



JANUARY - MARCH 2015

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*"One of the goals of the NRC Space Science Week is to enable opportunities to work across boundaries between our committees and our fields."*

*SSB Chair David Spergel*

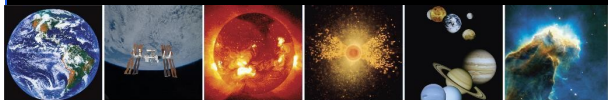
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NATIONAL ACADEMY OF SCIENCES

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## SPACE STUDIES BOARD NEWS



## FROM THE CHAIR



Many of the most exciting scientific questions are on the boundaries between different fields: How can our models and observations of the Sun's corona and the Earth's magnetosphere illuminate our understanding of the physics of black holes? How do observations of proto-planetary disks and exoplanets reshape our understanding of the formation of the Solar System? How do our observations of Uranus and Neptune shape the study of ice giants around other stars? How do extremophiles on Earth inform the search for life elsewhere? Similarly, some of the most important opportunities in both heliophysics and Earth Science lie on the boundary between science and applications.

While there is nearly universal recognition that we want to encourage investigations that cross field boundaries, both funding and our intellectual structures pose challenges to interdisciplinary research. Most faculty members, postdocs and graduate students are part of a particular department. Space science is funded through well-defined silos and our advisory structures parallel the funding silos and the departmental boundaries.

One of the goals of the NRC Space Science Week is to enable opportunities to work across boundaries between our committees and our fields. By having all of our standing committees meet in a single location, we can schedule joint sessions that focus on topics of mutual interest. At this year's Space Science Week,

Bruce Jakosky presented results from MAVEN to a joint session of the Committee on Astrobiology and Planetary Sciences and the Committee on Solar and Space Physics. MAVEN is an archetype for interdivisional science: this mission's observations of Martian Aurora inform both our understanding of Mars and the basic plasma physics of aurorae.

At this year's plenary sessions, Jack Kaye (NASA-Earth Science), Jim Green (NASA-Planetary Science), Paul Hertz (NASA-Astrophysics) and Jeff Newmark (NASA-Heliophysics) spoke about their efforts to support and encourage research that spanned their divisions. I was heartened to hear both the level of commitment to supporting interdivisional research and the recognition of the intellectual challenges. The second part of the plenary session had representatives of NASA's different mission directorates discuss efforts to span science, technology and human exploration. Greg Williams (NASA-Human Exploration and Operations), Jim Green (NASA-Science) and Jeff Sheehy (NASA-Space Technology) conveyed their belief that the different pieces of NASA were cooperating effectively. They cited joint efforts to develop coronagraphs for exoplanets and the coordinated program of scientific research and technology development that aims to enable human exploration of Mars.

While there is progress in bridging these boundaries in DC, I believe that the greatest obstacles to interdisciplinary research lies not in Washington, DC, but at many of our home institutions. University departments are reluctant to commit their FTEs for investigations that sit only partially within their traditional intellectual home. Graduate students are sometimes discouraged from wandering too far afield and postdocs are encouraged to develop marketable skills within standard subfields.

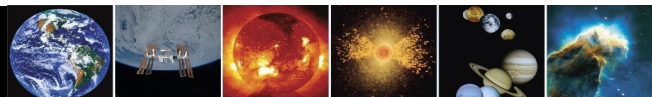
Even hiring schedules can end up discouraging interdisciplinary careers. When we wanted to hire a joint postdoc between our astronomy and geosciences departments at Princeton University, we were faced with the challenge that the American Astronomical Society's deadline for postdocs accepting positions (February 15) was long before the geoscientists even submitted their applications (April 15). When I was a graduate student in astrophysics, none of my fellow students were concerned about geology postdoc deadlines. In the coming years, modeling rocky exoplanets may be one of the most exciting areas of astrophysics, so we will need to identify ways of removing these institutional roadblocks to interdisciplinary research.

All of us who serve in leadership positions in science and science policy need to work to ensure that our institutional structures enable the best possible science and do not discourage researchers who venture into research that does not sit comfortably in our traditional bins.

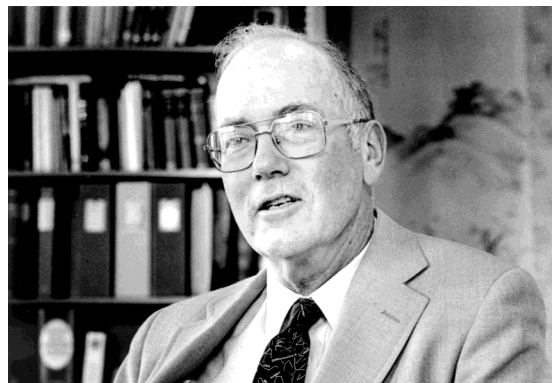
David Spergel, SSB Chair

*The views expressed here do not necessarily reflect those of the SSB or the National Research Council.*

The SSB's sister Board, the Aeronautics and Space Engineering Board, also publishes a newsletter; visit [http://sites.nationalacademies.org/DEPS/ASEB/DEPS\\_046908](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](http://sites.nationalacademies.org/DEPS/DEPS_059299) to subscribe.



