SPACE STUDIES BOARD NEWS

JANUARY—MARCH 2017

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**SSB/ASEB Symposium on America's Future in Civil Space**

In the context of revisiting the National Academies effort that led to the 2009 report, *America's Future in Space: Aligning the Civil Space Program with National Needs*, the boards have organized this symposium to address the evolution of the 2009 report's recommendations in the context of current topics and issues in civil space policy.



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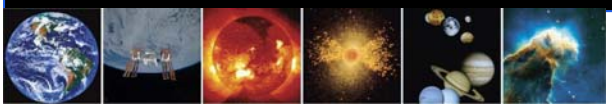
# SPACE STUDIES BOARD NEWS



## SSB LEADERSHIP

In January, Dr. Fiona Harrison succeeded Dr. David Spergel as chair of the SSB. Dr. Spergel will remain on the board as a vice chair along with Dr. Robert Braun.

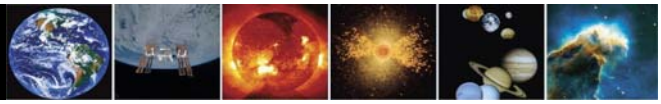
Dr. Harrison is the Benjamin M. Rosen Professor of Physics, and the Kent and Joyce Kresa Leadership Chair of the Division of Physics and Mathematics at the California Institute of Technology, Pasadena. She received her Ph.D. in physics from the University of California, Berkeley, and went to Caltech in 1993 as a Robert A. Millikan Prize Fellow in Experimental Physics. Dr. Harrison's primary research interests are in experimental and observational high-energy astrophysics. She also has an active observational program in gamma-ray, X-ray and optical observations of gamma-ray bursts, active galaxies, and neutron stars. Dr. Harrison is the principal investigator of NASA's Nuclear Spectroscopic Telescope Array (NuSTAR), a small explorer-class mission launched in 2012. She was awarded the Presidential Early Career Award in 2000, was named one of America's Best Leaders by U.S. News and the Kennedy School of Government in 2008, and received the NASA Outstanding Public Leadership Medal in 2013. In 2015, she was awarded the Bruno Rossi Prize of the High Energy Astrophysics Division of the American Astronomical Society, and in 2016 she won the Harrie Massey Award from the Committee on Space Research. She was elected to the American Academy of Arts and Sciences and the National Academy of Sciences in 2014.


On May 2, 2017, the SSB will meet with the Aeronautics and Space Engineering Board for a symposium on America's Future in Civil Space. And then on May 3-4, the SSB will hold its spring meeting. For more information visit www.nationalacademies.org/ssb.

In the context of revisiting the National Academies effort that led to the 2009 report, *America's Future in Space: Aligning the Civil Space Program with National Needs*, the boards have organized this symposium to address the evolution of the 2009 report's recommendations in the context of current topics and issues in civil space policy. The agenda is being coordinated by a small organizing committee drawn from both boards and the one-day participatory workshop will focus on three moderated panel and audience discussions on **Space in Support of National and International Challenges, Future of Exploration and Discover,** and **Public-Private Partnerships in Pursuit of National Space Priorities**. The symposium will also include a set of "lightning" talks on key challenges and opportunities in technology development and space science.

The goal is to conduct the one-day meeting as a dynamic discussion-focused event with the leaders of our civil space efforts in the room. We will be emphasizing discussion among the panelists and the attendees, in an intimate meeting venue and with the goal of thoroughly discussing and looking forward to the challenges and opportunities that lie ahead for this important national effort.

The event will be webcast and the recording will be available on our website. To register or view the recording after the event visit http://sites.nationalacademies.org/deps/spaceandaeronautics/deps_178446.



## SSB MEMBERSHIP



# SSB Staff News

Joseph "Joey" Schmitt joined the SSB as a Christine Mirzayan Fellow during this quarter. While with us he published a paper in *The Astronomical Journal* announcing the discovery of the exoplanet Kepler-150 f.

**The Discovery of Exoplanet Kepler-150 f**

*Joseph Schmitt*

Exoplanets, planets beyond our solar system, are one of the hottest fields in astronomy. A slow trickle of exoplanet discoveries began in 1992. This became a fire hose with the launch of the *Kepler* space telescope in 2009. About 3,500 exoplanets are now known. *Kepler* uses the "transit technique" to discover planets. This technique tracks how bright stars are over a long period of time. If a planet orbits a star at just the right angle relative to Earth, it crosses in front of (i.e., "transits") its star once per orbit and blocks some of the starlight. This dip in brightness tells astronomers of the likely existence of a planet.

