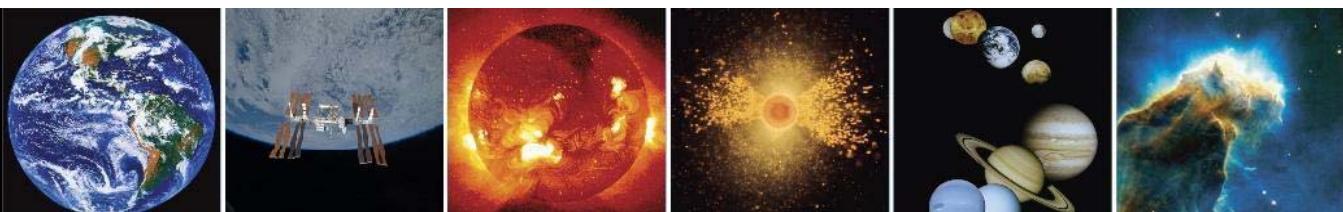


# SPACE STUDIES BOARD NEWS



O C T O B E R - D E C E M B E R 2 0 1 9

INSIDE THIS ISSUE



Space Science Week will be held  
March 31-April 2 in Washington, DC.

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*The National Academies of*  
**SCIENCES • ENGINEERING • MEDICINE**

# SPACE STUDIES BOARD NEWS

## SPACE STUDIES BOARD AND DISCIPLINE COMMITTEES

The Space Studies Board (SSB) met November 6-8, 2019, at the National Academies Arnold and Mabel Beckman Center in Irvine, CA. The board was briefed on and had discussions about the NASA Science Mission Directorate program and budget (Michael New, NASA SMD). The board held a session on the challenges and opportunities identified by the discipline committees of the SSB and ASEB (represented by the discipline committee co-chairs: CAA – Vicky Kalogera and Tom Greene; CSSP – Sarah Gibson and Maura Hagan; CESAS – Chelle Gentemann and Steve Running; CAPS – Chris House and Bill McKinnon; and CBPSS – Rob Ferl and Dava Newman). Board member Dave McComas then moderated a conversation with the NASA Science Advisory Committee chairs or their representatives on how the SSB could be of service (NAC Science - Meenakshi Wadhwa; HPAC – Michael Liemohn; PAC – Amy Mainzer; APAC – Leonidas Moustakas; ASAC – David Saah; and ESAC - James Marshall Shepherd). Open session on the first day concluded with an update from the European Space Science Committee (Athena Coustenis, Chair, ESSC). The second day included an update on the National Space Council User Group from NSC-member General Lester Lyles. Christine Borgman (UCLA) gave a well-received keynote presentation on Data, Infrastructure, and Stewardship. A panel discussion on utilizing big data to maximize scientific output was held, followed by a panel on the future of scientific journals. A session followed on humans and long-duration space missions, including an update and discussion on NASA planetary protection protocols (Alan Stern, SwRI), NASA plans for planetary protection for human missions (Lisa Pratt, NASA Planetary Protection Officer), and a panel on astronaut health during long-duration space missions. The board's next meeting will be held June 9-11, 2020 at the Keck Center in Washington, D.C. June 9 will be a joint session with the Aeronautics and Space Engineering Board. For additional information about the SSB including links to presentations and agendas, please go to [http://sites.nationalacademies.org/SSB/SSB\\_052281](http://sites.nationalacademies.org/SSB/SSB_052281).

The Committee on Astrobiology and Planetary Science (CAPS) did not meet during this quarter. However, CAPS, as the organizing committee for the next planetary science decadal survey, was active in three major areas. First, the negotiations between the SSB and NASA's Planetary Science Division (PSD) on the statement of task for the next decadal survey in planetary science and astrobiology was successfully concluded in late-October and the Executive Committee on the National Academies' Governing Board approved the prospectus describing the execution of the task at its meeting in early-December. Second, a town hall event describing the status of planning for the survey was held in December at the meeting of the American Geophysical Union in San Francisco. Participants in the town hall included Colleen Hartman (Director, SSB), Lori Glaze (Director, PSD), James L. Green (Chief Scientist, NASA), William McKinnon (Co-chair, CAPS), and David H. Smith (Senior Staff Officer, CAPS). Third, a proposal to NASA to fund the decadal survey is in preparation. Additional details about the decadal survey, including the statement of task, is at [https://sites.nationalacademies.org/SSB/ssb\\_198165](https://sites.nationalacademies.org/SSB/ssb_198165). The next meeting of CAPS will take place in Washington, DC, on March 31-April 2 as part of the 2020 Space Science Week. For additional information about CAPS including links to presentations and agendas, please go to [http://sites.nationalacademies.org/SSB/SSB\\_067577](http://sites.nationalacademies.org/SSB/SSB_067577).