## SSB Member News



Former SSB board chair **Charles H. Townes** died on January 27, 2015. He was professor emeritus at University of California, Berkeley. Dr. Townes served as chair of the Space Science Board from 1970 thru 1973. He was a physicist whose research was instrumental in the invention of the maser (microwave amplification by stimulated emission of radiation) and the laser (light amplification by stimulated emission of radiation). Dr. Townes was elected to the NAS-13 (Physics) in 1956. He was awarded the 1964 Nobel prize in physics (jointly with Nicolay Gennadiyevich Basov and Aleksandr Mikhailovich Prokhorov) "for fundamental work in the field of quantum electronics, which has led to the construction of oscillators and amplifiers based on the maser-laser principle". Dr. Townes also went on to develop the use of masers and lasers in astronomy. During his service as chair, the SSB published reports such as: *Priorities for Space Research: 1971-1980—Report of a Study on Space Science and Earth Observations Priorities* (1971), *Human Factors in Long-Duration Spaceflight* (1972), and *Outer Planets Exploration: 1972-1985* (1971).

Human Factors in Long-Duration Spaceflight (1972), and Outer Planets Exploration: 1972-1985 (1971).

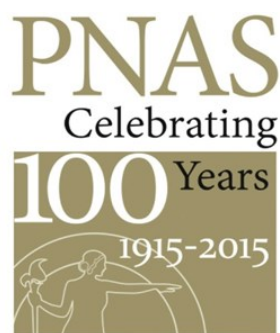
Below is a link to the NY times article about the life and accomplishments of Dr. Charles H. Townes.

[http://www.nytimes.com/2015/01/29/us/charles-h-townes-physicist-who-helped-develop-lasers-dies-at-99.html?\\_r=0](http://www.nytimes.com/2015/01/29/us/charles-h-townes-physicist-who-helped-develop-lasers-dies-at-99.html?_r=0)

### David Spergel wins Prize

SSB Chair David Spergel shared the 2015 Dannie Heineman Prize with Marc Kamionkowski "for their outstanding contributions to the investigation of the fluctuations of the cosmic microwave background that have led to major breakthroughs in our understanding of the universe"

## Other News



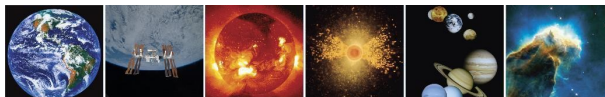
2015 marks the **100th anniversary of the Proceedings of the National Academy of Sciences (PNAS)**. Beginning with the first issue in January 1915, PNAS continues to publish articles across all scientific disciplines. The journal is recognized worldwide for the breadth of its content and the wealth of articles that have played a key role in the development of science by providing important scientific discoveries and by promoting discussion across disparate fields. PNAS is highlighting this rich content throughout its anniversary year.

<http://pnas100th.org/>

A former member of the Committee on Decadal Survey on Astronomy and Astrophysics 2010, **Neil deGrasse Tyson to Receive Public Welfare Medal** – Academy's Most Prestigious Award

In recognition of his "extraordinary role in exciting the public about the wonders of science, from atoms to the Universe," the National Academy of Sciences is presenting its 2015 Public Welfare Medal to astrophysicist, cosmologist, author, and science communicator Neil deGrasse Tyson, Frederick P. Rose Director of the Hayden Planetarium of the American Museum of Natural History. The medal is the Academy's most prestigious award, established in 1914 and presented annually to honor extraordinary use of science for the public good. The Public Welfare Medal will be presented to Neil deGrasse Tyson on April 26 during the Academy's 152nd annual meeting. More information, including a list of past recipients, is available at [www.nasonline.org/public-welfare-medal](http://www.nasonline.org/public-welfare-medal).

More information on the SSB and ASEB Board Meetings is at  
[http://sites.nationalacademies.org/SSB/SSB\\_054577](http://sites.nationalacademies.org/SSB/SSB_054577) (SSB) and  
[http://sites.nationalacademies.org/DEPS/ASEB/DEPS\\_058923](http://sites.nationalacademies.org/DEPS/ASEB/DEPS_058923)  
 (ASEB)



## SSB MEMBERSHIP

JANUARY 1, 2015—JUNE 30, 2015

**DAVID N. SPERTEL**, *Chair*  
Princeton University

**ROBERT D. BRAUN**, *Vice Chair (Begin 11/1)*  
Georgia Institute of Technology

**MARK R. ABBOTT**  
Oregon State University

**JAMES ANDERSON**  
Harvard University

**JAMES BAGIAN**  
University of Michigan

**JEFF M. BINGHAM**  
Consultant

**PENELOPE J. BOSTON**  
New Mexico Institute of Mining and Technology

**JOSEPH FULLER, JR.**  
Futron Corporation

**THOMAS R. GAVIN**  
Jet Propulsion Laboratory

**NEIL GEHRELS**  
NASA Goddard Space Flight Center

**SARAH GIBSON**  
National Center for Atmospheric Research

**RODERICK HEELIS**  
The University of Texas

**WESLEY HUNTRESS**  
Carnegie Institution of Washington

**ANTHONY C. JANETOS**  
Boston University

**DAVA J. NEWMAN**  
Massachusetts Institute of Technology

**SAUL PERLMUTTER**  
Lawrence Berkeley National Laboratory

**LOUISE M. PROCKTER**  
Johns Hopkins University, Applied Physics Laboratory

**MARCIA J. RIEKE**  
University of Arizona

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

**MEENAKSHI WADHWA**  
Arizona State University

**CLIFFORD M. WILL**  
University of Florida

**THOMAS H. ZURBUCHEN**  
University of Michigan



The Committee on Astronomy and Astrophysics (CAA) and the Space Studies Board (SSB) along with its international partners have organized a Focus Meeting (FM) at the 2015 International Astronomical Union (IAU) General Assembly in Hawaii.

