



July 21, 2014

Dear Colleagues,

Welcome to the 2014 Exploration Science Forum sponsored by NASA's Solar System Exploration Research Virtual Institute (SSERVI). The forum will begin by honoring our 2014 Shoemaker Award recipient, and award winners in two new categories for distinction among the exploration science community. The institute has established the Michael J. Wargo Award for excellence in joining together exploration and scientific endeavors, and the Susan Mahan Neibur Award to recognize significant achievement and promise in early career researchers. Recognizing the premature and deep loss to our communities and their families, we have named these awards after our esteemed, departed colleagues for their outstanding work. We are pleased to have Ms. Adele Morrissette with us to tell us more about her wonderful husband of many years, Mike Wargo.

The past several years have witnessed a renaissance in lunar science, demonstrated by several major lunar missions, the establishment of the NASA Lunar Science Institute (NLSI), and a growing and energized community of young scientists. NASA's desire to expand the NLSI to include studies of near Earth asteroids and the moons of Mars resulted in the creation of SSERVI in 2013. The selection of nine new teams has launched a robust, highly collaborative institute dedicated to exploration science. SSERVI is jointly supported by NASA's Science Mission Directorate and Human Exploration and Operations Mission Directorate, and we are pleased to have representatives from both with us at this conference. The Exploration Science Forum endeavors to join the lunar community with the small bodies community to share discoveries and understanding of our Moon, our neighbors, and our history. With the successes of DAWN and NEOWISE, the promise of OSIRIS-Rex scheduled for launch in 2016 and the future Resource Prospector Mission, we eagerly look forward to the future of exploration.

The ESF 2014 program was developed by an outstanding scientific organizing committee (SOC), led by Dana Hurley and Nancy Chabot, both of Johns Hopkins University Applied Physics Laboratory. The significant increase in the number of abstracts submitted this year meant the SOC had a lot of work to do, and many excellent talks from which to select. Our technical committee, led by SSERVI's Deputy Director, Greg Schmidt, devised a number of new approaches to maximize the effectiveness of the talks and poster sessions. The local organizing committee, led by SSERVI Chief of Staff Shirley Berthold, paid careful attention to all aspects related to your comfort and wellbeing. It is our desire that new knowledge, deeper understanding and old friends find you over the course of the 2014 Exploration Science Forum. Welcome.

Yvonne Pendleton

Director, NASA Solar System Exploration Research Virtual Institute (SSERVI)

# NEW IN 2014

## *What's New in 2014?*

SSSERVI has endeavored to use new technologies to make your experience of the Exploration Science Forum an even better one this year.

**POSTERS** Each poster this year will be accompanied by a QR code as shown in photo at right. Simply scan this code with your mobile device to take you to a unique web page created for each poster. At the option of the author, additional material will be available on this page to enhance the poster (for example, videos and other resources) which you can view on your tablet or smartphone. A brief video is required for all student posters, and we particularly encourage you to view these.

