*Zoom Remote Access Information - Day 1 Open* — *Phone: 877-853-5257*
*Link: https://nasem.zoom.us/j/269336935* — *Meeting ID: 269-336-935*

**Discussion with NASA Science Mission Directorate**

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| **9:30 AM** | **Welcome and Introduction of Members and Attendees** | ***Dr. Margy Kivelson, SSB Chair*** |
| **9:45 AM** | **SMD Program and Budget Update**<br>(45 minute presentation & 15 minute discussion) | ***Dr. Michael New, Deputy Assoc. Administrator for Science, Science Mission Directorate, NASA*** |

**Challenges and Opportunities Identified by the Discipline Committees**

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| **10:45 AM** | **Update from the Committee on Astronomy & Astrophysics**<br>(10 minute presentation & 5 minute discussion) | ***Dr. Vicky Kalogera[1] / Dr. Thomas Greene, CAA Co-chairs*** |
| **11:00 AM** | **Update from the Committee on Solar and Space Physics**<br>(10 minute presentation & 5 minute discussion) | ***Dr. Sarah Gibson / Dr. Maura Hagan, CSSP Co-chairs*** |
| **11:15 AM** | **Update from the Committee on Earth Science and Applications from Space**<br>(10 minute presentation & 5 minute discussion) | ***Dr. Chelle Gentemann / Dr. Steven Running, CESAS Co-chairs*** |
| **11:30 PM** | **Update from the Committee on Astrobiology and Planetary Science**<br>(10 minute presentation & 5 minute discussion) | ***Dr. Christopher House / Dr. William McKinnon[1], CAPS Co-chairs*** |

[1] ***Attendance via Zoom***

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| **11:45 PM** | **Update from the Committee on Biological and Physical Sciences in Space**<br>(10 minute presentation & 5 minute discussion) | ***Dr. Robert Ferl / Dr. Dava Newman[1], CBPSS Co-chairs*** |
| ***12:00 PM*** | ***Working Lunch in the Beckman Dining Room (informal discussions continue over lunch)*** | |

**Updates from NASA Science Advisory Groups**

**1:00 PM** **Panel 1: NASA Science Advisory Committee Chairs**
(10 minute panel presentations followed by 30 minute discussion)
**ISSUE: What are the concerns of the NASA Science Advisory Committees and are there any possible SSB studies that could arise from those concerns?**

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| ***Moderator:*** | ***Dr. David McComas, SSB Member*** |
| ***Panelists:*** | ***Dr. Meenakshi Wadhwa, Chair, Science Committee (NAC Science)*** |
| | ***Dr. Michael Liemohn, Chair, Heliophysics Advisory (HPAC)*** |
| | ***Dr. Amy Mainzer, Vice-Chair, Planetary Science Advisory (PAC)*** |
| | ***Dr. Leonidas Moustakas, Member, Astrophysics Advisory (APAC)*** |
| | ***Dr. David Saah, Chair, Applied Science Advisory (ASAC)*** |
| | ***Dr. James Marshall Shepherd, Chair, Earth Science Advisory (ESAC)*** [1] |

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| ***2:30 PM*** | ***Break*** | |
| **2:45 PM** | **European Space Science Committee Update**<br>(30 minute presentation & 15 minute discussion) | ***Dr. Athena Coustenis, Chair, European Science Foundation-ESSC*** |
| ***3:30 PM*** | ***Committee Meets in Executive Session*** | |

*** Details of November 6th Afternoon Panels**

**Panel 1: NASA Science Advisory Committee Chairs**
The NASA Advisory Council Science Committee is a standing committee commissioned to support the advisory needs of the NASA Administrator and the various NASA Mission Directorates. With the more specialized Science Advisory Committees, their goal is to provide recommendations that inform decisions on the scope and priorities of NASA programs. What is the current status of the various NASA Science Advisory Committees? What are their concerns and challenges? Are there any opportunities of interest to the Space Studies Board?

## THURSDAY, NOVEMBER 7, 2019

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| ***7:15 AM*** | ***Carpools leave from hotel lobby*** |
| ***7:30 AM*** | ***Working Breakfast Available in the Beckman Dining Room*** |
| ***8:15 AM*** | ***Committee Meets in Executive Session*** |
| ***9:00 AM*** | ***Break*** |

**OPEN SESSION**

*Zoom Remote Access Information - Day 2 Open* *Phone: 877-853-5257*
*Link: https://nasem.zoom.us/j/950482044* *Meeting ID: 950-482-044*

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| **9:15 AM** | **Welcome and Introduction** | ***Dr. Margy Kivelson, SSB Chair*** |



[1] ***Attendance via Zoom***

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| **9:20 AM** | **Update from the National Space Council User's Advisory Group (UAG)**<br>(20 minute presentation & 10 minute discussion) | ***Gen. Lester Lyles (ret.), USAF UAG Member*[1]** |

**Focus on Big Data and Space Science**

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| **9:50 AM** | **Keynote Speaker**<br>(45 minute presentation & 15 minute discussion) | ***Dr. Christine Borgman, UCLA*** |
| ***10:50 AM*** | ***Break*** | |

**Status of Big Data and the Ramifications for the Scientific Community (2 Panels)***

**11:05 AM** **Panel 2: Utilizing Big Data to Maximize Scientific Output**
(10 minute panel presentations followed by 40 minute discussion)
**ISSUE: How is the scientific community currently utilizing Big Data? What kind of infrastructure improvements are required in order to maximize utilization?**