International Astronomical Union (IAU) General Assembly  
Honolulu, HI  
August 3-14, 2015

<http://www.iau.org/news/announcements/detail/ann14013/>

Focus Meeting (FM) 11  
Global Coordination of Ground and Space Astrophysics and Heliophysics

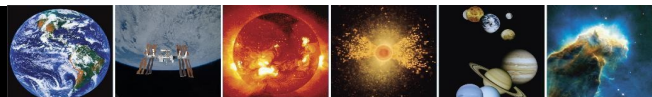
Purpose: As astronomical projects grow larger, international collaboration has become essential for both ground and space-based astronomy and heliophysics. The purpose of this Focus Meeting is to bring together a diverse set of stakeholders representing the astronomical and heliophysics disciplines from around the world to discuss how to deal with issues such as sharing data and providing access to facilities with the goal of continuing to move towards increased international cooperation in the strategic planning of these disciplines.

Details of the Focus Meeting are in the agenda found at the following page:  
[http://sites.nationalacademies.org/SSB/SSB\\_160906](http://sites.nationalacademies.org/SSB/SSB_160906)

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## SSB ACTIVITIES

### THE BOARD AND ITS STANDING COMMITTEES

The **Space Studies Board (SSB)** did not meet during the first quarter of 2015. The spring meeting will be held April 22-23 at the National Academy of Science main building (2101 Constitution Avenue). April 22 will be a joint session with the Aeronautics and Space Engineering Board (ASEB). Visit [www.nas.edu/ssb](http://www.nas.edu/ssb) to stay up to date on board, workshop, and study committee meetings and developments.

The **NRC Space Science Week** ([www.nationalacademies.org/spacescienceweek](http://www.nationalacademies.org/spacescienceweek)) was held March 31-April 2, 2015 in Washington, DC. All five of the SSB's active standing committees met in parallel (see descriptions of the individual standing committee meetings below). On the afternoon of March 31 the standing committees conducted a plenary session at which there was a presentation on the NASA SMD budget and its current program and priorities by Marc Allen, NASA SMD Deputy Associate Administrator for Research. The committees also participated in two roundtable discussions, the first on SMD Inter-divisional cooperation with Jack Kaye (ESD), Jim Green (PSD), Paul Hertz (ASD) and Jeff Newmark (HSD); and the second on NASA Inter-directorate cooperation with Greg Williams (HEOMD), Jeff Sheehy (STMD) and Jim Green (SMD). The committees were also briefed on an upcoming SSB study on achieving science with CubeSats that is beginning soon, chaired by Thomas Zurbuchen, University of Michigan; and on the current science on the International Space Station by NASA's Julie Robinson. The afternoon concluded with briefings from the White House by Tammy Dickinson (OSTP) and Grace Hu (OMB) and from Capitol Hill by Tom Hammond (House Science, Space and Technology Committee) and Nick Cummings (Senate Space, Science and Competitiveness Subcommittee).

On the evening of April 1, the **NRC Space Science Week Public Lecture** by Jason Kalirai, Space Telescope Science Institute, marked the 25th Anniversary of the Hubble Space Telescope. To view a video replay of *Our Place in the Universe: As Seen Through Past, Present, and Future Telescopes*, please visit [http://sites.nationalacademies.org/ssb/ssb\\_153311](http://sites.nationalacademies.org/ssb/ssb_153311).

The **Committee on Astrobiology and Planetary Science (CAPS)** met on March 31-April 2, 2015, in Washington, DC, as part of the 3rd NRC Space Science Week. In addition to joint plenary sessions with the other SSB standing committees, CAPS received briefings on the status of NASA's planetary science, astrobiology, and planetary protection programs. In addition, the committee heard updates on NASA's Mars and exoplanet exploration activities, the

NASA Astrobiology Institute, and the status of Europa mission development work. The committee also heard presentations on the recent Europa Plumes workshop, a joint NASA\_NSF workshop on Alternative Chemistries of Life Workshop, a series of perspectives on Mars exploration after Mars 2020, and synergies between human exploration and planetary science. CAPS also held a joint session with the Committee on Solar and Space Physics, during which both committees received briefings on China's future planetary and space physics missions and a presentation on the results from MAVEN.

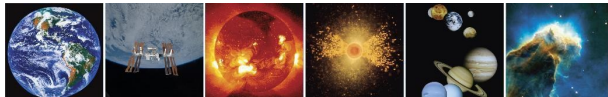
The next CAPS meeting is scheduled for September 16-17, 2015 in Irvine, California. For more information about CAPS, to learn about upcoming meetings, and download presentations from past meetings, please visit [http://sites.nationalacademies.org/SSB/SSB\\_067577](http://sites.nationalacademies.org/SSB/SSB_067577).



