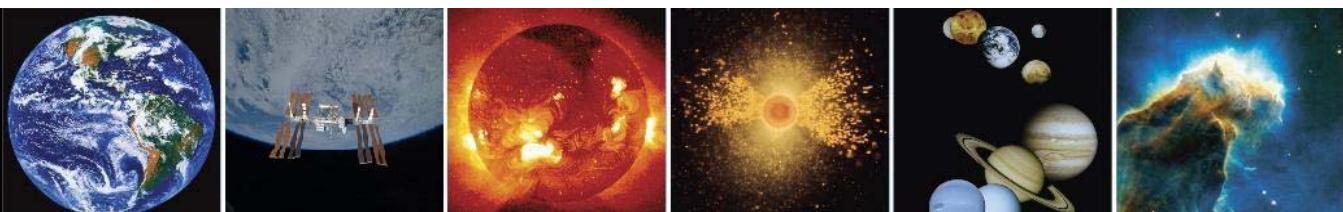


# SPACE STUDIES BOARD NEWS



JULY — SEPTEMBER 2017

## INSIDE THIS ISSUE



Space Science Week, a meeting of all 5 of the Board's Discipline/Standing Committees, will take place on March 27-29, 2018 in Washington, DC.

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# SPACE STUDIES BOARD NEWS

## SSB ACTIVITIES

### THE BOARD AND ITS DISCIPLINE/STANDING COMMITTEES

The Space Studies Board (SSB) did not meet during this quarter, but the SSB Executive Committee (XCOM) met in Pasadena, CA, August 8-9, 2017. The XCOM focuses on strategic discussions about the future of the board and in addition to the members of the XCOM, the meeting included representatives of the standing committees (CAA, CAPS, CESAS, CSSP, CBPSS); the NAC (Bradley Peterson, NASA Advisory Council Science Committee Chair); and the Science Mission Directorate (Thomas Zurbuchen, Associate Administrator, SMD/NASA). The next full meeting of the SSB will be held November 1-3 at the Arnold and Mabel Beckman Center in Irvine, CA. More information on the SSB can be found at <http://sites.nationalacademies.org/SSB/index.htm>.

The Committee on Astrobiology and Planetary Science (CAPS) held the second of its bi-annual meetings at the National Academies' Beckman Center in Irvine, California, on September 12-14, 2017. The committee heard updates on the activities of NASA's Planetary Sciences Division, Astrobiology Program and the NASA Astrobiology Institute. The committee continued its close scrutiny of the development of NASA flagship missions with presentations on Europa Clipper and Mars 2020. In addition, the members of CAPS heard reports on the current status and future plans of the Dawn and New Horizons' spacecraft and were briefed on the status of European planetary science missions in operation, under development and in formulation. The committee also heard science presentations on Sterol Biosynthesis and the Rise of Oxygen and the Permian-Triassic Extinction Landscape. During its closed sessions, the committee discussed the proposed Europa lander, the responsiveness of NASA's recently completed ice giant mission study to relevant decadal survey recommendations, the respective roles of NASA's Planetary Sciences and Astrophysics divisions in the study of exoplanets and the ongoing midterm decadal review. The committee's next meeting is scheduled to take place at the National Academy of Sciences Building in Washington, DC on March 27-29, 2018. More information on CAPS can be found at [http://sites.nationalacademies.org/SSB/ssb\\_067577](http://sites.nationalacademies.org/SSB/ssb_067577).

The Committee on Astronomy and Astrophysics (CAA) will hold its fall meeting October 24-25 at the Beckman Center in Irvine, CA and will host a town hall meeting at the AAS meeting in early January. More information on CAA can be found at [http://sites.nationalacademies.org/BPA/BPA\\_048755](http://sites.nationalacademies.org/BPA/BPA_048755).

The Committee on Biological and Physical Sciences in Space (CBPSS) did not meet face-to-face during this period but continued to follow progress of the ad hoc midterm review of the 2011 microgravity decadal report as well as community issues relevant to the CBPSS charge. Three committee members, including both co-chairs, participated in a July 17 panel session on the evolution of ISS science and the role of SSB advice at the 2017 ISS R&D Conference in Washington, DC. The panel had been organized, in cooperation with the American Astronautical Society, by CBPSS staff and members at NASA's request. Committee staff also participated in the ISS Workshop activity organized by NASA for August 9, 2017 in Washington, DC. More information on CBPSS can be found at [http://sites.nationalacademies.org/SSB/SSB\\_145312](http://sites.nationalacademies.org/SSB/SSB_145312).