The Committee on Astronomy and Astrophysics (CAA) held its fall meeting as a half-day teleconference on November 26, 2019. Representatives from NASA, NSF, DOE, and the Astro2020 Decadal Survey provided updates. The next meeting of CAA will take place in Washington, DC, on March 31-April 2 as part of the 2020 Space Science Week. For additional information about CAA including links to presentations and agendas, please go to [https://sites.nationalacademies.org/BPA/BPA\\_048755](https://sites.nationalacademies.org/BPA/BPA_048755).

## SSB MEMBERSHIP

JULY 1, 2019—JUNE 30, 2020

### MARGARET KIVELSON, *Chair*

University of California, Los Angeles

### JAMES H. CROCKER *Vice Chair*

Lockheed Martin Space Systems Company  
(retired)

### GREGORY P. ASNER

Carnegie Institution for Science

### JEFF M. BINGHAM

U.S. Senate (retired)

### ADAM BURROWS

Princeton University

### MARY LYNNE DITTMAR

Coalition for Deep Space Exploration

### JEFF DOZIER

University of California, Santa Barbara

### VICTORIA HAMILTON

Southwest Research Institute

### CHRYSSA KOUVELIOTOU

The George Washington University

### DENNIS P. LETTENMAIER

University of California, Los Angeles

### ROSALY M. LOPEZ

Jet Propulsion Laboratory

### STEPHEN J. MACKWELL

American Institute of Physics

### DAVID J. MCCOMAS

Princeton University

### LARRY PAXTON, JR.

Johns Hopkins University, Applied Physics Laboratory

### ELIOT QUATAERT

University of California, Berkeley

### MARK P. SAUNDERS

Independent Consultant

### BARBARA SHERWOOD LOLLAR

University of Toronto

### HOWARD J. SINGER

National Oceanographic and Atmospheric Administration

### HARLAN E. SPENCE

University of New Hampshire

### MARK H. THIEMENS

University of California, San Diego

### ERIKA WAGNER

Blue Origin, LLC

### PAUL WOOSTER

Space Exploration Technologies

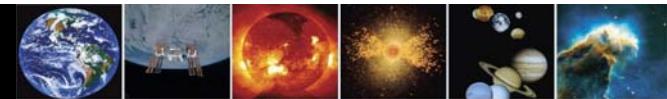
### EDWARD L. WRIGHT

University of California, Los Angeles

### LIAISON

### CHARLES KENNEL

U.S. Representative to COSPAR



## The Committee on Biological and Physical Sciences in Space

(CBPSS) met on October 29-31, 2019 in Irvine, CA for discussions about the upcoming decadal survey on life and physical sciences in space. SLPSRA Director Craig Kundrot began the first day of the meeting with an overview of recent SLPSRA accomplishments and organizational changes, future plans, and forecasts of program challenges and opportunities. Robyn Gatens, NASA, briefed the committee on NASA's plans to foster the developing LEO economy. Cindy Martin-Brennan, ISSNL, explained the role CASIS (now ISSNL) plays in catalyzing commercial LEO activities. Brad Carpenter, NASA, summarized the Fundamental Physics program's current activities and goals, including the Cold Atom Laboratory. Fran Chiaramonte, NASA, explained how physical sciences benefits from ISS access and enables further scientific investigations in space, highlighting advancements in carbon dioxide removal and capillary flow research. David Tomko, NASA, presented current space biology investigations, emphasizing enabling the role of inter-agency collaboration and new capabilities at NASA centers. Bill Paloski, NASA, reviewed HRP status and future plans, focusing on current ISS studies advancing human exploration of the Moon and Mars. The first day ended with a discussion of which specific discipline areas and challenges should be included in the scope of the next decadal survey. The second day began with presentations from additional NASA directorates and divisions. Jim Reuter, NASA, presented an update of STMD investigations relevant to the decadal survey, including cryogenics and synthetic biology, emphasizing STMD ties to the HRP and reliance on various flight opportunities and platforms. Chris Moore, NASA, explained NASA plans for lunar exploration, emphasizing areas for research community focus, including sustainable resource utilization and exploration, radiation protection, fire safety, planetary protection, and translating basic research into technology development. Lisa Pratt, NASA, discussed the need for planetary protection in human exploration, and its associated scientific and political challenges. The rest of the open session consisted of discussion on the need to retain international and commercial partnerships, and a review of the decadal study draft statement of task. Plans for the upcoming decadal town hall at the ASGSR meeting were also discussed. The CBPSS spring meeting will be held March 31-April 2 at the 2020 Space Science Week. For additional information about CBPSS including links to presentations and agendas, please go to [https://sites.nationalacademies.org/SSB/SSB\\_145312](https://sites.nationalacademies.org/SSB/SSB_145312).