The **Committee on Astronomy and Astrophysics (CAA)** met on March 31-April 2, 2015, in Washington, DC, as part of the 3rd NRC Space Science Week. In addition to joint plenary sessions with the other SSB standing committees, the CAA received briefings from and held discussions with Jim Ulvestad (NSF) on NSF's Division of Astronomical Sciences; Kathy Turner (DOE) on the Department of Energy's High Energy Physics Program; Paul Hertz (NASA) on the NASA Astrophysics Division; Eric Smith (NASA) on the James Webb Space Telescope; Steve Kahn (LSST) on the Large Synoptic Survey Telescope; Lyman Page (Princeton) on the tensor-scalar ratio from the ground and space; Bruce Macintosh (Stanford) on the WFIRST-AFTA coronagraph science and ground-based coronagraph progress; Ji Wu (Chinese Academy of Sciences) on the Chinese Academy of Sciences Program Astro Highlight; Angela Olinto (University of Chicago) on the 2014-2015 Astronomy and Astrophysics Advisory Committee Annual Report; and Pierre Binétruy (APC Université Paris Diderot) as the European Space Sciences Committee liaison. A new member to the committee, Bruce Macintosh, was also appointed this quarter.

The next committee meeting will take place during Space Science Week in 2016. In the interim, the CAA will meet periodically via teleconference. For more information about CAA, and to download presentations from past meetings, please visit [http://sites.nationalacademies.org/BPA/BPA\\_048755](http://sites.nationalacademies.org/BPA/BPA_048755).

The **Committee on Biological and Physical Sciences in Space (CBPSS)**. Following its October 2014 organizational meeting, where several issues of near-term importance to NASA microgravity research progress were identified, the committee worked with NASA to select the related topics of Open Science and Gen-



(Continued from page 5)

eLab Platform development as the focus of a 1-day symposium. Planning and organizing this event was the primary focus of the committee's work during this quarter, and the resulting symposium was held on Apr. 1, 2015 as part of the committee's scheduled Mar. 31-Apr. 2, 2015 meeting during the NRC Space Science Week. The symposium brought together experts from a range of government, academic and private database groups to discuss common development challenges. The discussion focused on challenges relevant to NASA Open Science approaches in general, and potential design input for NASA GeneLab in particular. Included in the symposium were two panels with ten experts representing diverse database efforts and platforms in the very rapidly growing field of 'omics' research. During the non-symposium portion of the meeting, the committee also heard a presentation on the role of CASIS in supporting microgravity research on the International Space Station, 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 Mar. 31st. Information about the committee and its membership can be found at [http://sites.nationalacademies.org/SSB/SSB\\_145312.htm](http://sites.nationalacademies.org/SSB/SSB_145312.htm).

The **Committee on Earth Science and Applications from Space (CESAS)** met on March 31-April 2, 2015, in Washington, DC, as part of the 3rd NRC Space Science Week. In addition to joint plenary sessions with the other SSB standing committees, CESAS received briefings from and held discussions with Jack Kaye (NASA) on current and planned activities within NASA's Earth Science Division; Paula Bontempi (NASA) on the Pre-Aerosol, Clouds, and ocean Ecosystem mission (PACE); Tom Burns (NOAA) on current and planned activities within NOAA NESDIS (National Environmental Satellite, Data, and Information Service); Sarah Ryker (USGS), on the Landsat program and plans for Landsat-9; Tim Stryker (OSTP), on the National Plan for Civil Earth Observations and thoughts on its use in the upcoming Earth science decadal survey; and Stacey Boland (JPL), on RapidScat, a low-cost instrument recently deployed on the International Space Station that is providing measurements of ocean vector winds. This meeting also had two roundtable discussions with a particular focus on planning for the second NRC decadal survey in Earth science and applications from space, which will get underway in Summer 2015. The next CESAS meeting is scheduled for September 24-25, 2015 in Washington, DC. For more information about CESAS, to learn about upcoming meetings, and download presentations from past meetings, please visit [http://sites.nationalacademies.org/SSB/SSB\\_066587](http://sites.nationalacademies.org/SSB/SSB_066587).

The **Committee on Solar and Space Physics (CSSP)** met on March 31 – April 2, 2015, at the NAS Building in Washington, DC during the 3rd NRC Space Science Week. During the meeting, the committee received updates on programs at NASA's Heliophysics Division (HPD), NSF's Division of Atmospheric and Geospace Sciences (GEO/AGS), and NOAA's Space Weather Prediction Center (SWPC) from Jeffrey Newmark, Interim Director of HPD, and Vladimir Papitashvili, Geospace Section Head (acting) in GEO/AGS, and Thomas Berger, Director SWPC, respectively. The committee also heard about the European Space Science Committee and

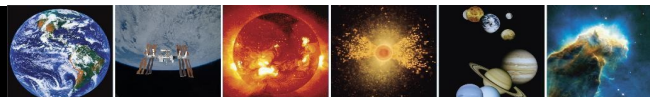
European activities in solar and space physics from Athena Cous-tenis, ESSC and Paris Observatory and Nicholas Walter, ESF. In joint session with the Committee on Astrobiology and Planetary Science, the committee heard from Bruce Jakosky, University of Colorado, about results from the MAVEN mission at Mars and from Ji Wu, Chinese Academy of Sciences National Space Science Center, regarding China's activities in solar and space physics. The committee also received an update on the construction of Daniel K. Inouye Solar Telescope from David Boboltz, NSF. The committee conducted a roundtable discussion about space weather that included the above mentioned representatives from NASA, NOAA, and NSF as well as a presentation on the national Space Weather Operations Research and Mitigation (SWORM) task force from William Murtagh, OSTP. Sarah Gibson, HAO, led a discussion on the initiation of the DRIVE initiative that was recommended in the 2013 solar and space physics decadal survey. Len Fisk, University of Michigan, gave an update on the AGU Solar Physics and Aeronomy section advocacy group, which was followed by a discussion of possible outreach activities for committee members and the community. Finally, the committee and representatives from the HPD at NASA discussed accelerating the STP science program. The committee's Fall meeting will be October 14-15, 2015, location to be determined. Further information about the committee, including presentations from the March 31- April 2, 2015 meeting, are available at [http://sites.nationalacademies.org/SSB/SSB\\_052324](http://sites.nationalacademies.org/SSB/SSB_052324).

