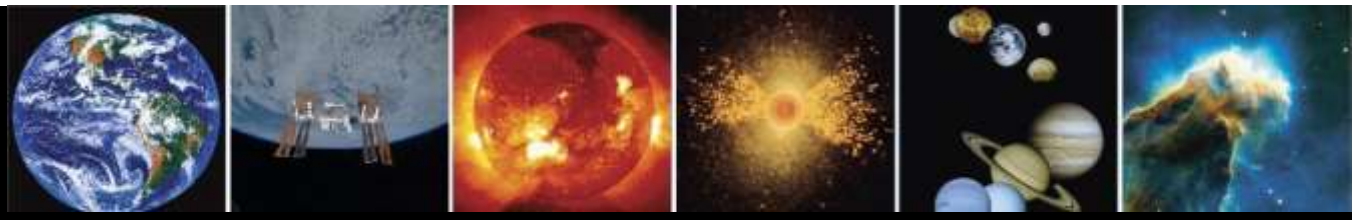
SPACE STUDIES BOARD NEWS



October-December 2015

Inside This Issue

"The recent Laser Interferometer Gravitational Wave Observatory (LIGO) discovery of gravitational waves from a pair of colliding black holes is one of the great scientific breakthroughs of the new millennium."

—SSB Chair David Spergel

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Space Studies Board News

From the Chair

The recent Laser Interferometer Gravitational Wave Observatory (LIGO) discovery of gravitational waves from a pair of colliding black holes is one of the great scientific breakthroughs of the new millennium. By enabling astronomers to hear the universe for the first time, this measurement will open new ways of studying the cosmos. The measurement is an important test of some of general relativity's profound and surprising predictions including the existence of black holes, and the existence of gravitational waves, ideas that even Einstein struggled with in his later works. The discovery of gravitational waves also has significant lessons for space policy.

Space-based gravitational wave astronomy should be an important part of NASA's astronomy portfolio. While ground-based experiments can detect short wavelength gravitational waves, we must go to space to detect long-wavelength gravitational waves. Just like with electromagnetic observations, the environment of space offers unique opportunities to observe part of the electromagnetic spectrum that are inaccessible from the ground. While LIGO can detect gravitational waves produced from the collision of stellar mass black holes, only space-based interferometers can detect the emission from the collision of supermassive black holes. These supermassive black holes are thought to be the engines that power quasars and help drive the evolution of galaxies. The origin and evolution of these supermassive black holes are among the great mysteries of astronomy. The 2010 astronomy decadal survey, *New Worlds New Horizons in Astronomy and Astrophysics* (NWNH) correctly identified gravitational wave astronomy as one of the major discovery areas and ranked LISA, the Laser Interferometry Space Antenna project, as its third priority for large space-based programs, and the second large mission in that list. With NWNH's top space-based priority, WFIRST (Wide Field Infrared Survey Telescope) having just entered phase A, and with LISA pathfinder, a technology demonstration precursor, now in orbit, I believe the time has come to accelerate efforts to build LISA. Since NASA announced that it did not have funding to continue its partnership to build this mission with the European Space Agency, ESA is moving toward deciding to build its version of the mission, eLISA, as its L3 mission with a tentative launch date of 2034. If NASA could revive its program and play a more significant role in the mission, this might both accelerate this launch date and enable a more capable mission.

The heroic saga of the LIGO experiment also holds important lessons for our broader civilian space program. LIGO was a tremendously technically challenging problem: detecting gravitational waves requires that the experiment detect relative motions of two test masses that are separated by four kilometers with an accuracy significantly better than the width of a nucleus. Developing the multiple technologies needed for the mission required 40 years of investment. Its success is a testament not only to the scientists and engineers who built the mission, but to those in the Federal government who provided the resources that enabled the mission to overcome the challenges. After investing nearly a billion dollars in the earlier version of the LIGO experiment that achieved its technical goals but did not detect any astronomical events, the LIGO team and its supporters did not abandon the project. Instead, they persevered. They made the investments and efforts needed to achieve the improved sensitivities. When Advanced LIGO achieves its sensitivity goals, we expect that it will be detecting black hole/black hole, black hole/neutron star and neutron star/neutron star collision daily. Like any scientific experiment that is exploring unchartered territory, Advanced LIGO may also reveal surprises that force us to reshape our understanding of the universe. As we work to build the James Webb Space Telescope, work towards Mars sample return and plan for human exploration of Mars, the success of LIGO is a reminder that while great tasks often require herculean efforts, they also can yield exciting rewards.