## The Committee on Earth Science and Applications from Space

(CESAS) met on December 17-18, 2019, in Washington, D.C. The first day of the meeting was devoted to sessions on emerging capabilities for unmanned aircraft systems for Earth observations, especially in support of the NASA airborne science program. The UAS sessions helped inform a NASA-requested workshop to be held in Spring 2020 to further assess the potential role of UAS in addressing the priorities of the 2018 decadal survey, *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space* (<https://www.nap.edu/catalog/24938/>) along with an examination of the need for an airborne platform like the aging NASA DC-8. CESAS will assist in the organization of that workshop; however, it will be led by the National Academies' Board on Atmospheric Sciences and Climate. On the second day of the meeting, the committee received briefings from officials from the

NASA Earth science division and from NOAA NESDIS regarding program status and progress in implementing the decadal survey. The next meeting of CESAS will be held March 31-April 2 as part of the 2020 Space Science Week. For additional information about CESAS including links to presentations and agendas, please go to [https://sites.nationalacademies.org/SSB/SSB\\_066587](https://sites.nationalacademies.org/SSB/SSB_066587).

The Committee on Solar and Space Physics (CSSP) held their fall meeting, October 22-24, 2019, in Washington, DC, where they heard presentations useful for issuing a short report on "Agile Responses to Short-Notice Rideshare Opportunities." The report will include: kinds of solar and space physics science enabled by an agile response to rideshare opportunities; types of payloads suited to ridesharing; and considerations for the development and implementation of a new NASA program. The CSSP is holding their spring meeting March 31- April 2, 2020 as part of the 2020 Space Science Week. For additional information about CSSP including links to presentations and agendas, and the statement of task for the short report, please go to [https://sites.nationalacademies.org/SSB/SSB\\_052324](https://sites.nationalacademies.org/SSB/SSB_052324).

## STUDY COMMITTEES

The Decadal Survey on Astronomy and Astrophysics 2020 (Astro2020) appointed six science panels, six program panels, and one panel called "state of the profession and societal impacts." All science panels completed their face-to-face meetings between August and October. Each science panel reviewed the science white papers relevant to their topic areas. They are now working on finalizing their deliverables. The program and state of the profession panels held their first meetings in October and November, and their next two meetings will be held between January and March 2020. These panels are reviewing the activity, project, or state of the profession consideration (APC) papers from the com-

## SSB DISCIPLINE COMMITTEE CO-CHAIRS

### Committee on Astrobiology and Planetary Science (CAPS)

Christopher H. House, The Pennsylvania State University  
William B. McKinnon, Washington University, St. Louis

### Committee on Astronomy and Astrophysics (CAA)

(joint with the Board on Physics and Astronomy)

Vassiliki (Vicky) Kalogera, Northwestern University  
Thomas Greene, NASA Ames Research Center

### Committee on Biological and Physical Sciences in Space (CBPSS)

(joint with the Aeronautics and Space Engineering Board)

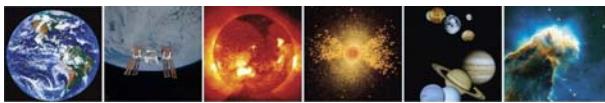
Robert J. Ferl, University of Florida  
Dava Newman, Massachusetts Institute of Technology

### Committee on Earth Science and Applications from Space (CESAS)

Chelle L. Gentemann, Earth & Space Research  
Steve W. Running, University of Montana (emeritus)

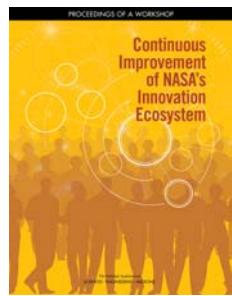
### Committee on Solar and Space Physics (CSSP)

Sarah Gibson, National Center for Atmospheric Research  
Maura E. Hagan, Utah State University