## STUDY COMMITTEES

The **Committee on Achieving Science Goals with CubeSats** is in the process of forming a committee. The committee chair, Thomas Zurbuchen, University of Michigan, has been appointed, and he presented to the plenary session of the SSB's Space Science Week on March 31, 2015. Those slides are available to view at [http://sites.nationalacademies.org/SSB/SSB\\_153141](http://sites.nationalacademies.org/SSB/SSB_153141). The full committee is expected to be appointed in May and to have their first meeting in the summer of 2015. More information about this project is available at: [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_160539](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_160539).

As the quarter ended, the ad hoc **Committee on a Framework for Analyzing the Needs for Continuity of NASA-Sustained Remote Sensing Observations of the Earth from Space** was finalizing its report revisions in response to external review. An approved prepublication version of the final report is now anticipated in May 2015. Additional information about the committee and its work is available at [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_084713](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_084713).

The ad hoc **Committee for the Review of the Mars Exploration Program Analysis Group (MEPAG) Report on Planetary Protection for Mars Special Regions**, a joint undertaking of the SSB and the European Science Foundation, held its second and final full meeting in Irvine, California on 12-13 February. The committee is currently drafting its report's and plans to send it to external reviewers during the second quarter of this year. The committee's final report is currently scheduled for release in the third quarter of 2015.



(Continued from page 6)

The Space Studies Board and the Board on Science Education held a workshop **Sharing the Adventure with the Student** on December 2-3, 2014, at the NAS auditorium, which focused on the contribution of NASA's Science Mission Directorate to K-12 science education. The workshop served as a venue for dialog between space and Earth scientists, engineers, education specialists ranging from high school principals to education researchers and state STEM education leaders, professional development providers, and informal science education institutions, among others. A report of the workshop is in review and will be released in the spring of 2015. For more information, please visit [http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_152563](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_152563).

With funding from NSF, the NRC conducted a study that recommends a strategy to optimize the U.S. optical and infrared system in preparation for the full operation of the Large Synoptic Survey Telescope. **The Committee on a Strategy to Optimize the U.S. Optical and Infrared System in the Era of LSST** was appointed in July 2014 and was led by Debra Elmegreen (Vassar College). Its first meeting was held on July 31-August 1, in Washington, DC. After its first meeting, the committee requested white papers from the astronomy community to aid its work. The second meeting was held on October 12-13, in Irvine, CA, and the third meeting was held on December 2-3, in Washington, DC. The report entered the review process in early February 2015, and the report was released on April 17, 2015. For more information about the committee, please visit [http://sites.nationalacademies.org/BPA/BPA\\_087934](http://sites.nationalacademies.org/BPA/BPA_087934).

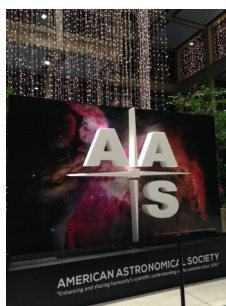
The ad hoc **Committee on Survey of Surveys: Lessons Learned from the Decadal Survey Process** has completed a draft of its report and it was sent to 12 reviewers for comment in early March. Reviewer comments were due at the end of March. Release of the committee's final report is scheduled for the third quarter of 2015. More information about the committee can be found at <http://www8.nationalacademies.org/cpl/projectview.aspx?key=49635>.

## OTHER ACTIVITIES

The SSB, acting in its role as the **U.S. National Committee for COSPAR** held its annual series of business meetings at its Paris headquarters on 23-26 March. These meetings were notable for two reasons. First, they were the first presided over by Lennard A. Fisk, following his election as president of COSPAR at the August, 2014, Scientific Assembly in Moscow. Second, they were the first where Charles Kennel participated in his new, dual role as U.S. representative to COSPAR and vice chair of the COSPAR Scientific Advisory Committee. Also present to report to the COSPAR Bureau were Gregg Vane and Rosaly Lopes, the chair of the Local Organizing Committee and vice chair of the Science Program Committee, respectively, for the 2018 COSPAR Scientific Assembly in Pasadena, California. COSPAR is currently completing the final preparations for second "off-year" symposium, to be held at Foz do Iguaçu, Brazil, on November 9-13, 2015. In addition, planning for the 2016 Scientific Assembly in Istanbul, Turkey, has begun in earnest.