David Spergel, SSB Chair

The views expressed here do not necessarily reflect those of the SSB or the National Academies of Sciences, Engineering, and Medicine

SSB MEMBERSHIP

SSB AND NASA NEWS

In December 2015, Marc Allen, former SSB Board Director, retired from NASA as the Deputy Associate Administrator for Research, Science Mission Directorate. Marc was director of the SSB for 7 years (December 1990-December 1997) and then moved to NASA as the Director for Strategic and International Planning before taking on his role as Deputy Associate Administrator. While at NASA, Marc continued to work closely with the SSB, which the SSB staff is very appreciative of. While we will miss working with Marc as a NASA employee, we look forward to seeing him at future SSB functions.

Above: Former SSB director, Joe Alexander (Marc's successor) speaking at his retirement party.

Right: John Grunsfeld, Associate Administrator, NASA/SMD, thanking Marc for his NASA service.

Photos courtesy of Dwayne Day

Space Science Week 2016

Space Science Week will be held March 29-31, 2016 at the NAS Building, 2101 Constitution Avenue, NW, Washington D.C. All 5 standing committees of the SSB will meet in parallel with a plenary session on the afternoon of the first day. More information is available at www.nas.edu/ssw.

SSB ACTIVITIES

THE BOARD AND ITS STANDING COMMITTEES

The **Space Studies Board** (SSB) met in Irvine, CA at the Arnold and Mabel Beckman Center, November 3-5, 2015.

During the first day of the meeting the Board heard reports from the standing committee co-chairs and held a discussion on committee issues and future actions. Standing committee co-chairs in attendance included: Marcia Rieke (CAA), Phil Christensen and J. Greg Ferry (CAPS), Joyce Penner (CESAS), Todd Hoeksema (CSSP), and Rob Ferl (CBPSS). The day continued with an update on COSPAR 2018 (Pasadena, CA) and other COSPAR activities from Gregg Vane (2018 Organizing Committee) and staff member David Smith. The Board then received a status report and had a discussion with John Grunsfeld, the NASA Science Mission Directorate (NASA SMD) Associate Administrator. The day ended with a variety of briefings on topics of interest to the Board. Those briefings included an update on ESSC activities (Athena Coustenis, ESSC Chair); the COSPAR Roadmap on Space Weather (Sarah Gibson, Board member); and the status of the 2016 SSB workshop (Michael Moloney, SSB Director). The briefings also included a discussion of the issues that the ad hoc Committee on NASA Science Mission Extensions will be focusing on with committee co-chair Vicky Hamilton, and the outcome of the recently published *Continuity of NASA Earth Observations from Space: A Value Framework* from ad hoc committee member Randy Friedl.

The second day of the meeting included several focus sessions and a science talk on the Stratocruiser by Board member Jim Anderson. The first focus session on NASA SMD and Education included impressions from the SSB 2014 workshop on education given by workshop planning committee members Phil Christensen and Jim Manning; a summary of the restructuring of SMD Education given by Kristen Erickson, NASA SMD; and a discussion about next steps. The second focus session was on *The Space Science Decadal Surveys: Lessons Learned and Best Practices,* including an overview of the report from Alan Dressler, ad hoc committee chair; a summary of how NASA Astrophysics is preparing for the next astronomy and astrophysics decadal survey given by Paul Hertz, NASA; a personal perspective given by Board member Tony Janetos on how the Earth science decadal survey might incorporate some of the lessons learned from the report and a general discussion amongst the Board and guests. The final focus session was on science and human exploration beyond low Earth Orbit. This session included presentations on the work of the ISECG Science Advisory Group by Greg Schmidt, NASA; science and human exploration of Mars by Richard Zurek, JPL; science and human exploration of the Moon by Clive Neal, LEAG Chair; and science and the human exploration of asteroids by Erik Asphaug, Arizona State University; followed by a discussion.