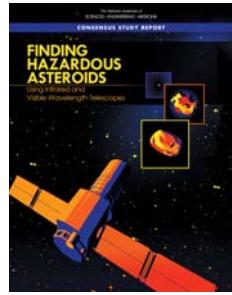


# SPACE STUDIES BOARD NEWS

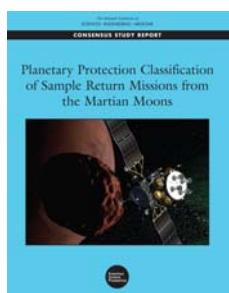
munity. The steering committee held its second meeting December 9-11, 2019, and heard reports from the science panels and initial thoughts from the program panels. Outreach has included an online webinar on October 28, 2019, a town hall meeting at the American Astronomical Society meeting in Honolulu, HI on January 7, 2020, and a listening session on the state of the profession on January 6, 2020. More information on Astro2020 is available at <http://nas.edu/astro2020>.



The prepublication version of the report of the **Committee on Continuous Improvement of NASA's Innovation Ecosystem**, titled *Continuous Improvement of NASA's Innovation Ecosystem: Proceedings of a Workshop* was delivered to NASA on July 17, 2019 and publicly released the following week. The published report is available at <https://www.nap.edu/catalog/25505>.



The **Committee on Near Earth Object Observations in the Infrared and Visible Wavelengths** delivered its report, *Finding Hazardous Asteroids Using Infrared and Visible Wavelength Telescopes*, to NASA in June and the report was publicly released in mid-June. NASA has taken early steps to begin a space telescope project such as that recommended in the study called, NEO Surveyor. The published report is available at <https://www.nap.edu/catalog/25476>.



The **Committee on Planetary Protection Requirements for Sample-Return Missions from Martian Moons**, was a joint activity between the Space Studies Board and the European Space Science Committee of the European Science Foundation (ESF), and included the participation of Japanese scientists. The committee's report, *Planetary Protection Classification of Sample Return Missions from the Martian Moons*, was published by the National

Academies Press in early July. In response to a request from NASA, committee staff organized a special session on planetary protection at the International Astronautical Congress in Washington, D.C., in October. The session was organized around the theme, "Planetary Protection for the Future: Science, Exploration, and Commerce" and featured contributions from the following participants: Kyle Acierno (Vice President of Global Sales and Strategy, ispace, Japan), James L. Green (Chief Scientist, National Aeronautics and Space Administration, United States), Dan Hendrickson (Vice President Business Development, Astrobotic Technology, United States), Michael Meyer (Lead Scientist for the Mars Exploration Program, National Aeronautics and Space Administration, United States), Simonetta Di Pippo (Director, United Nations Office for Outer Space Affairs, Austria), and Lisa Pratt (Planetary Protection Officer, NASA). More information about this committee and the IAC special session is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_181917](https://sites.nationalacademies.org/SSB/CurrentProjects/SSB_181917) and <http://www.iafastro.org/events/iac/iac-2019/technical-programme/>

[special-sessions](#), respectively. The committee's report is available at <https://www.nap.edu/catalog/25357>.

In the fourth quarter of 2019, the **Committee on the Review of Progress Toward Implementing the Decadal Survey—Solar and Space Physics: A Science for a Technological Society** completed its draft report, which then underwent review by a number of experts outside the Academy and a revised report was the result. The draft was released to the public as a pre-publication report in January. A published version is expected by March 31, 2020. Information about the committee and links to meeting presentations can be found at: [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_188088](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_188088).

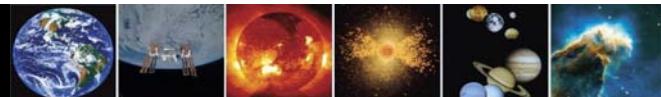
The **Committee on the Review of the Report of the NASA Planetary Protection Independent Review Board** was established in response to a request from NASA in August to conduct a review of the findings of the Planetary Protection Independent Review Board (PPIRB). The PPIRB was a review group that the NASA Science Mission Directorate established early in 2019 to look at NASA's planetary protection policies. It was led by Alan Stern, Southwest Research Institute. The National Academies' 10-member committee, chaired by Joseph Alexander, was appointed in late October and met in Washington, D.C., and Irvine, California, on November 20-22 and December 16-17, respectively. A subgroup of committee members also met in Pasadena, California, on January 20-21 to assemble a complete draft of its report. Delivery of the report to NASA is scheduled for the end of the first quarter of 2020. Additional information about the committee and its activities can be found at <https://www8.nationalacademies.org/pa/projectview.aspx?key=51852>.