The Committee on Earth Science and Applications from Space (CESAS) did not meet during this quarter; however, committee members were busy with a number of related activities. These included work on committees of the ongoing decadal survey in Earth Science and Applications from Space (see below) as several members of CESAS are participating in the survey: Joyce Penner, CESAS Co-Chair, University of Michigan; Steven A. Ackerman, University of Wisconsin, Madison; Stacey W. Boland, Jet Propulsion Laboratory; Efi Foufoula-Georgiou, University of California, Irvine; Everette Joseph, University of Albany, SUNY; Eric J. Rignot, University of California, Irvine; Christopher S. Ruf, University of

### SSB MEMBERSHIP

JULY 1, 2017—JUNE 30, 2018

**FIONA HARRISON**, *Chair*  
California Institute of Technology

**ROBERT D. BRAUN**, *Vice Chair*  
University of Colorado, Boulder

**JAMES ANDERSON**  
Harvard University

**JEFF M. BINGHAM**  
Consultant

**JAY C. BUCKEY**  
Geisel School of Medicine at Dartmouth

**ADAM BURROWS**  
Princeton University

**MARY LYNNE DITTMAR**  
Dittmar Associates, Inc.

**JOSEPH FULLER, JR.**  
Futron Corporation

**THOMAS R. GAVIN**  
Jet Propulsion Laboratory

**SARAH GIBSON**  
National Center for Atmospheric Research

**VICTORIA HAMILTON**  
Southwest Research Institute

**ANTHONY C. JANETOS**  
Boston University

**CHRYSSA KOUVELIOTOU**  
The George Washington University

**DENNIS P. LETTENMAIER**  
University of California, Los Angeles

**ROSALY M. LOPES**  
Jet Propulsion Laboratory

**DAVID J. MCCOMAS**  
Princeton Plasma Physics Laboratory

**LARRY PAXTON, JR.**  
Johns Hopkins University, Applied Physics Laboratory

**ELIOT QUATAERT**  
University of California, Berkeley

**BARBARA SHERWOOD LOLLAR**  
University of Toronto

**HARLAN E. SPENCE**  
University of New Hampshire

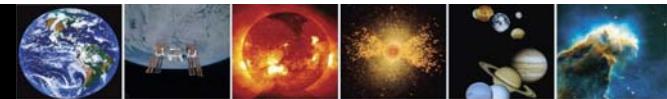
**MARK H. THIEMENS**  
University of California, San Diego

**MEENAKSHI WADHWA**  
Arizona State University

**EDWARD L. WRIGHT**  
University of California, Los Angeles

**LIAISON**

**CHARLES KENNEL**  
U.S. Representative to COSPAR



Michigan; and David L. Skole, Michigan State University. Towards the end of the quarter, the committee was engaged in planning for its next meeting, which will take place in Boulder, Colorado on October 23-24, 2017. Agenda items for the meeting include updates from NASA's Earth Science Division and NOAA NESDIS and discussions on the potential involvement of the committee in organizing a response to a National Academies study ("Independent Study on Future of National Oceanic and Atmospheric Administration Satellite Systems and Data") requested in section 301 of the Weather Research and Forecasting Innovation Act of 2017 (<https://www.congress.gov/bill/115th-congress/house-bill/353>). More information on CESAS can be found at [http://sites.nationalacademies.org/SSB/SSB\\_066587](http://sites.nationalacademies.org/SSB/SSB_066587).

The Committee on Solar and Space Physics (CSSP) did not meet this quarter. The committee is in the process of planning its fall meeting to be held October 24-25, 2017, in Irvine, CA. More information on CSSP can be found at [http://sites.nationalacademies.org/SSB/SSB\\_052324](http://sites.nationalacademies.org/SSB/SSB_052324).

## STUDY COMMITTEES

The Committee on an Astrobiology Strategy for the Search for Life in the Universe is currently being established after a request from NASA's Science Mission Directorate in response to direction from a Congressional mandate contained in the NASA Transition Authorization Act of 2017. Recruitment of prospective committee members was concluded by the end of the third quarter of 2017. A committee nomination memo has been submitted for National Academies' approval and formal appointment of the committee is anticipated by the end of October. The committee is scheduled to hold its first meeting at the National Academies' Arnold and Mabel Beckman Center in Irvine, CA, on January 17-19, 2018. A report is due to NASA by the end of August 2018. More information about the project is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_180812](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_180812).