***Moderator:*** ***Dr. Jeff Dozier, SSB Member***
***Panelists:*** ***Mr. Daniel Crichton, Manager, Data Science Program, NASA-JPL***
***Dr. Matias Carrasco Kind, Senior Researcher / Professor, NCSA/UIUC***
***Dr. Kian-Tat Lim, Data Management System Architect, LSST***
***Dr. Ivelina Momcheva, Support Scientist, Data Science Mission Office, STScI***
***Dr. D. Aaron Roberts, Program Scientist, Heliophysics Data Environment, NASA***

***12:35 PM*** ***Working Lunch in the Beckman Dining Room (informal discussions continue over lunch)***

**1:30 PM** **Panel 3: The Future of Scientific Journals**
(10 minute panel presentations followed by 40 minute discussion)
**ISSUE: How are major scientific journals reacting to the push towards open source journals? Do open source journals represent a major disruption in traditional peer-reviewed publications?**

***Moderator:*** ***Dr. Dennis Lettenmaier, SSB Member***
***Panelists:*** ***Dr. Matt Giampoala, VP of Publishing, AGU Journals***
***Mr. Edwin Henneken, IT Specialist, Astrophysics Data System, CfA-Harvard*[1]**
***Dr. Margaret Moerchen, Director, AGU Journals*[1]**
***Dr. May Chiao, Chief Editor of Astronomy, Nature***
***Dr. Ethan Vishniac, Editor-in-Chief, AAS Publications***

**Humans and Long Duration Space Missions**

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| **3:00 PM** | **NASA Planetary Protection for Human Missions**<br>(20 minute presentation & 10 minute discussion) | ***Dr. Lisa Pratt, Planetary Protection Officer, NASA*** |
| ***3:30 PM*** | ***Break*** | |
| **3:45 PM** | **NASA Planetary Protection Protocols**<br>(30 minute presentation & 15 minute discussion) | ***Dr. Alan Stern, Consultant and CEO, Golden Spike Company and Uwingu*** |



[1] ***Attendance via Zoom***

**4:30 PM** **Panel 4: Astronaut Health during Long Duration Space Missions**
(5 minute panel presentations followed by 60 minute discussion)
**ISSUE: What adverse health effects may arise for astronauts on long duration space missions? What technologies or methodologies have been developed to mitigate those effects? What can be done to improve astronaut health in the long term?**

***Moderator:*** ***Dr. Erika Wagner, SSB Member***
***Panelists:*** ***Dr. Michael Delp, Professor, Florida State***
***Dr. Rachael Seidler, Professor, U. of Florida***
***Dr. Jean Sibonga, Lead Scientist – Bone Discipline, NASA***[1]
***Mr. Sidney Sun, Associate Director for Life in Space, NASA***

**6:00 PM** **Board Members Group Photo**

***6:15 PM*** ***Adjourn for the day – evening free***

*** Details of November 7th Panels**

**Status of Big Data and the Ramifications for the Scientific Community**
Introduction: Big Data has revolutionized a number of scientific fields including space sciences. With the advent of greater processing power, less expensive data storage options, the cloud and cloud computing, and projects that produce an unprecedented amount of data, Big Data can have a transformative effect on the way that science is done and disseminated to the public. However, as with any transformation, there is the potential for disruption as the scientific community shifts to adapt. The only way to mitigate any possible disruption is to anticipate and be proactive in the change. The two panels today will explore the potential that Big Data offers and identify possible ways the scientific community can be proactive in the changing environment.

**Panel 2: Utilizing Big Data to Maximize Scientific Output**
Big Data has already changed much of the way we perform science, and moving forward, will play a greater role in the way that scientists obtain and handle data. More and more science is being done using previously acquired data stored in repositories and archives. Current and future projects will produce a prodigious amount of data that will be released to the public, enabling even more research than intended by the project's institutions. What is the current state of these sources of data and how has the scientific community adapted to their use? How can the federal government and its agencies facilitate the use of these databases, archives, and repositories? What steps are necessary to ensure that data sources are well-documented and easily usable? What resources and infrastructure will be required to ease the use of these sources of data in the future? Who will be responsible for funding data storage and data curation in the long-term?

**Panel 3: The Future of Scientific Journals**
Scientific journals have long been established as the primary method of organizing peer review and disseminating scientific research. However, with the advent of Big Data, there is now an organized push towards open source journals. In September 2018, the science agencies of 11 European countries started an initiative called "Plan S" requiring scientists to publish in freely-accessible journals by 2020. Though these open source journals allow the free access of their materials, it remains to be seen what effects initiatives like Plan S will have on traditional journals. How disruptive are initiatives like Europe's Plan S to major journal publishers? How can journals adapt in the changing environment? How can the various scientific institutions and the federal government that fund them ensure that research is simultaneously freely accessible to the public while maintaining the level of peer-review and quality control that we have come to expect from the major journal publishers?

**Panel 4: Astronaut Health during Long Duration Space Missions**
As humanity continues its exploration of space, one of the key issues to address is the long-term health effects that spaceflight has on astronauts. With plans for returning to the moon, Gateway Station, and the eventual human



[1] ***Attendance via Zoom***

exploration of Mars, these health effects will need to be well-understood for countermeasures to be developed and tested before these longer duration missions take place. What health effects are expected in a long duration mission like those planned for the moon, Gateway, or Mars? What countermeasures have been developed through the long duration missions of the present such as the International Space Station? What technological or medical improvements are needed in order to ensure the long-term health of astronauts in the future?

## FRIDAY, NOVEMBER 8, 2019

***Executive Session in its Entirety.***



[1] ***Attendance via Zoom***