On March 28, 2017, *The Astronomical Journal* announced the discovery of the exoplanet Kepler -150 f, a study I led with assistance from Jon Jenkins of the NASA Ames Research Center and my advisor Debra Fischer of Yale University. Due to the specific way that the main *Kepler* analysis pipeline searches for planet transits, we thought that there might be undiscovered planets remaining hidden in the data. After the analysis pipeline finds a suspected planet, it removes all data points associated with that planet's transits, which creates holes in the data, before searching for additional planets. A planet that falls into one of these holes could therefore be missed.

We therefore tried a new method in an effort to search for these potentially lost planets. We examined 114 stars known to possess at least three planets. Instead of removing the data points associated with known planet transits, we simply fit the data to the planet signals and subtracted the signals out, avoiding the creation of holes in the data. We then re-ran the analysis pipeline. Unfortunately for us, this new method did not yield any new planets. This effectively proved that the *Kepler* analysis pipeline is fairly robust.

However, we now had a clean set of data with all known planet signals removed. This made it ripe for a manual planet search. Visual searches for planets have been successful in finding some planets that computer algorithms miss, as proven by the Planet Hunters citizen science program. This is primarily due to the fact that the *Kepler* analysis pipeline requires that a planet transit at least three times to be flagged as a potential planet. (This avoids being overwhelmed by false positives.) Our eyes are not subject to this limit. I manually searched through the equivalent of 400 years worth of data and found two transits from Kepler-150 f.

Just finding suspected transits is not enough to call it a planet. Three techniques were used to officially confirm it. First, the star Kepler-150 already had four known planets, which meant Kepler-150 f had a >99% chance of being a true planet. A second technique independently calculated the planet probability to be >99%. A third technique analyzing the shapes of the transits for all five planets in the system was also consistent with the planetary explanation. Combined, this gave us a >99.998% confidence that this signal was caused by a new exoplanet, which we named Kepler-150 f.

Kelper-150 f is about the size of Neptune and orbits once every 637 days, one of the longest period planets discovered with the transit technique. Kepler-150 f was discovered in a system that was known for years to have four other planets. The fact that Kepler-150 f was missed for so long, only to be found through a visual search, suggests that other planets might also be hidden in the data.

# SSB ACTIVITIES

## THE BOARD AND ITS STANDING COMMITTEES

The **Space Studies Board (SSB)** did not meet during the first quarter. The next meeting of the SSB will be May 2-4. The first day will be a symposium held with the Aeronautics and Space Engineering Board on America's Future in Civil Space (more information is on page 2 of this newsletter).

The standing committees supported by NASA-SMD (**CAA, CAPS, CESAS, and CSSP)** were reconstituted as of January 1, 2017 as "discipline committees." The new status enables them to draft reports containing consensus conclusions and findings on the implementation of their respective decadal surveys.

During this quarter the four discipline committees and the ASEB/SSB standing Committee on Biological and Physical Sciences in Space (CBPSS) met in plenary and parallel at the **2017 Space Science Week**, March 28-30, 2017. During the afternoon of March 28 all 5 committees met in plenary which commenced with comments from Sarah Gibson (SSB member) and Jim Lancaster (Board on Physics and Astronomy Director) who provided a brief overview of those boards' current activities. Thomas Zurbuchen (SMD Associate Administrator) then provided an overview of the NASA Science Mission Directorate budget, program, and priorities, and concluded by taking questions from the audience. The plenary session also included two focus sessions, one on **The Discovery Frontiers of Data Analytics in Space Science** and another on **International Programs**. During the first focus session the committees heard space science discipline talks from Lea Shanley (UNC) and Barbara J. Thompson (NASA GSFC) and then participated in a Q&A and discussion. The second focus session featured overviews on the Russian, Chinese, and European Space Science Programs given by Lev Zelenyi (Russian Academy of Sciences), Chi Wang (Chinese Academy of Sciences), and Athena Coustenis (European Space Sciences Committee). For more information on the discipline and standing committees, please visit http://sites.nationalacademies.org/SSB/SSB_052296.