The spring meeting will be held in Washington, DC, April 26-28, 2016. Visit <www.nas.edu/ssb> to stay up to date on board, workshop, and study committee meetings and developments.

The Committee on Astrobiology and Planetary Science (CAPS) did not meet during this quarter. The next meeting of CAPS will be held in Washington, DC on March 29-31, 2016 during Space Science Week. To learn about upcoming meetings, and download presentations from past meetings, please visit http://sites.nationalacademies.org/SSB/SSB_067577.

The **Committee on Astronomy and Astrophysics (CAA)** did not meet in person this quarter. The next committee meeting will take place during Space Science Week on March 29-31, 2016. In the interim, the CAA may meet periodically via teleconference. For more information about the CAA, and to download presentations from past meetings, please visit http://sites.nationalacademies.org/BPA/BPA_048755.

The **Committee on Biological and Physical Sciences in Space (CBPSS)** met on October 27-29, 2015 in Irvine, California for a meeting organized to explore both near term challenges and opportunities in the microgravity research endeavor, and long term planning for the post-ISS period. At the meeting, CBPSS received a presentation on NASA's SLPSRA Program Status and Issues from Marshall Porterfield who also updated the committee on the status of Genelab and Open Science. David Tomko, NASA, presented on Space Biology planning and Steve Davison, NASA, discussed Human Research planning. Francis Chiaramonte, NASA, briefed CBPSS on Physical Sciences and Nan Yu, JPL, presented on Fundamental Physics planning. The committee also heard briefings from Robyn Gatens regarding Commercial LEO for Research; Warren Bates, CASIS, on Promoting LEO Ecosystem development and Ben Roberts, OSTP for a discussion on Commercial LEO and ISS follow-on Issues. The committee also held a focused panel session on the Potential of Cubesats for Microgravity Research which included a presentation from Tony Ricco, NASA and Wayne Nicholson of the University of Florida. The Panel session included discussions with A.C. Matin, Stanford; John Hines, JH Technology Associates; Sharmila Bhattacharya, NASA Ames; and Andrew Pohorille, NASA. CBPSS

also heard from Jeff Smith, NASA on the potential for biological experiments on the Orion EM-1 Mission. The open sessions concluded with parallel breakout discussion groups focused on needs, challenges, and far term directions. After consideration of the most rapidly developing programs and research areas, the committee added membership expertise in statistics and translational bioinformatics, science of decision making, and fluid dynamics in low gravity.

During this quarter the co-chairs and/or staff participated in conferences such as the American Society for Gravitational and Space Research in Alexandria, VA on November 11-14, 2015 as well as SpaceCom on November 17-19 in Houston, TX. Also during this period the committee has been actively planning its meeting during Space Science Week which will include a one-day symposium on research in commercial LEO. CBPSS is also in discussion with NASA regarding a midterm review of the Decadal Survey.

The next in person meeting will be held March 29-31, 2016 in Washington, DC during Space Week. More information about the committee and its membership can be found at http://sites.nationalacademies.org/SSB/SSB_145312.

The **Committee on Earth Science and Applications from Space (CESAS)** met on December 2-3, 2015 in Washington, DC. Completing updates begun during a September 24-25, 2015 WebEx meeting, the committee heard from Dan St. Jean regarding NOAA NESDIS programs and activities and from Greg Snyder, USGS, who reviewed progress in the 2nd National Assessment for Civil Earth Observations. The committee also held sessions on the recently competed ad hoc study, *Continuity of NASA Earth Observations from Space: A Value Framework (2015).* The committee chair, Byron Tapley, University of Texas, and committee members, Randy Friedl, JPL and Bruce Wielicki, NASA LaRC, briefed the committee on the report, which was followed by roundtable discussion, "Incorporating the Decision Framework in Decadal Survey and Agency." The committee also held a session on guidance for the upcoming Earth science decadal survey based on the 2015 report *The Space Science Decadal Surveys: Lessons Learned and Best Practices (2015)*. This session was led by Stacey Boland, JPL, a member of the study committee as well as a member of the CESAS. Finally, Thomas Zurbuchen, University of Michigan, provided the committee with an update on the ad hoc SSB study he is chairing, Achieving Science Goals with CubeSats. In closed session, the committee reviewed progress in organizing the next decadal survey for Earth science and applications from space.