The planning **Committee for Science Opportunities Enabled by Gateway: A Workshop** stood down to allow for expected NASA re-planning efforts affecting the schedule and science capability planned for Gateway. NASA has since determined that the opportunities for science on Phase 1 Gateway will be limited so the workshop planning has been stopped. The committee's work is now concluded.

Nominations for the planning **Committee for the Space Weather Operations and Research Infrastructure Workshop** were completed during this quarter. The workshop will identify gaps and future needs for space weather products and services and, in response to the workshop's lead sponsor, NOAA, will give particular attention to the Space Weather Follow On program (SWFO) and options for future observing architectures. An in-person meeting of the planning committee is scheduled for February 27-28, 2020 in Washington, D.C. with the workshop likely to occur in May-July 2020. Information about the committee and the workshop will be posted here: <https://www8.nationalacademies.org/pa/projectview.aspx?key=51809>.

## OTHER ACTIVITIES

The **Committee on Space Research (COSPAR)**, for which the SSB is the U.S. National Committee, held its 4th Symposium in Herzliya, Israel, on November 4-8. Daniel Nagasawa, a newly hired staff member on SSB, attended the meeting in Israel, which focused on small satellites for sustainable science and development. The next major events are the annual business meetings in Paris,



France, on 16-19 March and the 43rd COSPAR Scientific Assembly in Sydney, Australia, on August 15-23. Additional information about COSPAR is available at <https://cosparhq.cnes.fr/>.

The **Forum for New Leaders in Space Science**, a cooperative activity between the National Academies of Sciences, Engineering, and Medicine and the Chinese Academy of Sciences (CAS), is designed to provide opportunities for a highly select group of young space scientists from China and the United States to discuss research in an intimate and collegial environment. The 10<sup>th</sup> Forum, devoted to planetary science and Earth observation from space, was held in Washington, DC on October 28-29 (photo below). The presentations by the 14 young researchers from universities, research institutes, and agencies in the United States and China were supplemented by those from more senior members of the U.S. and Chinese scientific communities including Dong Xiaolong (National Space Science Center, CAS), Lin Yangting (Institute of Geology and Geophysics, CAS), William B. McKinnon (Washington University), Steven W. Running (University of Montana), and Shi Jiancheng (Aerospace Information Research Institute, CAS). In addition, the participants had a behind-the-scene tour of the meteorite collection at the Smithsonian's National Museum of Natural History. Additional details concerning this activity are available at [http://sites.nationalacademies.org/SSB/SSB\\_086017](http://sites.nationalacademies.org/SSB/SSB_086017).

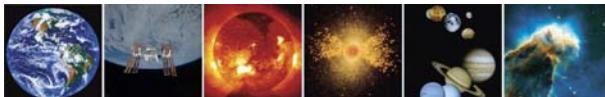


## REPORT RELEASE

Copies of reports are available from the SSB office at 202-334-3477 or at <https://www.nap.edu/author/SSB>.

### Progress Toward Implementation of the 2013 Decadal Survey for Solar and Space Physics: A Midterm Assessment (2020)

The 2013 report *Solar and Space Physics; A Science for a Technological Society* outlined a program of basic and applied research for the period 2013-2022. This publication describes the most significant scientific discoveries, technical advances, and relevant programmatic changes in solar and space physics since the publication of that decadal survey. *Progress Toward Implementation of the 2013 Decadal Survey for Solar and Space Physics* assesses the degree to which the programs of the National Science Foundation and the National Aeronautics and Space Administration address the strategies, goals, and priorities outlined in the 2013 decadal survey, and the progress that has been made in meeting those goals. This report additionally considers steps to enhance career opportunities in solar and space physics and recommends actions that should be undertaken to prepare for the next decadal survey.



## SSB STAFF NEWS



Mia Brown, SSB and ASEB Research Associate, was one of five winners the 2019 International Astronautical Federation Young Space Leaders Award. More information is available at <http://www.iafastro.org/winners-of-the-2019-iaf-young-space-leaders-recognition-programme/>.

*Mia (second from the right) receiving her award at the 2019 meeting of the International Astronautical Federation.*

We are happy to announce that Samantha Rawlins will be joining us from January 21-April 10 as a Christine Mirzayan Science and Technology Policy Fellow.