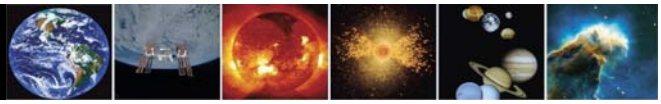

Kevin Hand (JPL) speaking at the 2017 Space Science Week public lecture. *Photo courtesy of Kim DeRose, DEPS staff*

On the evening of March 29, Kevin Hand (JPL) gave a public lecture on ***The Search for Life in Oceans Beyond Earth***, which drew over 300 attendees. A recording of the lecture is available at https://livestream.com/accounts/7036396/events/7103996.

The **Committee on Astrobiology and Planetary Science (CAPS)** met for the first time in its new role as a FACA-chartered "discipline committee" as part of the 2017 Space Science Week (28-30 March). The committee welcomed several new committee members including the new co chair, William McKinnon (Washington University). Other recent appointees included, Erik Aspaug (Arizona State University), Alexander Hayes (Cornell University), Edwin Kite (University of Chicago), Alyssa Rhoden (Arizona State University), and Nita Sahai (University of Akron). The committee's new status enables it to write short reports and the topic of the first, suggested by James L. Green (NASA), is "Getting Ready for the Next Planetary Science Decadal Survey." Work on the report began at the March meeting and continued into April. The report is scheduled to be delivered to NASA in mid-to-late May. The committee's next meeting is scheduled to take place at the National Academies Beckman Center in Irvine, California, on September 12-14 , 2017.

The **Committee on Astronomy and Astrophysics (CAA)** met in-person during the 2017 Space Science Week, from March 28-30 at the National Academy of Science building in Washington, DC. The meeting opened with introductions from the committee's co-chairs, Marcia Rieke and Steve Ritz. This was followed with updates on NASA's Astrophysics Division from Paul Hertz. The committee then joined the Space Science Week plenary session for the afternoon. On Wednesday, the CAA continued its meeting with a presentation from Ralph Gaume (National Science Foundation, Division of Astronomical Sciences). The CAA and CAPS then met in a joint session and heard a summary of the recent workshop on Searching for Life Across Space and Time (James Kasting, planning committee chair) and discussed follow-up studies on life-detection and exoplanets as legislated by the NASA Transition Authorization Act of 2017. After the joint session, the CAA heard a presentation from the chair of the Astronomy and Astrophysics Advisory Committee, Buell Jannuzi (University of Arizona and Steward Observatory), who summarized that committee's recent annual report. The second day of the meeting concluded with a discussion of the upcoming astronomy and astrophysics decadal survey. The third and final day of the meeting was spent preparing the committee's short report on Small Explorers Missions as requested by NASA. The next CAA meeting will be held at the Beckman Center in Irvine, CA in late October.

The **Committee on Biological and Physical Sciences in Space (CBPSS)** worked with NASA to select the topic of "Exploration Systems Interface with Biological and Physical Behaviors" as the focus of a 1-day symposium held on March 29, 2017, as part of the committee's scheduled March 28-30, 2017 meeting during the 2017 Space Science Week. The symposium brought together academic, government and industry researchers and developers to discuss the specific interactions of biological and physical processes with the exploration technology systems, and how that interaction is altered by the space environment. The presentations and discussions focused on the most important challenges that these alterations posed to the development of safe, effective and reliable spacecraft



## 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>.

systems, as well as the research that was needed to address these challenges. The areas covered ranged from microgravity fluid physics and combustion to cryogenic management and in-space manufacturing. During the nonsymposium portion of the meeting, the committee also heard a presentation on the evolution of Center for the Advancement of Science in Space (CASIS) work to expand the ISS user base, and a status update on NASA's Space Life and Physical Sciences Research and Applications program. The committee also met in plenary with the other standing committees of the Space Studies Board on March 28.

On March 22, 2017 committee co-chair Dr. Rob Ferl gave invited testimony at the House Subcommittee on Space hearing on "The International Space Station after 2024: Options and Impact".