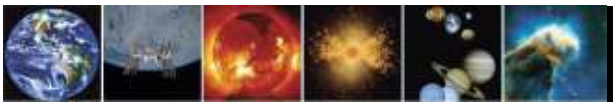
The next CESAS meeting will be during Space Science Week on March 29-31, 2016 in Washington, D.C. For more information about CESAS, to learn about upcoming meetings, and download presentations from past meetings, please visit http://sites.nationalacademies.org/SSB/SSB_066587.

The **Committee on Solar and Space** Physics (CSSP) met October 14-15, 2015 in Washington, DC. At the meeting, CSSP held discussions on decadal survey issues such as the progress of the DRIVE initiative at NASA and NSF and pacing of new Explorer missions. They also held discussions on the status of the space weather action plan implementation, Heliophysics mission management, possibilities for the start of an IMAP-like mission, future studies, and strategies for including solar and space physics in transition information for the incoming presidential administration. The committee heard briefings from Janet Kozyra, NSF, with an update from NSF Geospace; Ralph Stoffler with Air Force Perspectives on Space Weather; Tom Berger, NOAA, with an update on SWPC and DSCOVR; William Lotko on the NSF Geospace Portfolio Review; Todd Hoeksema on the Grants Success Rate study; Jim Ulvestad, NSF, on DKIST and Arecibo; and from NASA's Living With a Star Planning. CSSP also heard an Update on Achieving Science Goals with CubeSats Study from its chair, Thomas Zurbuchen. The committee also met via teleconference on November 24, 2015, to discuss current events.

The committee's Spring meeting will be held during Space Science Week on March 29-31, 2016 at the NAS building in Washington, D.C.. Further information about the committee are available at http://sites.nationalacademies.org/SSB/SSB_052324.

STUDY COMMITTEES

The **Committee on Achieving Science Goals with CubeSats** had its third committee meeting in closed session on October 22-23, 2015, in Washington, DC, followed by a policy-focused meeting on October 30, 2015, in Washington, DC. The meeting opened with perspectives on CubeSat policy issues from Thomas Kalil, OSTP. The committee then held a panel discussion regarding orbital debris and space situational awareness, with participation from Josef Koller, DOD; J.-C. Liou, NASA; Lt. Col. Scott Putnam, JSpOC; Michael Romanowski, FAA; Dan Oltrogge, AGI; and Brian Weeden, Secure World Foundation. In the afternoon, the committee held a panel discussion on spectrum, with participation from Kathryn Medley, FCC; Jonathan Williams, NTIA; Brennan Price, ARRL; William Horne, NASA; and Therese Moretto Jorgensen, NSF. The final discussion of the day regarded ITAR current issues presented by Kevin Schmadel and Martin Ruzek, USRA. The committee is



(Continued from page 5)
currently writing its draft report. More information about this project is available at: http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_160539.

The Space Studies Board solicited nominations for membership on the **Committee on the Assessment of the National Science Foundation's 2015 Geospace Portfolio Review**, and the slate of nominees has been put before the leadership of the National Academy of Sciences for approval. More information about this project is available at: http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_169109.

The edited and final version of the report *Continuity of NASA Earth Observations from Space: A Value Framework* was published in November 2015. The report identifies key evaluation factors and puts forward a decision-making framework that quantifies the need for measurement continuity and the consequences of measurement gaps for achieving long-term science goals. Following publication, Byron Tapley, University of Texas and committee chair, briefed the report to NASA, NOAA, CESAS, and the Space Studies Board. The report may be read online or downloaded at: http://www.nap.edu/catalog/21789/continuity-of-nasa-earth-observations-from-space-a-value-framework.