The **Forum for New Leaders in Space Science**, a cooperative activity with the Chinese Academy of Sciences, 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 at meetings to be held in China and the United States. Following the successful completion of the first and second Forums in Beijing and Irvine, California, in, respectively May and November of last year, planning for the third and fourth Forums began. The SSB and CAS decided in March that the third Forum will take place in Shanghai on October 9-10, 2015 and that the fourth Forum will be held in Irvine on May 16-17, 2016. The scientific focus of both meetings will be planetary science and earth science from space. A joint solicitation for applicants will begin in early April and will close on May 29. Successful applicants will be contacted no later than July 24. Additional details can be found at [http://sites.nationalacademies.org/SSB/SSB\\_086017](http://sites.nationalacademies.org/SSB/SSB_086017).

## OUTREACH



The SSB in conjunction with the Board on Physics and Astronomy exhibited at the American Astronomical Society in Seattle WA, in January 2014. While at the meeting the SSB distributed over 500 reports and copies of the Space Studies Boards Compilation of Selected Reports 1958-2014 DVD's to the attendees. Other outreach activities included participation at the Lunar and Planetary Science Conference in The Woodlands, TX in March 2015 in which our SSB research associate Katie Daud and intern Angela Dapremont respectively participated in a poster sessions.

## SSB STANDING COMMITTEES

**Committee on Astronomy and Astrophysics (CAA)**  
(Joint with the Board on Physics and Astronomy)

Marcia Rieke, University of Arizona (Co-Chair)  
Paul L. Schechter, MIT (Co-Chair)

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

Philip R. Christensen, Arizona State University (Co-Chair)  
J. Gregory Ferry, Pennsylvania State University (Co-Chair)

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

Elizabeth Cantwell, Lawrence Livermore National Laboratory (Co-Chair)  
Robert J. Ferl, University of Florida (Co-Chair)

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

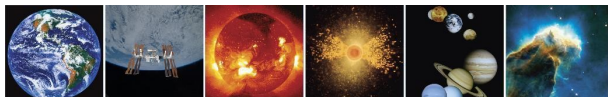
Mark R. Abbott, Oregon State University (Co-Chair)  
Joyce E. Penner, University of Michigan (Co-Chair)

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

J. Todd Hoeksema, Stanford University (Co-Chair)  
Mary K. Hudson, Dartmouth College (Co-Chair)

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





## New Releases

### Optimizing the U.S. Ground-Based Optical and Infrared Astronomy System (2015)

New astronomical facilities, such as the under-construction Large Synoptic Survey Telescope and planned 30-meter-class telescopes, and new instrumentation on existing optical and infrared (OIR) telescopes, hold the promise of groundbreaking research and discovery. How can we extract the best science from these and other astronomical facilities in

an era of potentially flat federal budgets for both the facilities and the research grants? Optimizing the U.S. Ground-Based Optical and Infrared Astronomy System provides guidance for these new programs that align with the scientific priorities and the conclusions and recommendations of two National Research Council (NRC) decadal surveys, New Worlds, New Horizons for Astronomy and Astrophysics and Vision and Voyages for Planetary Sciences in the Decade 2013-2022, as well as other NRC reports.

This report describes a vision for a U.S. OIR System that includes a telescope time exchange designed to enhance science return by broadening access to capabilities for a diverse community, an ongoing planning process to identify and construct next generation capabilities to realize decadal science priorities, and near-term critical coordination, planning, and instrumentation needed to usher in the era of LSST and giant telescopes.

View the full report at:

<http://www.nap.edu/catalog/21722/optimizing-the-us-ground-based-optical-and-infrared-astronomy-system>



### Space Studies Board Annual Report 2014 (2015)

The original charter of the Space Science Board was established in June 1958, 3 months before the National Aeronautics and Space Administration (NASA) opened its doors. The Space Science Board and its successor, the Space Studies Board (SSB), have provided expert external and independent scientific and programmatic advice to NASA on a continuous basis

from NASA's inception until the present. The SSB has also provided such advice to other executive branch agencies, including the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), the U.S. Geological Survey (USGS), the Department of Defense, as well as to Congress.

Space Studies Board Annual Report 2014 covers a message from the chair of the SSB, David N. Spergel. This report also explains the origins of the Space Science Board, how the Space Studies Board functions today, the SSB's collaboration with other National Research Council units, assures the quality of the SSB reports, acknowledges the audience and sponsors, and expresses the necessity to enhance the outreach and improve dissemination of SSB reports.

This report will be relevant to a full range of government audiences in civilian space research - including NASA, NSF, NOAA, USGS, and the Department of Energy, as well members of the SSB, policy makers, and researchers. View report at:

<http://www.nap.edu/catalog/21671/space-studies-board-annual-report-2014>

## SSB STAFF

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**CELESTE A. NAYLOR**  
Information Management Associate

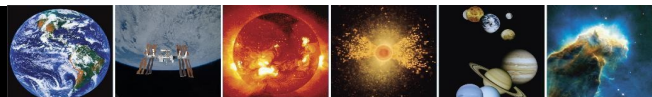
**TANJA E. PILZAK**  
Manager, Program Operations

**SANDRA WILSON**  
Senior Financial Assistant

**ANGELA DAPREMONT**  
Lloyd V. Berkner Space Policy Intern

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





## Conference Summary

SSB intern Angela Dapremont had the opportunity to present her research, conducted during the summer of 2014 at NASA Goddard Space Flight Center, at the 46<sup>th</sup> Lunar and Planetary Science Conference (LPSC) in The Woodlands, TX.

Below is a summary of her experience.