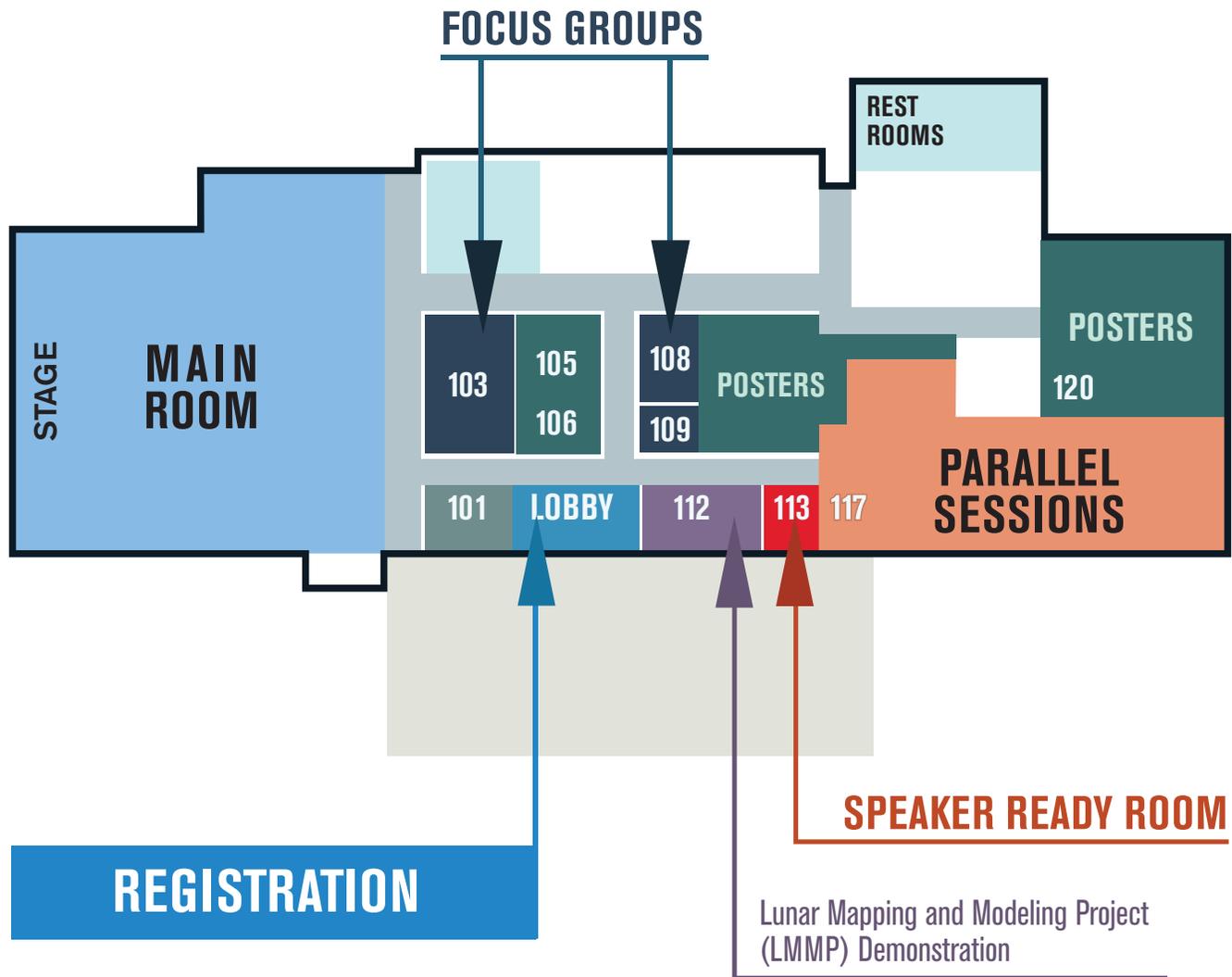
**REGISTRATION** You will note iPad minis at the registration desk this year. These will streamline early morning check-in for participants. iPads will also enable remote participation with our Double Telepresence Robots.

**FOR ORAL PRESENTERS** You will have two options to advance your slides – either the standard device (with improved reception over the 2012 Forum), or an iPad mini. The iPad mini allows you to see your current slide while on stage, and to advance your slide with a simple right to left swipe.

**ROBOTS FOR REMOTE ATTENDEES** SSSSERVI now has two small, low-cost robots made by Double Robotics, a local Sunnyvale company. These robots are controlled remotely and simply via an iPhone, iPad or the Chrome browser on your computer. They work like a mobile version of FaceTime, allowing the user to drive around with a live audio and video feed. Additionally, the robot's height can be raised or lowered to simulate the remote user standing or sitting at a table. We encourage you to interact with those attending this year's Forum in this new way.

We will be giving you evaluations towards the end of the Forum, and we encourage you to share your opinions of how these technologies worked for you, and to suggest improvements for the future.