The **2017-2027 Decadal Survey for Earth Science and Applications from Space (ESAS 2017)** is underway. Sponsored by NASA, NOAA, and the USGS, the survey will produce a report by July 31, 2017 that will:

- Assess progress in addressing the major scientific and application challenges outlined in the 2007 survey;
- Develop a prioritized list of top-level science and application objectives to guide space-based Earth observations over the survey interval;
- Identify gaps and opportunities in the programs of record at NASA, NOAA, and USGS in pursuit of the top-level science and application challenges—including space-based opportunities that provide both sustained and experimental observations; and
- Recommend—considering science priorities, implementation costs, new technologies and platforms, interagency partnerships, international partners, and in situ and other complementary programs—approaches to facilitate the development of a robust, resilient, and appropriately balanced U.S. program of Earth observations from space.

Like the 2007 inaugural decadal survey (http://www.nap.edu/openbook.php?record_id=11820), ESAS 2017 will help shape science priorities and guide agency investments into the next decade. Detailed information about the survey and a calendar of upcoming events is available at a newly created survey website: www.nas.edu/esas2017. Notable events in the past quarter included appointment of the Survey Steering Committee, receipt of over 200 responses to the survey's Request for Information (RFI), the organization of a Town Hall on December 14, 2015 at the Fall Meeting of the American Geophysical Union, the organization of the first meeting of the steering committee on January 18-20, 2016 in Washington DC, organization of a Town Hall on January 13, 2016 at the 96th annual meeting of the American Meteorological Society, and preparation for a town hall at the AGU Ocean Sciences meeting in February 2016. The survey will be supported by several study panels and working groups; in total some 100 members of the community are expected to participate on one or more of the survey's committees. For further information, please visit the survey website; for questions not answered on the site, please write to esas2017@nas.edu.

The **Committee for the Review of the Mars Exploration Program Analysis Group (MEPAG) Report on Planetary Protection for Mars Special Regions,** an ad hoc activity of the Academies and the European Science Foundation has completed its work and was dissolved at the end of December, 2015. The final, printed version of the committee's report, *Review of the MEPAG Report on Mars Special Regions*, was released in late-December 2015. A modified version of the committee's final report has been submitted for publication in *Astrobiology*. Additional details can be found at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_153480.

The **Committee on NASA Science Mission Extensions** was named in October and held a committee-only teleconference in December. The committee is co-chaired by Vicky Hamilton and Harvey Tananbaum. The committee's first in-person meeting is scheduled for February 1-2, 2016 at the Keck Center in Washington DC and the second meeting is scheduled for March 2-4, 2016 at the Beckman Center in Irvine. The committee will be looking at the process by which NASA conducts science mission extensions. Its report is tentatively scheduled for delivery to NASA in late summer 2016. More information about this project can be found at: http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_169078.

The **Review of NASA's Planetary Science Division's Restructured Research and Analysis Programs** was formally initiated toward the end of this quarter. Recruitment on committee members will commence in the New Year and a report is scheduled to be delivered to NASA by December 2016. Additional information about this project can be found at http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_169563.

The **Committee to Review of Progress Toward the Decadal Survey Vision in New Worlds, New Horizons in Astronomy and Astrophysics**, chaired by Jacqueline Hewitt, held their first meeting on October 8-10, 2015, in Washington, D.C. The committee heard from NASA Astrophysics Division (APD), NSF Division of Astronomical Sciences (AST), DOE High Energy Physics (HEP), Office of Science and Technology Policy, Japan Aerospace Exploration Agency, European Space Agency, and project teams from or representatives of the Wide-Field Infrared Survey Telescope, Mid-Scale Innovations Program, U.S. Laser Interferometer Space Antenna Project, and U.S. Athena. The committee held a science