The Committee on Best Practices for a Future Open Code Policy for NASA Space Science has been appointed. The study is to investigate and recommend best practices for NASA as it considers whether to establish an open code and open models policy, complementary to its current open data policy. The committee is currently planning its first meeting to be held November 14-16, 2017, in Washington, D.C. More information about the project is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_178892](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_178892).

A draft report from the **2017-2027 Decadal Survey for Earth Science and Applications from Space (ESAS 2017)** entered the Academies review process in late August. As the quarter ended, the steering committee for the survey, working with its study panels and staff, was working on responding to report review. An approved pre-publication version of the steering committee's final report is targeted for the end of this calendar year; when announced, plans for the public release of the survey report will be posted on the committee's website ([www.nas.edu/esas2017](http://www.nas.edu/esas2017)). The committee will be providing an update on the survey at a Town Hall to be held on December 13, 2017 at the fall meeting of the American Geophysical Union in New Orleans, LA (<https://agu.confex.com/agu/fm17/meetingapp.cgi/Session/29794>). A Town Hall is also scheduled on January 10, 2018 at the annual meeting of the American Meteorological Society (<https://tinyurl.com/y8dqzbkf>) in Austin, TX, and has been proposed for the February 11-16, 2018 Ocean Sciences Meeting in Portland, Oregon. Some 100 members of the community are serving on one or more of the survey's committees. Links on the survey's website describe activities during the quarter in more detail; also posted on the website are survey newsletters to the community, links to community responses to survey RFIs (requests for information), information on the organization of the survey and its members, and archives that include presentations made to the committee and previous Town Hall presentations.

The Committee on an Exoplanet Science Strategy is currently being recruited. This study was requested by NASA's Science Mission Directorate in response to direction from a Congressional mandate contained in the NASA Transition Authorization Act of 2017. It is anticipated that the committee will hold its first meeting in the fourth quarter of 2017 or the first quarter of 2018. A report is due to NASA by the end of August 2018. More information about the project is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_180659](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_180659).

The Committee on Extraterrestrial Sample Analysis Facilities has been appointed. The study is to prepare for what laboratory analytical capabilities and infrastructure will be needed by NASA's Planetary Science Division (and partners') analysis and curation of existing and future extraterrestrial samples. The committee is currently planning its first meeting to be held November 19-21, 2017, in Irvine, CA. More information about the project is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_178893](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_178893)

## SSB DISCIPLINE/STANDING COMMITTEE CO-CHAIRS (January-December 2017)

### 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)

Marcia Rieke, University of Arizona  
Steven Ritz, University of California, Santa Cruz

### Committee on Biological and Physical Sciences in Space (CBPSS) (joint with the Aeronautics and Space Engineering Board)

Elizabeth Cantwell, Arizona State University  
Robert J. Ferl, University of Florida

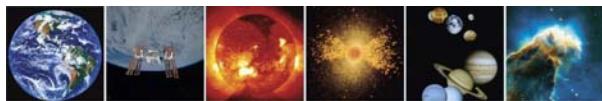
### Committee on Earth Science and Applications from Space (CESAS)

Michael D. King, University of Colorado, Boulder  
Joyce E. Penner, University of Michigan

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

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

For more information, go to [http://sites.nationalacademies.org/SSB/ssb\\_052296](http://sites.nationalacademies.org/SSB/ssb_052296).



**The Committee on Large Strategic NASA Science Missions: Science Value and Role in a Balanced Portfolio** delivered its report, **Powering Science – NASA’s Large Strategic Science Missions to NASA** in August. The committee co-chairs Ralph McNutt and Kathryn Thornton briefed NASA Associate Administrator for SMD Thomas Zurbuchen and his staff, as well as staff of the House Science, Space, and Technology Committee, and the House Appropriations Committee. The report is in final production stage and will be printed by the end of the year. A summary of the report and a link to the full text is available on page 6.

## The Committee on a Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at

**NASA** held its final meeting on August 28-30 in Irvine, CA where it focused on report revisions and reviewing and finalizing its findings and recommendations. No open sessions were

held. Following the meeting the committee continued to work intensively on preparing the report for external review, which is planned for early October. More information on the project can be found at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_174910](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_174910).