**Samantha Rawlins** is currently completing a PhD in Aerospace Systems Engineering at the University of Alabama in Huntsville. She holds an MS in Nuclear and Quantum Engineering from the Korea Advanced Institute of Science and Technology (KAIST), and a BS in Aerospace Engineering from the California Polytechnic State University in San Luis Obispo. Samantha's research focuses on applying a model-based systems engineering approach towards a crewed mission to Mars utilizing NASA's nuclear thermal propulsion technology. Her previous work has included investigating alternative, minimally-intrusive solutions for simultaneously generating power from the propulsive reactor. During her studies, Samantha quickly recognized the importance of policy for enabling future space exploration missions and has consistently advocated for space nuclear technologies both independently on the Hill and through various organizations. She is honored to have been selected as a Mirzayan Fellow and greatly looks forward to receiving formal training on space policy matters and working with the Space Studies Board towards establishing a more robust space nuclear policy.

Jordan McKaig, Sarah Moran, and Osase Omoruyi completed their terms as Lloyd V. Berkner Space interns in November and December of 2019. Jordan's and Sarah's reflections on their experiences with the SSB are below.

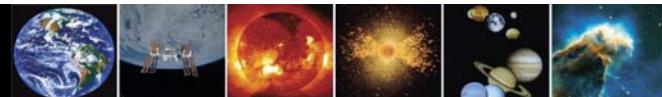


#### **Jordan McKaig**

Participating in the Lloyd V. Berkner Space Policy Internship at The National Academies of Sciences, Engineering, and Medicine's Space Studies Board was an eye-opening and an altogether incredible experience. At the SSB, my three primary academic interests of biology, international studies, and space research blended together seamlessly as I dove into the nuanced world of space policy. Every day presented new and fascinating topics, and I cannot believe how much I have learned and experienced over the past ten weeks.

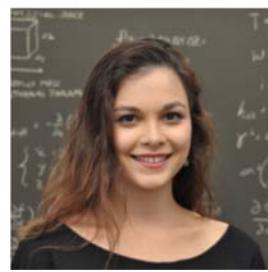
My time at the SSB happened to coincide with a major inflection point in planetary protection, a topic very relevant to my prospective future career in astrobiology. As the SSB conducted a review of a recent planetary protection report, I learned about how planetary protection policy integrates perspectives from international and business relations, biology, planetary science, and engineering in order to ensure sustainable and responsible exploration of space. I also supported the upcoming decadal survey for the Committee on Biological and Physical Sciences in Space, for which I had the opportunity to travel to Irvine, CA for the committee meeting. That entire week, I was blown away by the sheer amount of brainpower in one room, and had a sense that I was observing the careful construction of the architecture for space biology and physics research that will define the next era of space exploration.

Beyond the doors of the Keck Center, I loved taking advantage of the plethora of space-related opportunities that DC offers. I attended events hosted by Brazil and the United Arab Emirates in their embassies, and by Japan in the Capitol Building, to learn about their respective space programs, congressional hearings focused on the rapidly-evolving Artemis program and the future of human and robotic spaceflight, and a space law conference focusing on how to mitigate emerging issues in space policy. I even got to attend the International Astronautical Congress, which happened to be in DC this year. I have never seen so many people passionate about space in one place, and it



was amazing to learn about the wide variety of inspirational ideas for the future of space exploration from all around the globe.

When considering my future career as a scientist, I have always had vague and undefined hopes to be involved in policy engagement. After my time at the SSB, I have now seen very clear examples of how I can work to translate discoveries from space exploration into publicly accessible knowledge and benefits, and I look forward to carrying the lessons learned here as I continue to be involved in the space community. I was able to meet so many fascinating people, and was able to make connections with people that I hope to interact with throughout the rest of my career. I am so grateful to the SSB staff for being so welcoming and supportive, answering my many questions, sharing their expertise, and making me feel like a part of the team. It has been an honor and a pleasure to work here, and I am so grateful to have had this opportunity!



**Sarah Moran**

I had a lovely and productive twelve weeks as a Lloyd V. Berkner Space Policy Intern at the National Academies of Sciences, Engineering, and Medicine with the Space Studies Board. Taking a brief hiatus from my graduate school studies in exoplanet science, I was able to see “where the sausage gets made” for space sciences “in the room where it happens.” Space and policy have been my (separate) passions since undergrad, so I was elated for the chance to combine them perfectly for Fall 2019 with the National Academies.