(Study Committees continued from page 6)

symposium during its second meeting on December 12-14, 2015 at the Beckman Center in Irvine, CA. The committee heard an opening keynote address from Roger Blandford, who chaired the 2010 astronomy and astrophysics decadal survey. The symposium continued with a series of speakers and panel discussions. The sessions assessed what progress had been made on the high-priority science questions and discovery areas identified in the New Worlds, New Horizons report. This symposium was webcast and is posted to the Academies Vimeo page: https://vimeo.com/album/3742483. During the second day of the meeting the committee heard talks from the Large Synoptic Survey Telescope, Thirty Meter Telescope, Giant Magellan Telescope, the Cherenkov Telescope Array, as well as presentations from the European Consortium's eLISA mission and a community leader in exoplanet technology for direct imaging space-based missions. The committee has also held bi-weekly teleconferences, hearing from Daniel Eisenstein, Harvard University, on the Dark Energy Spectroscopic Instrument, Debra Elmegreen, Vassar College, on the Optical and Infrared Astronomy Report, Randall Smith, Smithsonian Astrophysical Observatory, on IXO-Athena-preparations, Amber Miller, Columbia University, on Cosmic Microwave Background polarization, Eric Smith, NASA, on the James Webb Space Telescope, and Terry Herter and Riccardo Giovanelli, Cornell University, on the Cornell Caltech Atacama Telescope. The committee also held a splinter session at the American Astronomical Society meeting on January 5, 2016 to gather community input. The committee's third meeting was held on January 11-13, 2016, in Washington, D.C. The committee spoke with NASA APD, NSF AST, and DOE HEP at this meeting, and spent most of the meeting in closed session. The fourth meeting, held February 26-27, allowed the committee to have a final discussion with NASA, NSF, and DOE and to work in closed session on the report. For more information on the project please visit: http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_161177.

The Committee on Survey of Surveys: Lessons Learned from the Decadal Survey Process has completed its task and was dissolved at the end of October 2015. The final, printed version of its report**,** *The Space Science Decadal Surveys: Lessons Learned and Best Practices,* was released in late-October (2015). For more information, and a free PDF of the report, please visit http://sites.nationalacademies.org/SSB/CompletedProjects/SSB_088262.

OTHER ACTIVITIES

The **Forum for New Leaders in Space Science,** a cooperative activity between the Academies and the Chinese Academy of Sciences (CAS) 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, held the first meeting of its second cohort of young scientists at the headquarters of the Shanghai branch of the Chinese Academy of Sciences on October 9-10, 2015 *(photo below, courtesy of the Chinese Academy of Science*). The second session will be held at the Academies' Beckman Center in Irvine, California on May 16-17, 2016. The scientific focus of both meetings is planetary science and Earth science from space. Additional details can be found at http://sites.nationalacademies.org/SSB/SSB_086017.

COSPAR held the second of its new series of "off-year" symposia, at Foz do Iguacu, Brazil, on November 9-13. The SSB, in its capacity as the US National Committee for COSPAR, continues to follow closely the arrangements for COSPAR's 41st and 42nd Scientific Assemblies, to be held in Istanbul, Turkey, on July 30 -7 August, 2016, and Pasadena, California on 14-22 July, 2018, respectively. The next milestone in the planning for the latter is the site visit to Pasadena by COSPAR's leadership scheduled for January 25-26, 2016. The next round of COSPAR business meetings will be held at the organization's Paris headquarters on March 22-24, 2016.