# *Building 152*

200 Dailey Road, NASA Research Park, Moffett Field

# EARLY REGISTRATION

Sunday, July 20, 2014

5-7:30pm Early Registration and Reception

SSERVI Building 17

## AGENDA DAY 1

Monday, July 21, 2014

TIME	EVENT	LOCATION
7:00	Poster Setup Begins	Building 152
7:30	Student Lightning Round presenters: Breakfast with SSERVI Director	Building 152
8-8:30	REGISTRATION	Building 152
8:30	PLENARY SESSION Ia: Mission Updates <b>Chair: Yvonne Pendleton</b>	Building 152 MAIN ROOM
8:30	<b>Welcome Speakers: Pete Worden, Jim Green, Victoria Friedensen and Yvonne Pendleton</b>	Building 152 MAIN ROOM
8:45	<b>SSERVI Honors and Invited Lectures: Shoemaker Award, Wargo Award and Neibur Awards</b>	Building 152 MAIN ROOM
10:05	<b>John Keller</b> The Lunar Reconnaissance Orbiter – Highlights and Looking Forward (Invited)	Building 152 MAIN ROOM
10:25	<b>Christopher Russell</b> The Smallest Terrestrial Planet Seen in the Light of Dawn (Invited)	Building 152 MAIN ROOM
10:45	BREAK	
10:55	<b>Rick Elphic</b> Barnstorming the Moon: Adventures of the Lunar Atmosphere and Dust Environment Explorer (Invited)	Building 152 MAIN ROOM
11:15	<b>Jasper Halekas</b> The Latest From ARTEMIS (Invited)	Building 152 MAIN ROOM
11:35	<b>Scott Sandford</b> An Overview of the OSIRIS-REX Asteroid Sample Return Mission (Invited)	Building 152 MAIN ROOM
11:55	LUNCH and POSTER VIEWING, <b>FOCUS GROUP MEETINGS 12:20-1:30</b> (See page 11)	
1:30	PLENARY SESSION Ib: Mission Updates Continued <b>Chair: Brad Bailey</b>	Building 152 MAIN ROOM
1:30	<b>Maria Zuber</b> The Interior Structure of the Moon from the Gravity Recovery and Interior Laboratory Mission (Invited)	Building 152 MAIN ROOM
1:50	<b>Amy Mainzer</b> Exploring the Near-Earth Objects with NEOWISE (Invited)	Building 152 MAIN ROOM
2:10	PLENARY SESSION II: Asteroid Populations and Geophysics <b>Chair: Brad Bailey</b>	Building 152 MAIN ROOM
2:10	<b>William Bottke</b> Overview Talk Parallel Session #1 - GEOPHYSICS Moon-Forming Impact Ejecta as the Source of the Earliest Lunar Bombardment	Building 152 MAIN ROOM
2:30	<b>Lance Benner</b> Overview Talk Parallel Session #2 - ASTEROID POPULATIONS Radar Reconnaissance of Near-Earth Asteroids	Building 152 MAIN ROOM
2:50	Lightning Round #1: Student Poster Previews	Building 152 MAIN ROOM
3:00	Transition to Parallel Session Rooms	

# AGENDA DAY 1

Monday, July 21, 2014

	PARALLEL SESSION #1 GEOPHYSICS <b>Chairs: William Bottke, Paul Hayne</b> Building 152 MAIN ROOM	PARALLEL SESSION #2 ASTEROID POPULATIONS <b>Chairs: Michael Busch, Amy Mainzer</b> Building 152 ROOM 117
3:10	<b>Billy Quarles</b> Theia's Provenance: Dynamical Evolution of a Late Impactor	<b>Michael Busch</b> Radar and Near-Earth Asteroid Exploration Missions
3:25	<b>Julien Salmon</b> Accretion of the Moon from Disk Produced by Non-Canonical Impacts	<b>Carolyn Nugent</b> Exploring Asteroid Surfaces: Thermophysical Modeling with NEOWISE Observations
3:40	<b>Jean Pierre Williams</b> Global Surface Temperatures of the Moon	<b>Humberto Campins</b> Water and Organic Molecules on Asteroids and on Earth
3:55	<b>Paul Hayne</b> Thermal Inertia of the Moon from Diviner Lunar Radiometer Measurements	<b>Martin Connors</b> The Temporal Variation of the Rate of Interplanetary Field Enhancements Seen in Association with Asteroids 2201 Oljato at Venus and 138175 at Earth
4:10	<b>Nathan Williams</b> Fault Dislocation Modeling of Tectonic Landforms in Mare Frigoris	<b>Hairong Lai</b> You Know Where the Parent Body is but Where are the Co-Orbitals?
4:25	<b>Simone Dell'Agnello</b> Next-Generation Laser Retroreflectors for Solar System Exploration, Geodesy and Gravitational Physics	<b>Hong-Kyu Moon</b> The DEEP-SOUTH: Round-the-clock Physical Characterization of NEOs in the Southern Hemisphere
4:45	<b>PLENARY SESSION III: NASA Town Hall</b> <b>Chair: Yvonne Pendleton</b>	
		Building 152 MAIN ROOM
5:30	<b>POSTER SESSION</b>	
		Building 152