Not only did I gain a deeper appreciation and understanding of the Decadal Surveys and their importance for the space science community, but I was able to truly participate and make an impact through various parts of the Decadal process. While with the SSB, I was able to be part of the Committee on Astrobiology and Planetary Science’s meeting in sunny Pasadena to continue preparations for the next Planetary decadal survey, I sat in on and observed discussions through several panel meetings across DC of the ongoing Astro2020 Decadal, and I aided extensively in the writing, review, and completion of the Midterm Assessment of the Solar and Space Physics Decadal Survey. Thus, I got to touch on Planetary Science, Astronomy, and Heliophysics throughout my time at the Academies as well as be actively involved through multiple vantage points as part of the overall process.

My dive into solar, space, and heliophysics continued with attending the meeting of the Committee on Solar and Space Physics, where I observed and assisted in planning a report on rideshare opportunities. As an exoplanet scientist by training, I found that my scientific expertise actually found much use in the realm of heliophysics, and I enjoyed my foray into the world of solar wind, magnetospheres, space plasmas, and more.

In the greater DC science policy world, I went to the Hill to attend multiple, sometimes contentious hearings on the Artemis program to return humans to the Moon as well as hear a briefing by the Dragonfly team on their newly selected mission to Titan. I am so grateful for the opportunity to try on science policy for size, and I’ll take the lessons I learned back to my graduate studies and beyond. The SSB staff taught me so much, and I deeply appreciate each of them sharing their expertise, guidance, and warmth throughout my stay with the Academies. I look forward to interacting with the SSB in the future, perhaps even one day serving as a fully-fledged scientist on one of the committees I got to see for the first time as an intern!

## SSB Staff

### COLLEEN N. HARTMAN

Director

### ARTHUR A. CHARO

Senior Program Officer

### DWAYNE A. DAY\*

Senior Program Officer

### SANDRA J. GRAHAM

Senior Program Officer

### GREGORY MACK\*

Senior Program Officer

### ABIGAIL SHEFFER

Senior Program Officer

### DAVID H. SMITH

Senior Program Officer

### DANIEL NAGASAWA

Associate Program Officer

### MIA BROWN

Research Associate

### MEGAN CHAMBERLAIN

Senior Program Assistant

### GAYBRIELLE HOLBERT

Program Assistant

### ANDREA REBOLZ\*

Program Coordinator

### DIONNA WISE

Program Coordinator

### MEG KNEMEYER

Financial Officer

### RADAKA LIGHTFOOT

Senior Financial Associate

### CELESTE A. NAYLOR

Information Management Associate

### TANJA E. PILZAK

Manager, Program Operations

### JORDAN MCKAIG

Lloyd V. Berkner Space Policy Intern  
(through November 2019)

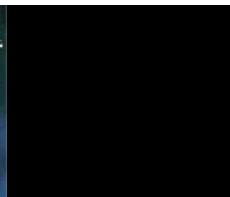
### SARAH MORAN

Lloyd V. Berkner Space Policy Intern  
(through November 2019)

### OSASE OMORUYI

Lloyd V. Berkner Space Policy Intern  
(through December 2019)

\* Staff of other Academies boards who are shared with the SSB.



## SSB Meetings Calendar

J A N U A R Y						
S	M	T	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
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January—March Astro2020 Panels—see [www.nas.edu/astro2020](http://www.nas.edu/astro2020) for more information

February 27-28 Planning Committee on Space Weather Operations and Research Infrastructure Workshop Washington, DC

March 24-26 Decadal Survey on Astronomy and Astrophysics 2020 (Astro2020) Steering Committee Washington, DC

March 31-April 2 Space Science Week 2019  
Committee on Astrobiology and Planetary Science  
Committee on Astronomy and Astrophysics  
Committee on Biological and Physical Science in Space  
Committee on Earth Science and Applications from Space  
Committee on Solar and Space Physics Irvine, CA

## Upcoming Events

May 4-6, 2020 Decadal Survey on Astronomy and Astrophysics 2020 (Astro2020) Steering Committee Irvine, CA

June 9-11, 2020 Space Studies Board Washington, DC

August 15-22, 2020 43rd COSPAR Scientific Assembly Sydney, Australia

November 4-6, 2020 Space Studies Board Irvine, CA

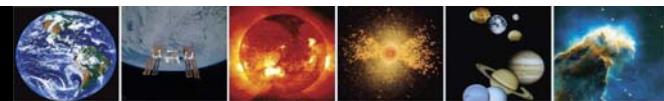


National Academy of Sciences Building  
2101 Constitution Ave NW  
Washington, DC