## The Committee on Planetary Protection Requirements for Sample-Return Missions from Martian Moons

is a joint activity between the Space Studies Board and the European Space Science Committee of the European Science Foundation (ESF), with some participation by Japanese scientists. The committee is the result of parallel requests sent by the Planetary Protection Offices of NASA and the European Space Agency to the National Academies and ESF, respectively. The joint committee will hold a single planned meeting in London on November 7-9 to assess the results of research jointly sponsored by NASA and ESA on whether or not hypothetical martian organisms can survive ejection from the surface of Mars during a giant impact and subsequent emplacement on the surfaces of Phobos and Deimos. A major goal of this activity is to determine whether or

not samples returned from the martian moons receive a planetary protection classification of “restricted” or “unrestricted” Earth return. Since the joint study is motivated by the desire of both NASA and ESA to participate in the Japan Aerospace Exploration Agency’s (JAXA’s) planned Mars Moons Exploration mission, the inclusion of Japanese scientists was thought to be desirable by all concerned. JAXA has agreed to fund the participation of two independent Japanese experts in this activity. The Japanese scientist will be joined by five experts from the United States and five from Europe at the meeting in London. More information on the project can be found at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_181917](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_181917).

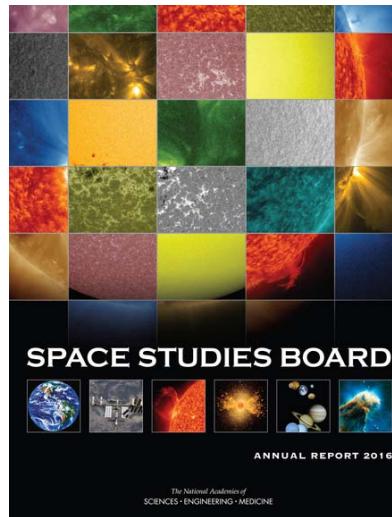
**The Committee on the Review of Planetary Protection Policy Development Processes** held its fourth and final planned meeting at the National Academies’ J. Erik Jonsson Center in Woods Hole, MA, on August 8-10. The committee schedule calls for a draft report to be sent to external reviewers late in the fourth quarter of 2017 or early in the first quarter of 2018 and for a final, approved prepublica-

tion to be delivered to NASA early in the second quarter of 2018. Additional information about the committee and its activities can be found at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_175768](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_175768).

## The Committee on the Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences

held its third meeting in late August in Woods Hole, MA with a fourth meeting scheduled for Irvine in late November and a fifth scheduled for February in Washington. The introduction of a new NASA architecture proposal for Mars sample return during the August meeting complicated the committee’s work and, along with the addition of the Mars program assessment, led the committee to conclude that a fifth meeting and a delay in report delivery were required. The committee aims to deliver its report to NASA in summer 2018. Additional information about this project can be found at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_177619](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_177619).

## Space Studies Board Annual Report 2016



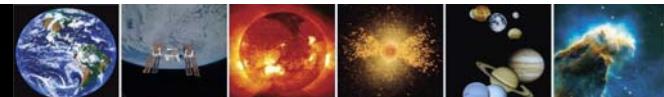
**Space Studies Board Annual Report 2016**, available at <http://www.nap.edu/catalog/24748>

The proceedings of the workshop, **Searching for Life Across Space and Time**—held at the Academies’ Beckman Center on December 5-6, 2016—was approved for release on August 10 and published in mid-September. The proceedings report can be downloaded at <https://www.nap.edu/catalog/24860/searching-for-life-across-space-and-time-proceedings-of-a>. In addition, a limited number of copies of the report are still available upon request from the Space Studies Board. For more information on the project please visit: [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_161177](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_161177). Additional details and the video recording of the workshop can be found at [http://sites.nationalacademies.org/ssb/currentprojects/ssb\\_173278](http://sites.nationalacademies.org/ssb/currentprojects/ssb_173278).

## OTHER ACTIVITIES

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 their research activities in an intimate and collegial environment. Continuing support for this activity from CAS and the National Academies Presidents’ Committee permitted the recruitment of a fourth cohort of young U.S. and Chinese scientists to begin during the third quarter of 2017. The fourth cohort, drawn from the space astronomy and astrophysics and solar and space physics communities, will meet in Guangzhou in southern China on January 23-24 and in Pasadena, California, on July 12-13 (i.e., immediately prior to the July 14-21 COSPAR Scientific Assembly). Additional details concerning this activity can be found at [http://sites.nationalacademies.org/SSB/SSB\\_086017](http://sites.nationalacademies.org/SSB/SSB_086017).