Presenting my research at LPSC was a goal of mine upon entering the field of planetary science. Thus, I did not hesitate to take advantage of the opportunity to communicate the work that I conducted as an intern at NASA Goddard Space Flight Center alongside working at the SSB.

There were several conference sessions that I attended that were related to my research focused on geologic mapping of the Arsia Mons fan shaped deposit including, *Mars Geomorphology and Climate: Fire and Ice* and *Planetary Volcanism: If You Can't Stand the Heat Get Out of the Mantle*. I also took advantage of the opportunity to acquire knowledge in subjects with which I was less familiar by listening to talks at the session titled *Venus: New Flashes of Insight*. By attending session talks, I was able to take away information that helped me prepare for my poster presentation.

I also had the opportunity to attend several NASA budget related highlighted events including the *NASA Headquarters Briefing* and *The 2016 NASA Budget: The Planetary Community's Response and Next Steps*. As a result of my work with the SSB, I had a unique and in depth perspective on the topics discussed at these events.

The poster session was an enlightening experience in that I had the opportunity to share my work with those who were familiar with planetary volcanology and those who were not. The conference participants with whom I interacted posed wide ranging questions including those associated with terrestrial glaciers and characteristics of volcanoes on Mars.

In the future, I hope to continue gaining knowledge in both planetary geology and space policy. I plan to use my experiences to further augment my understanding of the connection between these two disciplines.

### Lloyd V. Berkner Space Policy Internships

Berkner Autumn Program 2015 (Undergraduate and Graduate Students) Applications will be accepted beginning April 1, 2015. The deadline for submitting applications is June 5, 2015; selections will be made by July 3, 2015.

Further information maybe found at;  
[http://sites.nationalacademies.org/SSB/SSB\\_052239](http://sites.nationalacademies.org/SSB/SSB_052239)



The National Space Science Center of the Chinese Academy of Sciences and the Space Studies Board of U.S. National Academy of Sciences' National Research Council are pleased to invite applications for the 2015-16 Forum for New Leaders in Space Science. The Forum, initiated in 2014, is designed to provide opportunities for a highly select group of young Earth and space scientists from China and the United States to discuss their research activities in an intimate and collegial environment at meetings to be held in China and the United States.

The goals of the Forum are threefold:

1. To identify and highlight the research achievements of the best and brightest young scientists currently working at the frontiers of their respective disciplines;
2. To build informal bridges between the Earth- and space-science communities in China and the United States; and
3. To enhance the diffusion of insights gained from participation in the Forum to the larger Earth- and space-science communities in China and the United States.

The 1st and 2nd Forums were held in China and the USA in May and November, 2014, respectively. The 3rd Forum will be held, in Shanghai, China, on 9-10 October, 2015 and the 4th Forum will be held in Irvine, California, USA on 16-17 May, 2016. The scientific scope of the 2015-2016 session is limited to the studies of planetary bodies in the solar system and Earth science from space. Both events will include focused presentations by young scientists, topical presentations by senior scientists and group discussions. Participants will be selected by an international Program Committee. The travel and subsistence costs for U.S. participants will be paid by the National Research Council. Travel costs for Chinese participants will be paid by their own organizations. Three nights of local accommodation plus selected meals and transportation to/from the meeting site will be provided by the local host organization.

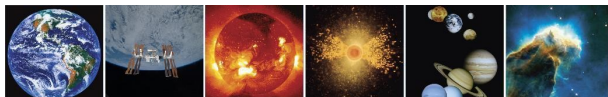
Eligibility requirements and application process are described on the following site:

[http://sites.nationalacademies.org/SSB/SSB\\_086017](http://sites.nationalacademies.org/SSB/SSB_086017)

### The First Forum for New Leaders in Space Science

May 8-9, 2014, Beijing





## Staff News



**Angela Dapremont** completed her assignment as an SSB intern from September 2014 through March 2015. Her reflection on her experience with the SSB is below.

My internship with the SSB has broadened my view of the possibilities and opportunities associated with a career in space policy. I arrived at the start of the internship eager to learn about how I could apply my research back-

ground in geological science to the discipline of space policy. I was able to accomplish this goal through my work with the SSB.

Two intellectually rewarding experiences during my internship were associated with NASA related hearings on Capitol Hill. I submitted notes for a House of Representatives Subcommittee on Space hearing focused on the Space Launch System (SLS) and Orion Multipurpose Crew Vehicle (Orion), as well as a Senate Subcommittee on Space, Science and Competitiveness hearing focused on the NASA budget request for fiscal year 2016. These experiences were the equivalent of being "in the field" as a geologist and I gained firsthand knowledge of the factors involved in the creation of space policy. As an SSB intern, I also had the opportunity to attend the CBPSS and SSB November 2014 meetings. The discussions and presentations provided at these meetings were valuable because they represented insight into the challenges and decisions associated with the formulation of space policy.

I now have a greater understanding of how space policy is formulated and implemented through my internship with the SSB. I am grateful for this opportunity not only because of the work I was able to contribute, but the people who made my time with the SSB an enjoyable experience. I am confident that I will continue to use the knowledge that I have acquired through the internship as I progress in my career.



**Michelle Thompson** completed her assignment as an SSB intern from September 2014 through December 2014. Her reflection on her experience with the SSB is below.