# AGENDA DAY 2

Tuesday, July 22, 2014

TIME	EVENT	LOCATION
8-8:30	REGISTRATION	Building 152
8:30	PLENARY SESSION IV: Volatiles and Geology <b>Chair: Greg Schmidt</b>	Building 152 MAIN ROOM
8:30	<b>Joseph Lazio</b> Overview Talk - Fifty Years of Exploration Science with the Deep Space Network (Invited)	Building 152 MAIN ROOM
8:50	<b>Brent Garry</b> Overview Talk Parallel Session #3 - GEOLOGY The Formation of Pits in Volcanic Environments: Analogs and Lessons for Future Planetary Exploration	Building 152 MAIN ROOM
9:10	<b>Nancy Chabot</b> Overview Talk Parallel Session #4 - VOLATILES Inner Solar System Volatiles: Insights from Images of Mercury's Polar Deposits	Building 152 MAIN ROOM
9:30	LIGHTNING ROUND #2: Student Poster Previews	Building 152 MAIN ROOM
9:40	Transition to Parallel Session Rooms	
	<b>PARALLEL SESSION #3 GEOLOGY</b> <b>Chairs: Sarah Braden, Barbara Cohen</b> Building 152 MAIN ROOM	<b>PARALLEL SESSION #4 VOLATILES</b> <b>Chairs: Timothy A. Livengood, Matt Siegler</b> Building 152 ROOM 117
9:50	<b>M. Elise Rumpf</b> Thicknesses of Lunar Lava Flows: Comparison of Layered Mare Units with Terrestrial Analogs	<b>Richard Miller</b> New Insights into the Polar Depth Distribution of Hydrogen at the Lunar Poles
10:05	<b>Lauren Jozwiak</b> Lunar Floor-fractured Craters: Constraining the Timing of Intrusion Formation within the Lunar Volcanic History	<b>Matt Siegler</b> Evolution of Lunar Ice Stability
10:20	<b>Jennifer Whitten</b> Lunar cryptomaria: The Distribution and Composition of Ancient Volcanic Deposits on the Moon	<b>David Glenar</b> Influence of Faint Light Sources on the Moon's Permanently Shadowed Regions
10:35	<b>Abigail Fraeman</b> Compositions of Phobos and Deimos: The View from Visible to Near Infrared Spectroscopy	<b>Wes Patterson</b> Mini-RF Bistatic Observations of Cabeus Crater
10:50	<b>Benjamin Greenhagen</b> Compositional Ground Truth for the Diviner Lunar Radiometer: Comparing Apollo Sites and Soils	<b>Timothy A. Livengood</b> Evidence for Diurnally Varying Hydration at the Moon's Equator from the Lunar Exploration Neutron Detector (LEND)
11:05	<b>Daniel Moriarty</b> The Diverse Local and Regional Stratigraphy of the South Pole – Aitken Basin	<b>Michael Zimmerman</b> Simulations of the Thermal and Plasma Environment within Lunar Pits and Lava Tubes: Could Cryogenic Regions Trap Ions from the Solar Wind?
11:20	<b>Noah Petro</b> Sampling Impact Melt from the South Pole-Aitken Basin and SPA Pre-Nectarian Basins	<b>Katharine Robinson</b> Varied H Concentration and Isotopic Composition in the Lunar Interior
11:35	<b>J.R. Skok</b> Mojave Volatiles Prospector – Water in the Mojave Desert as an Analog to the Lunar Poles	<b>Jim Head</b> Lunar Regional Pyroclastic Deposits: Evidence for Eruption from Dikes Emplaced into the Near-Surface Crust
11:50	<b>Emily Law</b> The Lunar Mapping and Modeling Portal: Tools for Mission Planning, Science, and Outreach	<b>Shuai Li</b> Quantitative Mapping of Hydration in Lunar Pyroclastic Deposits and Implications for Lunar Volcanic Processes
12:05	LUNCH and POSTER VIEWING, <b>FOCUS GROUP MEETINGS 12:20-1:30</b> (See page 11)	