**COSPAR** held the third of its new series of “off-year,” topical symposia on September 18-22, 2017, on Jeju Island, South Korea. Work on the 42<sup>nd</sup> Scientific Assembly, to be held in Pasadena, California,



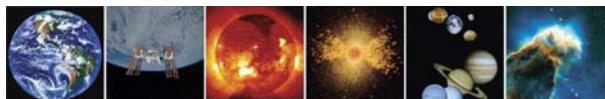
on July 14-21, 2018, progresses and the abstract submission and registration website (<http://cospar2018.org/>) went live in mid-September. COSPAR is also seeking nominations for awards to be made at the Pasadena assembly. Full details of the various awards and nomination procedures can be found at <https://cosparhq.cnes.fr/awards>. The deadline for receipt of completed nominations at COSPAR's headquarters in France is 30 November, 2017. The next round of COSPAR business meetings (i.e., the Pasadena Assembly Science Program Committee, the COSPAR Scientific Advisory Committee and the COSPAR Bureau) will be held in Paris on March 19-21, 2018. The 43<sup>rd</sup> Scientific Assembly will be held in Sydney, Australia, on August 15-23, 2020.

**Planetary Protection of the Outer Solar System:** This 3-year activity, funded via the European Union's Horizon 2020 funding program and organized by the European Science Foundation (ESF), was formally initiated in January 2016, and is designed to address a series of closely related topics in the general area of planetary protection for the icy bodies of the outer solar system. Although the National Academies' is not formally involved in this project, the Space Studies Board has observer status on the PPOSS steering group and has agreed, with NASA's concurrence, to sponsor the participation of two U.S. experts in activities associated with PPOSS' Work-Packages 3 and 5. Activities associated with Work-Package 5—a review of the current planetary protection regulation structure for the icy bodies of the outer solar system—will commence in 2018. The two US experts—Geoffrey Collins (Wheaton College, Massachusetts) and Mark Saunders (NASA Langley Research Center, retired)—are participating in their personal capacity as scientific and technical experts and their work and that of PPOSS is not officially endorsed by the SSB or the National Academies. Additional information about PPOSS can be found at <http://pposs.org/>.

**Science Strategy For Space Exploration Of The Outer Solar System Icy Moons Oceans (Exoceans)** is a European activity to review and synthesize the current status of astrobiological knowledge about the outer solar system with particular emphasis on the icy satellites of the giant planets. The Exoceans group is a cooperative venture between the European Space Science Committee, the European Marine Board, and the International Space Science Institute (ISSI). The Space Studies Board is not formally involved in this activity but has agreed, with NASA's concurrence, to fund the participation of two US scientists in Exoceans activities. The relevant U.S. participants are Christopher House (Pennsylvania State University) and Alexander Hayes (Cornell University). The Exoceans group plans to hold three meetings: the first in France at Observatoire de Paris on 13-14 November and the others in Bern, Switzerland, in June and September, 2018. The outcome of this activity will be a book in the ISSI Space Science Series, published by Springer.

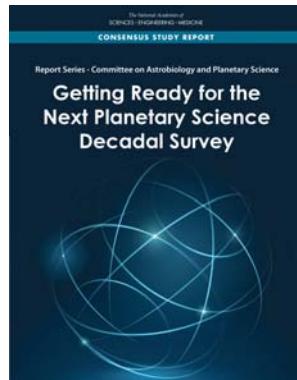
Photo credit Dwayne Day. Images from Vision and Voyages meeting in Woods Hole in August 2017





## NEW RELEASES

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



### Report Series: Committee on Astrobiology and Planetary Science: Getting Ready for the Next Planetary Science Decadal Survey

This study discusses the publicly available studies of future flagship- and New Frontiers-class missions NASA initiated since the completion of Vision and Voyages. The report considers the priority areas as defined in Vision and Voyages where publicly available mission studies have not been undertaken; appropriate mechanisms by which mission-study gaps might be filled in the near- to mid-term future; and other activities that might be undertaken in the near- to mid-term future to optimize and/or expedite the work of the next planetary science decadal survey committee.