The fall semester I spent as a Lloyd V. Berkner Space Policy Intern at the SSB was absolutely invaluable to my career. From the moment I arrived, I was immersed in the world of science and space policy. I spent my first few days en-

gaged in NRC committee meetings, learning the nature of top-level space policy discussions. From my first few minutes at the SSB, I never stopped learning. As the semester progressed, I worked on an upcoming report, attended more committee and board meetings, and spent time in the House committee chamber. My primary focus, however, was working on the Sharing the Adventure with the Student Workshop. I had the rare opportunity to start at the SSB just as the project was ramping up, and stay through to the Workshop's

execution. I assisted Abigail Sheffer and committee members in planning the agenda, recruiting speakers for the workshop, and pulling all the pieces together during the event. It provided me with important insight into the purpose and power of science policy in a scenario far removed from the committee meeting room. It gave me the chance to feel involved in something with significant impact on the direction of science and space policy. It was an incredibly rewarding experience.

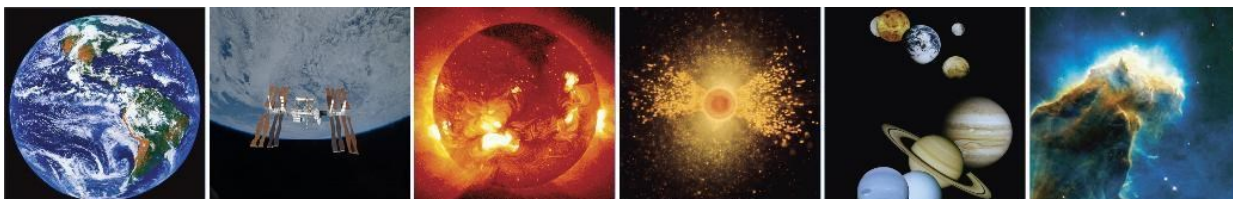
In addition to the gratifying work I was doing, I was equally happy getting to know the members of the SSB and the individuals on their various committees. I had the opportunity to discuss with each of them what a career in science policy entails, all while accumulating first-hand experience. Everyone at the SSB was incredible to work with and be mentored by, and they were always willing to provide insight and guidance relevant to my career.

The semester I spent at the SSB honed my communication and writing skills and provided me an insider's look at the important intersection of government and academia. It certainly inspired in me a deeper interest in science policy and a better understanding of the important task policy-makers and facilitators have undertaken. I am very grateful to have had this opportunity and wouldn't have traded it for anything



SSB Research Associate Katie Daud attended the Lunar and Planetary Science Conference in The Woodlands, TX. Here she is pictured with a poster she co-authored while working at the National Air and Space Museum.





## SSB Calendar

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April 21-22

SSB Spring 2015 Meeting

Washington, DC

May 11-13

Planetary Protection Meeting of Experts

Washington, DC

## Future Meetings

September 16-17, 2015	Committee on Astrobiology and Planetary Science	Irvine, CA
September 24-25, 2015	Committee on Earth Science and Applications from Space	Washington, DC
October 14-15, 2015	Committee on Solar and Space Physics	Washington, DC
October 27-29, 2015	Committee on Biological and Physical Sciences in Space	Washington, DC
November 3-4, 2015	Studies Board Fall Meeting	Irvine, CA

More information on the SSB and ASEB Board meetings is at

[http://sites.nationalacademies.org/SSB/SSB\\_054577](http://sites.nationalacademies.org/SSB/SSB_054577) (SSB) and

[http://sites.nationalacademies.org/DEPS/ASEB/DEPS\\_058923](http://sites.nationalacademies.org/DEPS/ASEB/DEPS_058923) (ASEB)

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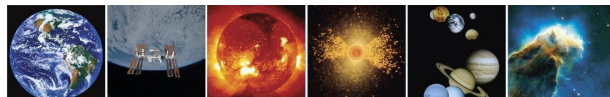


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- ☐ Space Studies Board Annual Report 2014 (2015) **Book and CD**
- ☐ The Space Studies Board 1958-2014: Compilation of Reports (2015) **DVD**
- ☐ Solar and Space Physics: A Science for a Technological Society: An Overview (2014) **Booklet**
- ☐ Pathways to Exploration: Rationales and Approaches for a U.S. Program of Human Space Exploration (2014) **DVD Only**
- ☐ Evaluation of the Implementation of WFIRST/AFTA in the Context of New Worlds, New Horizons in Astronomy and Astrophysics (2014)
- ☐ Review of the Draft 2014 Science Mission Directorate Science Plan (2014)
- ☐ Opportunities for High-Power, High-Frequency Transmitters to Advance Ionospheric/Thermospheric Research: Report of a Workshop (2014)
- ☐ Lessons Learned in Decadal Planning in Space Sciences: Summary of a Workshop (2013) **CD**
- ☐ Landsat and Beyond: Sustaining and Enhancing the Nations Land Imaging Program (2013)
- ☐ Solar and Space Physics: A Science for a Technological Society (2013) **Book and CD**
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- ☐ The Effects of Solar Variability on Earth's Climate: A Workshop Report (2012)
- ☐ Vision an Voyages for Planetary Science (2012) **Booklet**
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- ☐ Earth Science and Applications from Space: A Midterm Assessment of NASA's Implementation of the Decadal Survey (2012) **Book and CD**
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- ☐ Assessment of a Plan for U.S. Participation in Euclid **CD Only**
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