The **Committee on Earth Science and Applications from Space (CESAS)** met on March 28-29, 2017 in Washington, DC as part of the 2017 Space Science Week. In addition to an update, provided by Michael Freilich, Director of NASA's Earth Science Division (ESD), on ESD programs and activities, the meeting featured a number of presentations related to the potential use of commercial providers of Earth observation data, especially regarding inputs to numerical weather prediction models, with a focus on current and proposed capabilities from small-sats, CubeSats, and constellations of small spacecraft. The committee had discussions on these topics with former NOAA Administrator and current CEO of GeoOptics, Inc., Conrad C. Lautenbacher (Vice Admiral, USN ret) and Jonny Dyer, Chief Engineer, Terra Bella (formerly Skybox Imaging). The committee also received two presentations by Jim Yoe, Chief Administrative Officer of the Joint [NOAA-NASA] Center for Satellite Data Assimilation (JCSDA), the first reviewing current and potential future activities of the JCSDA, and the second on Frontiers of Numerical Weather Prediction. The committee also received presentations from Dan St. Jean, NOAA Deputy Director of the Space Platforms Requirements Working Group, and Karen St. Germain, Director, Office of Systems Architecture and Advanced Planning, NOAA NESDIS, on the NOAA Commercial Weather Data Pilot and the NOAA Satellite Observing System Architecture Study. The committee also welcomed new members Molly E. Brown, University of Maryland College Park; Otis Brown, NC State University; Everette Joseph, University of Albany, SUNY; R. Steven Nerem, University of Colorado, Boulder; Eric J. Rignot, University of California, Irvine; and Christopher S. Ruf, University of Michigan. The committee's next meeting will take place in fall 2017.

The **Committee on Solar and Space Physics (CSSP)** held its spring meeting during the 2017 Space Science Week, March 28-30, 2017 in Washington D.C. at the National Academy of Sciences building. On its first day, the committee was briefed by NOAA representatives on the Space Weather Prediction Center and the ongoing implementation of the National Space Weather Action Plan before joining the other committees in plenary session. On the second day, the committee received agency updates from the NSF Geospace Section, NSF Astronomical Sciences Division about the DKIST telescope, NASA Heliophysics, as well as a briefing on the recent report *Assessment of the NSF's 2015 Geospace Portfolio Review.* The committee then held a focus session on options for the implementation of Heliophysics Science Centers (HSCs)—a part of the DRIVE (Diversify, Realize, Integrate, Venture, Educate) recommendation from the decadal survey.

NASA and NSF jointly will create HSCs to tackle key science problems requiring multidisciplinary teams, but the decadal did not give much specific guidance. To aid in drafting a series of findings and conclusions, the committee heard presentations and held discussions with guests on the status of NASA's DRIVE Implementation plan, NSF Physics Frontiers Centers, and the NASA Astrobiology Institute. The committee spent the remainder of its time discussing the issues presented. The CSSP's report will enter review in April.

## STUDY COMMITTEES

The **Committee on the Assessment of the National Science Foundation's 2015 Geospace Portfolio Review** has released the final report *Assessment of the National Science Foundation's 2015 Geospace Portfolio Review* The report is available at https://www.nap.edu/catalog/24666/assessment-of-the-national-science-foundations-2015-geospace-portfolio-review.

The **Committee on Best Practices for a Future Open Code Policy for NASA Space Science** is in the process of being nominated. 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. More information about the project is available at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_178892.

The **2017-2027 Decadal Survey for Earth Science and Applications from Space (ESAS 2017)** was very active during the quarter with numerous teleconferences among and between the steering committee and its five study panels. In addition, the survey steering committee met in person for their fourth and fifth meetings on January 18-20, 2017 at the Beckman Center in Irvine, CA and on March 6-8, 2017 in Washington, DC, respectively. Public sessions at the

January meeting included discussions with George Komar, Associate Director of NASA's Earth Science Division and Program Manager of the Earth Science Technology Office and Karen St. Germain, Director, Office of Systems Architecture and Advanced Planning, NOAA NESDIS. During the meeting, the committee also hosted a virtual town hall via WebEx that provided an update to the community on survey progress. On January 24, 2017, the survey co-chairs hosted a community forum on the decadal survey during the 97th Annual Meeting of the American Meteorological Society, which was held in Seattle, WA. The steering committee's fifth meeting did not include public sessions. The survey study panels met together—along with a number of steering committee members—for their third and final meeting, which was held at the Beckman Center in Irvine, CA from February 15-18, 2017. As the quarter ended, preparations were underway for the last of the scheduled six meetings of the survey steering committee; it will be held from May 9-11, 2017 in Boulder, Co. An approved pre-publication version of the steering committee's final report is due by the end of 2017. Some 100 members of the community are serving on one or more of the survey's committees. Links on the survey website, www.nas.edu/esas2017, describe survey activities during the quarter in more detail; also posted on the website are survey newsletters to the community.

The **Committee on Extraterrestrial Sample Analysis Facilities** is in the process of being nominated. 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. More information about the project is available at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_178893.