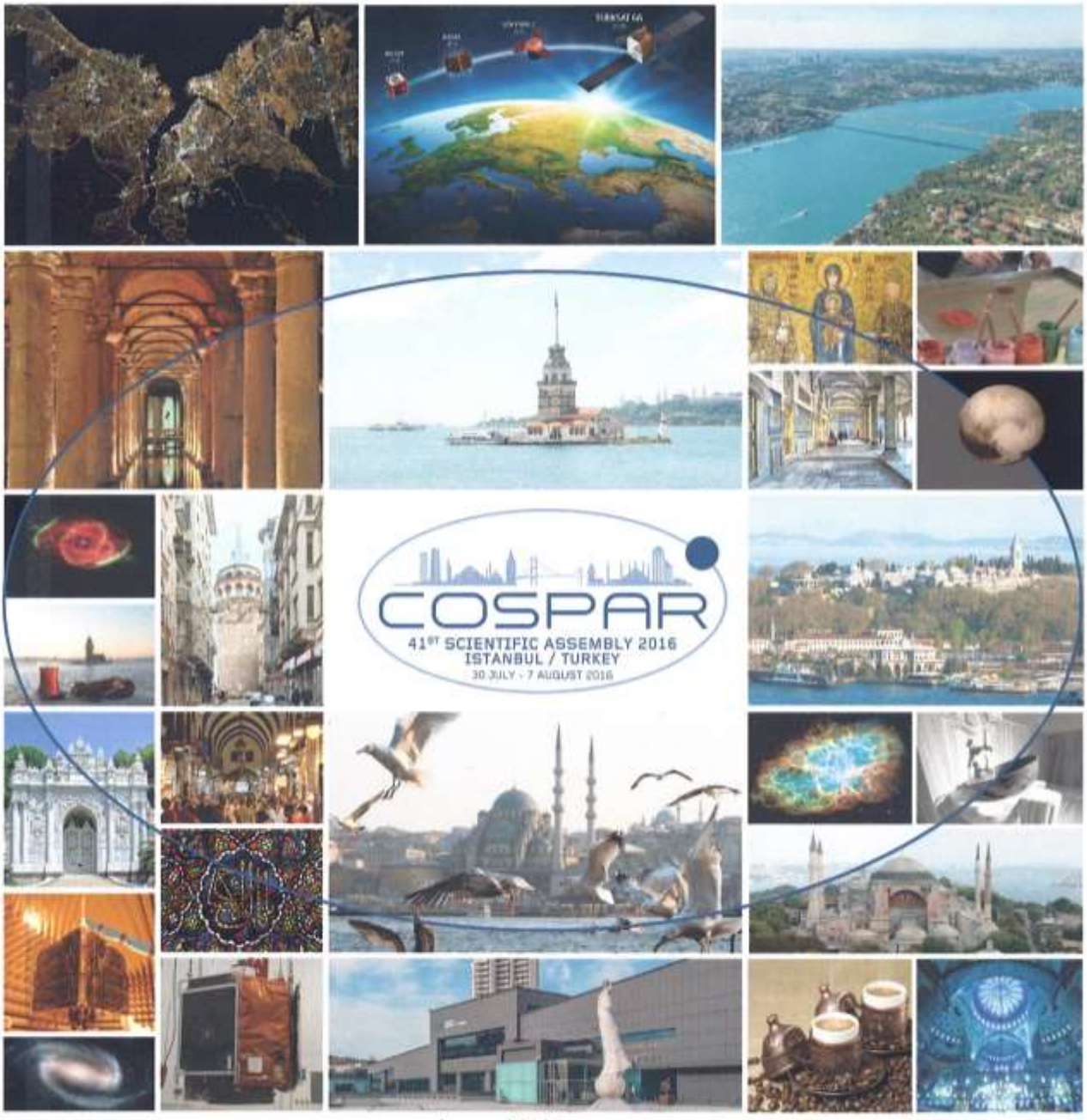
CONGRESSIONAL TESTIMONY

From L-R: Dr. Scott Pace, Dr. Walter Scott, Mr. Robbi Schingler, Dr. Samuel Goward, and Dr. Anthony Busalacchi. *Photo courtesy of the Committee on Sci-*

On November 17, 2015, the Subcommittee on Space and the Subcommittee on Environment held a hearing on Exploring Commercial Opportunities to Maximize Earth Science Investments. Several people testified, including Dr. Anthony Busalacchi (University of Maryland and co-chair of the National Academies of Sciences, Engineering, and Medicine Decadal Survey for Earth Science and Applications from Space), Dr. Scott Pace (George Washington University), Dr. Walter Scott (DigitalGlobe), Mr. Robbi Schingler (PlanetLabs), and Dr. Samuel Goward (University of Maryland).