Available at: <http://www.nap.edu/read/24843>



### Powering Science: NASA's Large Strategic Science Missions

Large strategic missions are essential to maintaining the global leadership of the United States in space exploration and in science because only the United States has the budget, technology, and trained personnel in multiple scientific fields to conduct missions that attract a range of international partners. This report examines the role of large, strategic missions within a balanced program across NASA-SMD space and Earth sciences programs. It considers the role and scientific productivity of such missions in advancing science, technology and the long-term health of the field, and provides guidance that NASA can use to help set the priority of larger missions within a properly balanced program containing a range of mission classes.

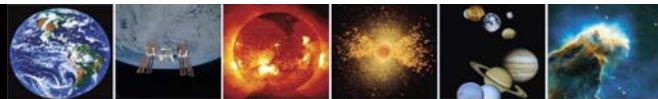
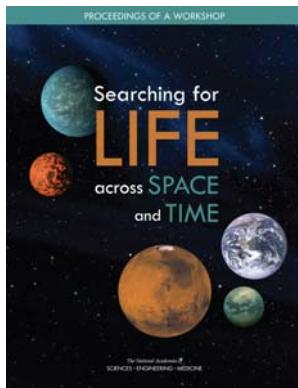
Available at: <http://www.nap.edu/read/24857>



### America's Future in Civil Space: Proceedings of a Workshop—in Brief

Since the National Research Council released the report *America's Future in Space: Aligning the Civil Space Program with National Needs* in 2009, numerous changes have occurred in the civil space arena. In May 2017, the National Academies of Sciences, Engineering, and Medicine convened a workshop on America's Future in Civil Space with several objectives, including reviewing the history of U.S. space policy and how it might form a broad policy basis for twenty-first century leadership in space, examining the balance and interfaces between fundamental scientific research in space, human space exploration, robotic exploration, earth observations, and applications of space technology and civil space systems for societal benefits, and discussing the value, purpose, and goals of international cooperation in space. The workshop participants sought to capture what has changed, determine how to harness new opportunities, and decisively inform and encourage bold and timely implementation. This publication briefly summarizes the presentations and discussions from the workshop.

Available at: <http://www.nap.edu/read/24921>

**(New Releases continued from page 6)****Searching for Life Across Space and Time: Proceedings of a Workshop**

The search for life is one of the most active fields in space science and involves a wide variety of scientific disciplines, including planetary science, astronomy and astrophysics, chemistry, biology, geoscience. In December 2016, the Space Studies Board hosted a workshop to explore the possibility of habitable environments in the solar system and in exoplanets, techniques for detecting life, and the instrumentation used. This publication summarizes the presentations and discussions from the workshop.

Available at: <http://www.nap.edu/read/24860>

**Lloyd V. Berkner Space Policy Internships**

The Space Studies Board's Lloyd V. Berkner Space Policy Internship provides a paid opportunity for students interested in science policy to work at the National Academies of Science, Engineering and Medicine in Washington, D.C.

This unique internship provides first-hand experience with the policy aspects of space science and exploration, right in the heart of Washington D.C.



The Space Studies Board (SSB) was established in 1958 to serve as the focus of interests and responsibilities for space research within National Academy of Sciences. The SSB is an independent, authoritative forum for information and advice on all aspects of space science and applications.

Interns will experience all aspects of the science and policy studies, used by the National Academies to advise federal agencies, such as NASA, from project initiation through final publication of advisory reports.

**Space Studies Board**  
The Keck Center  
500 Fifth Street, NW  
Washington, DC 20001

**Application due date for summer 2018 undergraduate internship:**  
February 2<sup>nd</sup>, 2018

Successful applicants will be notified by March 2<sup>nd</sup>, 2018

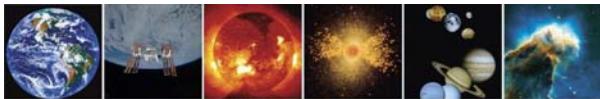
**Application due date for fall 2018 graduate internship:**  
June 2<sup>nd</sup>, 2018

Successful applicants will be notified by July 7<sup>th</sup>, 2018

**Eligibility Requirements**

- Registered student at a U.S. university/college;
- Completed junior year (for undergraduates), majoring in any physical sciences (other areas considered on a case-by-case basis);
- Long-term career goals in space science research, applications, or policy;
- Possess good written and verbal communications skills;
- Capable of responding to general guidance and working independently;
- Familiar with the internet, and basic research techniques; and
- Familiarity with Microsoft Office is desirable, but not essential.