The **Committee on Large Strategic NASA Science Missions: Science Value and Role in a Balanced Portfolio** is co-chaired by Kathy Thornton of the University of Virginia and Ralph McNutt of the Johns Hopkins Applied Physics Laboratory. The committee held its second meeting December 7-10 at the Beckman Center. The committee heard from representatives of the decadal surveys as well as leaders of several flagship-class science missions. Among the issues that the committee discussed were the definition of large strategic missions, and how they are being conducted within NASA. The committee held its third meeting February 15-17 at the Keck Center where it heard from NASA officials about the status of the science divisions. The committee is drafting its report and preparing to submit it for review. The committee plans to deliver its report to NASA in summer 2017. Additional information about this project can be found at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_173492.

The **Committee on a Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at NASA** held its first meeting on February 7-9, 2017 in Washington, D.C. The committee first met with Dr. Craig Kundrot, director of the NASA Division of Space Life and Physical Sciences Research and Applications (SLPSRA), who provided an overview of the organization as well as its relationship to the decadal. Next, Dr. Francis Chiaramonte, Dr. David Tomko, Dr. Steve Davison, and Dr. Mark Lee briefed the committee on the research and accomplishments of the four SLPSRA research subdivisions including physical sciences, biological sciences program, human research, and fundamental physics. NASA Deputy Chief Scientist Dr. Gale Allen provided context for SLPSRA's role within NASA, including organizational connections and potential future roles. Dr. Julie Robinson, ISS Chief Scientist, briefed the committee on ISS research, past, present, and future. She highlighted groundbreaking discoveries, including the "Cool Flames" experiment. Finally, the Committee's open session ended on the second day with a briefing from Michael Roberts, Deputy Chief Scientist at the Center for the Advancement of Science in Space (CASIS), about the role of CASIS in microgravity research. The committee spent the remainder of its meeting in closed session reviewing materials, developing data requests, and conducting task and meeting planning—with a particular focus on plans for a Community Input Event during its next meeting. Following the February meeting, the committee continued to rapidly develop, organize and publicize this event. The committee's next meeting was held on April 18-20, 2017 in Washington, DC.

On March 22, 2017 committee co-chair Dr. Rob Ferl gave invited testimony at the House Subcommittee on Space hearing on "The International Space Station after 2024: Options and Impact".

The **Committee on NASA Science Mission Extensions** delivered its final report to NASA which went public in early September 2016. The co-chairs Vicky Hamilton and Harvey Tananbaum briefed the report to NASA officials and congressional staff and also presented to the NASA Advisory Committee's Science Committee. The report recommended that the 2-year cadence for conducting senior reviews of extended missions should be increased to every three years to increase efficiency. The NASA Authorization Act, signed into law on March 21, included this language. NASA now plans to adjust its senior review cadence as a result. The report includes a number of additional recommendations concerning the process of senior reviews for NASA's space science disciplines. The report is available at https://www.nap.edu/catalog/23624/extending-science-nasas-space-science-mission-extensions-and-the-senior

The **Committee on the Review of NASA's Planetary Science Division's Restructured Research and Analysis Programs** has completed all of its planned meetings. A complete draft of the committee's report was assembled late last year and the committee spent the first few months of 2017 responding to reviewer comments. A revised draft of the report was approved for release by the National Academies on March 14. A complete, edited copy of the report in prepublication format was delivered to NASA on 19 April and the chair of the committee briefed the leadership of NASA's Science Mission Directorate on the report's conclusions and recommendations on April 21, 2107. The public release of the report was April 26, 2017. Printed copies of the report will be available during the second quarter of 2017. The report is available at https://www.nap.edu/catalog/24759/review-of-nasas-planetary-science-divisions-restructured-research-and-analysis-programs.

**The SSB's sister Board, the Aeronautics and Space Engineering Board, also publishes a newsletter; visit <http://sites.nationalacademies.org/DEPS/ASEB/DEPS_046908> to subscribe or to view past newsletters. SSB's division, the Division on Engineering and Physical Sciences, also publishes a newsletter; visit <http://sites.nationalacademies.org/DEPS/DEPS_059299> to subscribe.**

The **Committee on the Review of Planetary Protection Policy Development Processes,** was formally appointed in February and held its first meeting at the National Academy of Sciences in Washington, D.C. on March 7-9. Following the receipt of a request from NASA last December for the committee to issue an interim report, the first meeting was devoted exclusively to beginning work on a short document outlining the goals, rationales and definition of planetary protection. Work on the interim report continued until mid-April. The draft interim report was sent to eight external reviewers for comment on April 21 and the committee expects to deliver the document to NASA in mid-to-late May. Work on the committee's main report will continue at meetings to be held in Washington, D.C., and Irvine, California, on May 23-25 and June 27-29, respectively. A fourth meeting will be scheduled for the third quarter of 2017. The committee schedule call for a draft report to be sent to external reviewers in the fourth quarter of 2017 and for a final, approved draft to go to NASA late in the first quarter or 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.