All of the testimonies and a video of the hearing are available here https://science.house.gov/legislation/hearings/subcommittee-space-and-subcommittee-environment-hearing-

THE COMMITTEE ON SPACE RESEARCH
LOOKS FORWARD TO HOSTING YOU
IN ISTANBUL - TURKEY
AT ITS 41st SCIENTIFIC ASSEMBLY, 30 JULY - 7 AUGUST 2016



Assembly Venue
Istanbul Congress Center (ICC)

Abstract Submission Deadline
12 February 2016
Scientific Program/Abstract Submission
https://www.cospar-assembly.org

Early Registration Deadline
31 May 2016
Website of the Local Organizers
http://cospar2016.tubitak.gov.tr/

TÜBİTAK
TÜBİTAK UZAY

Staff News

Thomas Katucki completed his term as a Lloyd V. Berkner Space intern in November 2015. His reflections on his experience with the SSB is below.

The Lloyd V. Berkner Space Policy Internship at the Space Studies Board was an incredibly rewarding experience. What first captivated me was the breadth of knowledge and resources that were available throughout the SSB and the National Academies of Sciences, Engineering, and Medicine. I attended numerous meetings, conversed with countless speakers, and oversaw committees working on the future of space policy and space science for the years to come. I had never thought I would be as involved as I was during my internship; I performed tasks ranging from creating materials used at meetings I attended to researching information used in reports. I felt fully involved at the intersection between space, politics, and policy during my time as an intern.

The time I spent at the Space Studies Board showed me how important it is to possess a multitude of cross-disciplinary skills. While working on reports and during committees I saw the necessity of seeing and solving problems with a diverse set of tools. Committees heard from speakers representing science, corporations, government, and other entities; calling upon these different influences is what gives the Academies such a defining role in writing and influencing future space policy.

I am incredibly thankful for the time I spent here during the fall semester; not only did this internship reaffirm my interest in space but is also showed me how space policy (as well as science and politics) operate in the real world. I would like to thank everyone at the National Academies for making this an absolutely amazing experience.

SSB STANDING COMMITTEES

Committee on Astrobiology and Planetary Science (CAPS)

Philip R. Christensen, Arizona State University (Co-Chair)
J. Gregory Ferry, Pennsylvania State University (Co-Chair) *through January 2016*
Christopher H. House (Co-Chair) *from March 2016*

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

Marcia Rieke, University of Arizona (Co-Chair)
Steven Ritz, University of California, Santa Cruz (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)

Joyce E. Penner, University of Michigan (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>.

SSB Staff

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ABIGAIL SHEFFER
Program Officer

KATIE DAUD
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DIONNA WILLIAMS
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MEG KNEMEYER
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Manager, Program Operations

SANDRA WILSON
Senior Financial Assistant

THOMAS KATUCKI
Lloyd V. Berkner Space Policy Intern

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

SSB Calendar

January

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April

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January 11-13, 2016	Review of Progress Toward the Decadal Survey Vision in New Worlds, New Horizons in Astronomy and Astrophysics	Washington, DC
January 18-20, 2016	Committee on Earth Science and Applications from Space—Steering Committee	Washington, DC
February 1-2, 2016	Committee on NASA Science Mission Extensions	Washington, DC
February 26-27, 2016	Review of Progress Toward the Decadal Survey Vision in New Worlds, New Horizons in Astronomy and Astrophysics	Washington, DC
March 2-4, 2016	Committee on NASA Science Mission Extensions	Irvine, CA
March 29-31, 2016	Space Science Week Committee on Astrobiology and Planetary Science (CAPS) Committee on Astronomy and Astrophysics (CAA) Committee on Biological and Physical Science in Space (CBPSS) Committee on Earth Studies and Applications in Space (CESAS) Committee on Solar and Space Physics (CSSP)	Washington, DC
April 26-28, 2016	Space Studies Board Meeting	Washington, DC

More information on the SSB and ASEB Board meetings can be found at <http://sites.nationalacademies.org/SSB/SSB_054577 > (SSB) and <http://sites.nationalacademies.org/DEPS/ASEB/DEPS_058923> (ASEB)

Our meeting facilities

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