**For further details and application procedures visit the Lloyd V. Berkner Space Policy Internship Webpage:**  
[http://sites.nationalacademies.org/SSB/SSB\\_052239](http://sites.nationalacademies.org/SSB/SSB_052239)



## SSB Staff

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Director

## ARTHUR A. CHARO

Senior Program Officer

## SANDRA J. GRAHAM

Senior Program Officer

## DAVID H. SMITH

Senior Program Officer

## DWAYNE A. DAY\*

Senior Program Officer

## DAVID LANG\*

Program Officer

## ABIGAIL SHEFFER

Program Officer

## NATHAN BOLL

Associate Program Officer

## SARAH BROTHERS

Associate Program Officer

## MA BROWN

Research Associate

## MARCHEL HOLLE

Research Associate

## ANDREA REBOLZ\*

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## DIONNA WISE

Program Associate

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## CARMELA J. CHAMBERLAIN

Administrative Coordinator

## MEG KNEMEYER

Financial Officer

## CELESTE A. NAYLOR

Information Management Associate

## TANJA E. PILZAK

Manager, Program Operations

## MADISON BORRELLI

Lloyd V. Berkner Space Policy Intern

## ALLISON MCGRaw

Lloyd V. Berkner Space Policy Intern

## DANIELLE MONTECALVO

Lloyd V. Berkner Space Policy Intern

## JACOB ROBERTSON

Lloyd V. Berkner Space Policy Intern

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

## SSB Staff News

The SSB welcomed a new Associate Program Officer, Sarah Brothers and 2 new Lloyd V. Berkner Space Policy Interns this quarter, Jacob Robertson and Allison McGraw.

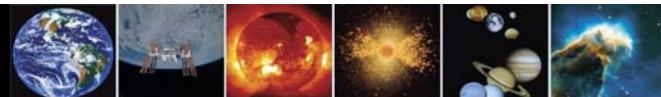
**Sarah C. Brothers** is an associate program officer with the Space Studies Board. Prior to joining the SSB, she worked as a postdoctoral research associate in the Department of Geology & Geophysics at Texas A&M University, where she acted as a technical writer for a team investigating Titan's dunes using Cassini radar. Dr. Brothers' interest in space science began as an undergraduate research assistant working with a co-investigator on the Mars Reconnaissance Orbiter Shallow Radar. After completing a Dwornik Award-winning thesis concerning subsurface sounding of Martian water ice, she went to graduate school to study desert environments through the lenses of planetary and petroleum geology. Internships with BHP Billiton and Hess Corporation complemented her academic experiences and taught her that how scientific effort is organized, motivated, and applied is as important as the science itself. She earned her Ph.D. in geoscience from the Jackson School of Geosciences, The University of Texas at Austin and her B.A. in geology from Bryn Mawr College.



**Jacob Robertson** is a senior studying physics and astronomy at Austin Peay State University in Tennessee. Since 2016, he has interned on-site and remotely with the Dark Energy Survey at Fermilab, supporting survey calibrations. Jacob has held leadership roles in student government and the physics and astronomy club and his interest in policy grew from his experience with science communication and outreach. He recently completed an outreach internship with the education division of the American Institute of Physics. Jacob has supported both Space Studies Board and Aeronautics and Space Engineering Board projects covering planetary protection, extraterrestrial sample return, open code, and unmanned aircraft systems. Jacob has enjoyed learning about the role and impact of the National Academies in government advising and is excited to continue into a career in science and space policy.



**Allison McGraw** is a graduate intern for the Space Studies Board at The National Academies of Science, Engineering and Medicine, as well as a graduate student at The University of Arizona's Lunar and Planetary Lab in Tucson, Arizona. Her research topics of interest mostly reside in the characterization of asteroids and their linkages to meteorite material, space debris policy and management techniques, as well as involvement in public education for planetary science topics. McGraw works with Dr. Vishnu Reddy of the Lunar and Planetary Lab and is currently a first-year graduate student. McGraw was selected as a NASA Space Grant Undergraduate Intern through the Arizona Space Grant Consortium where her work with asteroid-meteorite characterization first began with Dr. Reddy. She spent two years of her undergraduate career working for HiRISE (High Resolution Imaging Science Experiment) where she worked as a Digital Terrain Model (DTM) specialist creating 3D maps of the Martian surface from high-resolution stereo imagery. She also dedicated a large part of her undergraduate career teaching the public and local Tucson community about topics in astronomy, planetary sciences and the universe through the Flandrau Science Center and Planetarium, the Kitt Peak National Observatory Visitor Center, and The University of Arizona Astronomy Club. McGraw received a B.S. in geosciences, planetary sciences and astrobiology from The University of Arizona (2017) as well as completing an additional Undergraduate Certification in Geospatial Information Systems (GIS).