Committee members and public attendees at the 2017 Space Science Week public lecture, ***The Search for Life in Oceans Beyond Earth,*** *given by Dr. Kevin Hand (JPL). Photo courtesy of Kim DeRose, DEPS staff.*

The **Committee on the Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences** was approved in late February 2017. The committee is co-chaired by Louise Prockter of the Lunar and Planetary Institute and Joseph Rothenberg, formerly of Google. The committee's first meeting is scheduled for May 4-5 at the Keck Center in Washington, DC. The second meeting is scheduled for CalTech, July 11-13. The third meeting is likely to be held in late August in Woods Hole, and a fourth meeting is likely to be held at the Beckman Center in Irvine. In March the NASA Authorization Act was signed into law and included provisions for an Academies assessment of NASA's Mars Exploration Program. NASA and the Academies determined that the best course of action would be to incorporate this assessment into the mid-term review and to add several members with Mars expertise. The committee aims to deliver its report to NASA in spring 2018. Additional information about this project can be found at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_177619.

The workshop, **Searching for Life Across Space and Time,** was successfully held on December 5-6 at the Academies' Beckman Center in Irvine, California. A complete draft of the workshop's proceedings was assembled during the first quarter of 2017 and sent to external reviewers in the latter half of April. A revised and approved draft of the proceedings is scheduled for release in the second quarter of 2017. Additional details and the video recording of the workshop can be found at http://sites.nationalacademies.org/ssb/currentprojects/ssb_173278.

## OTHER ACTIVITIES

The **Forum for New Leaders in Space Science** is a cooperative activity between the National Academies of Sciences, Engineering, and Medicine and the Chinese Academy of Sciences (CAS) and 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. The third cohort of participants, representing the life- and physical-science research communities will hold the second of their two scheduled meetings at the National Academies' J. Erik Jonsson Center in Woods Hole, Massachusetts, on May 16-17, 2017. In the meantime, the SSB successfully applied for and received funding from the National Academies of Sciences, Engineering, and Medicine Presidents' Committee to permit the recruitment of a fourth cohort of young U.S. and Chinese scientists. Details remain to be formalized with CAS, but it is anticipated that the fourth cohort will include representatives from the astrophysics and heliophysics communities. Tentative plans call for the fourth cohort to meet in China early in 2018 and in California, immediately prior to the July 2018 COSPAR Scientific Assembly in Pasadena. Additional details concerning this activity can be found at http://sites.nationalacademies.org/SSB/SSB_086017.

**COSPAR** successfully held its annual round of business meetings (including the first meetings of the science program committee for the September 18-22, 2017, COSPAR Symposium in Jeju Island, South Korea and the July 14-21, 2018, Scientific Assembly in Pasadena, California) at COSPAR headquarters in Paris on March20-22, 2017. One of the highlights of the March 22 meeting of the COSPAR Bureau was the selection of the date for the 2020 Scientific Assembly in Sydney, Australia. The 42nd COSPAR Scientific Assembly will take place on August 15-23, 2020, and will coincide with Australia's annual National Science Week. A second highlight was the approved of new terms of reference (ToR) for the Panel on Planetary Protection. The new ToR establishes a more formal

membership structure for the panel and formalizes several existing, but informal, practices relating to panel operations, reporting arrangements, and the implementation of requirements deriving from COSPAR's planetary protection policies. A third highlight was the Bureau's approval of a plan to move the offices of the COSPAR Secretariat from Paris to Montpellier in the south of France. COSPAR will continue to hold its annual business meetings in Paris and will retain a single, small office at CNES headquarters, its current base of operations, for use by visiting staff.