Keck Center  
500 Fifth St NW,  
Washington, DC

Arnold and Mabel Beckman Center  
100 Academy Drive  
Irvine, CA

J. Erik Jonsson Conference Center  
314 Quissett Ave  
Woods Hole, MA

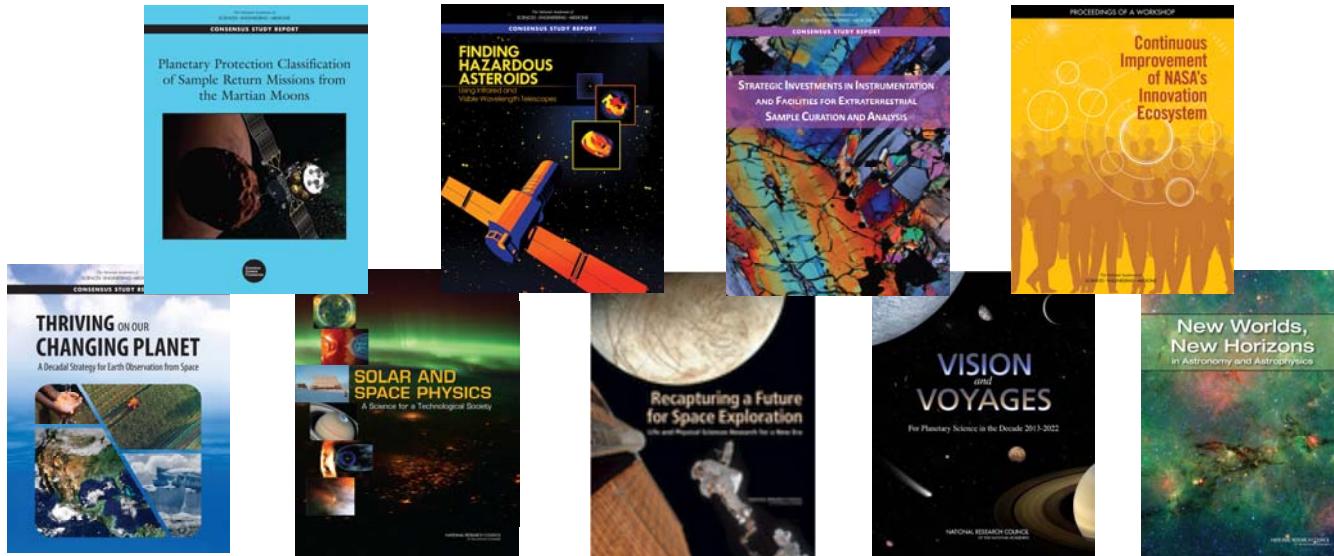


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- Report Series: Committee on Astrobiology and Planetary Science: Review of the Commercial Aspects of NASA SMD's Lunar Science and Exploration Initiative (2019) [Available online only](#)
- Planetary Protection Classification of Sample-Return Missions from the Martian Moons (2019)
- Strategic Investments in Instrumentation and Facilities for Extraterrestrial Sample Curation and Analysis (2019)
- An Astrobiology Strategy for the Search for Life in the Universe (2019)
- Open Source Software Policy Options for NASA Earth and Space Sciences (2018)
- Exoplanet Science Strategy (2018)
- Visions into Voyages for Planetary Sciences in the Decade 2013-2022: A Midterm Review (2018)
- Report Series: Committee on Astronomy and Astrophysics: Mission Concept Studies (2018) [Available online only](#)
- Review and Assessment of Planetary Protection Policy Development Processes (2018)
- Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space (2018) [Available online only](#)
- A Midterm Assessment of Implementation of the Decadal Survey on Life and

### Physical sciences Research at NASA (2017)

- America's Future in Civil Space: Proceedings of a Workshop-in Brief (2017)
- Searching for Life Across Space and Time: Proceedings of a Workshop (2017)
- Powering Science: NASA's Large Strategic Science Missions (2017)
- Report Series: Committee on Astrobiology and Planetary Science: Getting Ready for the Next Planetary Sciences Decadal Survey (2017) [Available online only](#)
- Report Series: Committee on Astronomy and Astrophysics: Small Explorer Missions (2017) [Available online only](#)
- Report Series: Committee on Solar and Space Physics: Heliophysics Science Centers (2017) [Available online only](#)
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- Assessment of the National Science Foundation's 2015 Geospace Portfolio Review (2017)
- Extending Science—NASA's Space Science Mission Extensions and the Senior Review Process (2016)
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- Solar and Space Physics: A Science for a Technological Society: An Overview (2014) Booklet
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