*(Staff News continued from page 8)*

**Madison Borrelli and Danielle Montecalvo completed their terms as Lloyd V. Berkner Space interns in August 2017. Their reflections on their experiences with the SSB are below.**



This summer I was able to get an inside look at how space policy works as an intern at the Space Studies Board. I had a great time learning about the process and even taking part in it. During my internship, I honed new skills such as science communication to various levels of readership. I was able to write report highlights, edit report language, and attend briefings. One of my favorite experiences this summer was attending the planetary science decadal survey midterm review in California. After learning about the process of writing a report, I enjoyed seeing a committee in action. I talked to several planetary scientists doing fascinating research, and we even went on a behind the scenes tour at JPL.

The SSB staff were incredibly welcoming and always willing to help when I had a question. They all wanted to make sure that my limited time at the SSB was valuable and did whatever they could to ensure I was getting as much out of the experience as possible. I am so glad I had the opportunity to explore my interest in space policy and to get an idea of what kind of careers are in the field. Now, going forward, I will be able to make a more informed decision about my career path. This internship opened my eyes to how many opportunities there are for people with a science background that do not necessarily involve doing research.



My work as a Lloyd V. Berkner Space Policy Intern exposed me to a wide range of professional and academic experiences in the space community. Some of the first few projects that I worked on involved compiling background information for the Planetary Protection Interim Report and the Strategic Missions Report. I wrote space mission and policy summaries, responses to editorial reviewers for SSB reports, and used data analysis to construct arguments for Space Studies Board committee meetings on these topics. Additionally, I attended a variety of space policy colloquiums, Congressional events, and NAS meetings with experts in the field throughout the duration of the summer. Likewise, I helped wherever the SSB staff needed a hand; I organized reports and information on our database system and did online research for various projects. A personal highlight was attending the Planetary Protection Policy Interim Report committee meeting at the National Academies facility in Irvine, California. I engaged with experts from a variety of different disciplines including scientists, lawyers, professors, and NASA employees. Furthermore, I enjoyed attending the ISS R&D Conference at the Omni

Shoreham Hotel in Northwest D.C. Through these events, it was insightful to see how different areas of expertise can integrate and work together with issues regarding space policy.

As someone with an interdisciplinary field of study, working for the SSB exposed me to an array of possibilities for potential career opportunities. My interests in International Studies and Physics were perfectly blended together through the intersection of policy and science in space. This internship depicted the importance of the public and private sectors working together. Throughout my time at SSB, I engaged with space consulting firms and companies, astrobiologists and astrophysicists, professors, space lawyers, NASA officials, and Congressional representatives. I am humbled to have the experience as an intern on the SSB and am grateful for all of the connections I have made throughout the space community, especially the SSB staff. Thank you for an amazing summer!



## SSB Calendar

N O V E M B E R						
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J A N U A R Y						
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November 1-3 Space Studies Board Irvine, CA

November 7-9 Planetary Protection Requirements for Sample-Return Missions from Martian Moons London, England

November 14-16 Committee on Best Practices for a future Open Code Policy for NASA Space Science Washington, DC

November 19-21 Extraterrestrial Sample return Analysis Facilities Irvine, CA

November 29-December 1 Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences Irvine, CA

January 16-18 State of the Science of Astrobiology Irvine, CA

January 23-24 Symposium with Chinese Academy of Science Guangzhou, China

February 26-28 Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences Washington, DC

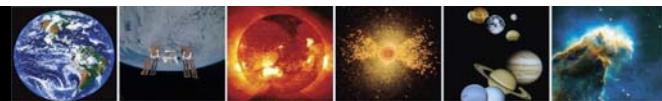


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Keck Center  
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Washington, DC

Arnold and Mabel Beckman  
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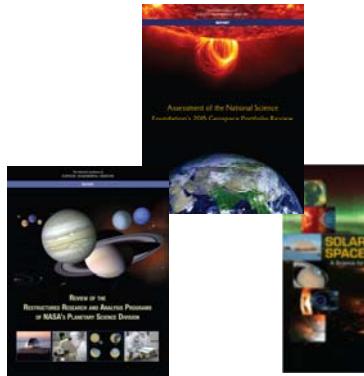
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