**Planetary Protection of the Outer Solar System**: This 3-year activity, funded via the European Commission'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. The PPOSS group addressing the activities of Work-Package 3—a document identifying current scientific and technical research issues relating to planetary protection for objects in the outer solar system—commenced work at a pair of back-to-back meetings at the German Aerospace Center in Cologne on January 23-27, 2017. Work on this activity continues at a meeting held in Florence, Italy, on 10-12 April. 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 Work-Package 3 and follow-on activities. To this end, ESF selected Geoffrey Collins (Wheaton College) and Mark Saunders (NASA Langley Research Center, retired) as their preferred participants from a list of candidates drafted by the SSB staff. Both Dr. Collins and Mr. Saunders are participating in their own recognizance 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/.

The SSB, in conjunction with the Board on Physics and Astronomy, exhibited at the **American Astronomical Society** meeting in Grapevine, Texas, in January 2017. While at the meeting the SSB distributed reports and copies of the Space Studies Boards Compilation of Selected Reports DVD's to the attendees. In addition the SSB and the BPA promoted and held a town hall for the upcoming decadal survey on astronomy and astrophysics, Astro2020.

# NEW RELEASE

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

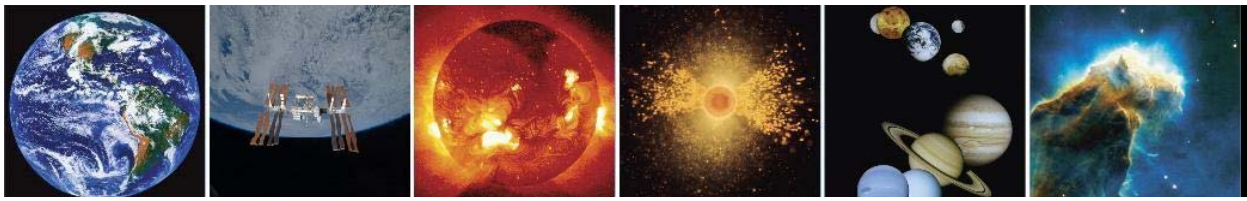
## Review of NASA's Planetary Science Division's Restructured Research and Analysis Programs

The Research and Analysis (R&A) program managed by NASA's Planetary Science Division (PSD) supports a broad range of planetary science activities, including the analysis of data from past and current spacecraft; laboratory research; theoretical, modeling, and computational studies; geological and astrobiological fieldwork in planetary analog environments on Earth; geological mapping of planetary bodies; analysis of data from Earth- and space-based telescopes; and development of flight instruments and technology needed for future planetary science missions. The primary role of the PSD R&A program is to address NASA's strategic objective for planetary science and PSD's science goals.

Recently, PSD reorganized the R&A program to provide better alignment with the strategic goals for planetary sciences. The major changes in the R&A program involved consolidating a number of prior program elements, many of which were organized by subdiscipline, into a smaller number of thematic core research program elements. Despite numerous efforts by PSD to communicate the rationale for the reorganization and articulate clearly the new processes, the report finds that there has been significant resistance from the planetary science community and concerns in some sectors regarding the major realignment of funding priorities.

Review of NASA's Planetary Science Division's Restructured Research and Analysis Programs examines the new R&A program and determines if it appropriately aligns with the agency's strategic goals, supports existing flight programs, and enables future missions. This report explores whether any specific research areas or subdisciplinary groups that are critical to NASA's strategic objectives for planetary science and PSD's science goals are not supported appropriately in the current program or have been inadvertently disenfranchised through the reorganization.

Available at https://www.nap.edu/catalog/24759/review-of-nasas-planetary-science-divisions-restructured-research-and-analysis-programs



# SSB Calendar

**April**

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**May**

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**July**

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| April 18-20 | Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at NASA (joint with ASEB) | Washington, DC |
| May 2 | Symposium on America's Future in Space (joint with ASEB) | Washington, DC |
| May 3-4 | Space Studies Board Spring meeting | Washington, DC |
| May 4-5 | Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences | Washington, DC |
| May 9-11 | Decadal Survey for Earth Science and Applications from Space—Steering Cmte | Boulder, CO |
| May 15-17 | Forum for New Leaders in Space Science | Woods Hole, MA |
| May 23-25 | Review of Planetary Protection Policy Development Processes | Washington, DC |
| June 27-30 | Review of Planetary Protection Policy Development Processes | Irvine, CA |
| July 11-13 | Review of Progress Toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences | Pasadena, CA |

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

**Keck Center**
**500 Fifth St NW,**
**Washington, DC**

**Arnold and Mabel Beckman**
**100 Academy Drive**
**Irvine, CA**

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

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