# AGENDA DAY 2

Tuesday, July 22, 2014

TIME	EVENT	LOCATION
1:30	PLENARY SESSION V: Exospheres, Outreach and Geochemistry <b>Chair: Doris Daou</b>	Building 152 MAIN ROOM
1:30	<b>Mehdi Benna</b> Overview Talk Parallel Session #5 - EXOSPHERES Variability of Helium, Neon and Argon in the Lunar Exosphere as Observed by the LADEE NMS Instrument	Building 152 MAIN ROOM
1:50	<b>Patrick Peplowski</b> Overview Talk Parallel Session #6 - GEOCHEMISTRY Abundances of H and Major-elements on Asteroid 433 Eros: Revisiting the In-situ Measurements of the NEAR Gamma-Ray Spectrometer	Building 152 MAIN ROOM
2:10	<b>Linda Billings</b> Overview Talk - Communication Challenges Facing NASA's Near-Earth Object Program and the International Asteroid Warning Network	Building 152 MAIN ROOM
2:30	LIGHTNING ROUND #3: Student Poster Previews	Building 152 MAIN ROOM
2:40	Transition to Parallel Session Rooms	
	<p>PARALLEL SESSION #5 EXOSPHERES + OUTREACH <b>Chairs: Rick Elphic, Kurt Retherford</b> Building 152 MAIN ROOM</p>	<p>PARALLEL SESSION #6 GEOCHEMISTRY + OUTREACH <b>Chairs: Karl Hibbitts, Derek Sears</b> Building 152 ROOM 117</p>
2:50	<b>Michele Cadieux</b> Crowd Sourcing, Social Media and Citizen Science	<b>Kyeong Kim</b> Introduction to Elemental Distribution of Si and Other Major Elements on the Lunar Surface Observed by Kaguya GRS
3:05	<b>Anthony Colaprete</b> Initial Results from the LADEE Ultraviolet-Visible Spectrometer	<b>Maurizio Pajola</b> Is Phobos Capture Origin a Priori Excluded From its Low Bulk Density?
3:20	<b>Dana Hurley</b> Propagation of Water in the Chang'e-3 Exhaust Plume from LADEE Observations	<b>Karl Hibbitts</b> Relevance of UV Reflectance Spectroscopy to Inferring the Compositions of the Moon and Asteroids
3:35	<b>Andrew Poppe</b> LADEE/LDEX Observations of Pick-up Ion Variability in the Lunar Exosphere	<b>Darby Dyar</b> Valence State Measurements of Minerals Using X-ray Absorption Spectroscopy
3:50	<b>Kurt Retherford</b> Lunar Volatile Transport in the Exosphere and from Impact Plumes: LRO/LAMP Observing Campaigns Coordinated with LADEE	<b>Aron Coraor</b> Simulating Surface Materials: Preparation for the Exploration of Airless Bodies
4:05	<b>Menelaos Sarantos</b> The Na and K Content of the Moon's Exosphere is Limited by the Impact Vaporization Rate	<b>Martin Schoonen</b> Reactive Oxygen Species Generation by Lunar Simulants
4:20	<b>Tim Stubbs</b> The Effects of Meteoroid Streams on the Lunar Environment: Observations from the LADEE Mission	<b>Alexandra Matiella Novak</b> Lessons Learned on Professional Development for Future Teachers: The Solar System Exploration Pre-service Teacher Institute
4:35	Transition to Parallel Session Rooms	
4:45	LEAG/SBAG Town Hall Meeting <b>Chair: Greg Schmidt</b>	Building 152 MAIN ROOM
5:30	POSTER SESSION	Building 152

# AGENDA DAY 3

Wednesday, July 23, 2014

TIME	EVENT	LOCATION
8-8:30	REGISTRATION	Building 152
8:30	PLENARY SESSION VI: Human Exploration Drivers, Regolith and Dust <b>Chair: Greg Schmidt</b>	Building 152 MAIN ROOM
8:30	<b>Anthony Colaprete</b> Resource Prospector: A Lunar Volatiles Prospecting and ISRU Demonstration Mission (Invited)	Building 152 MAIN ROOM
8:50	<b>Michele Gates</b> Asteroid Redirect Mission (ARM) (Invited)	Building 152 MAIN ROOM
9:10	<b>Paul Spudis</b> Overview Talk Parallel Session #7 - Human Destination Drivers The Moon as an Enabling Asset for Spaceflight	Building 152 MAIN ROOM
9:30	<b>Daniel Britt</b> Overview Talk Parallel Session #8 - Regolith & Dust Forward Modeling Space Weathering	Building 152 MAIN ROOM
9:50	Transition to Parallel Session Rooms	
	<p>PARALLEL SESSION #7 HUMAN EXPLORATION AND DESTINATION DRIVERS <b>Chairs: Samuel Lawrence, Clive Neal</b> Building 152 MAIN ROOM</p>	<p>PARALLEL SESSION #8 REGOLITH &amp; DUST <b>Chairs: Brett Denevi, Amanda Hendrix</b> Building 152 ROOM 117</p>
10:00	<b>Mark Robinson</b> Discoveries from the Lunar Reconnaissance Orbiter and Future Human Exploration of the Moon	<b>Amanda Hendrix</b> Regional Variations in FUV Lunar Signatures
10:15	<b>Ben Bussey</b> New Analyses of the Moon's North Polar Illumination Conditions	<b>Tristram Warren</b> The Oxford Space Environment Goniometer
10:30	<b>David Kring</b> Implementing the GER: Human-assisted Lunar Sample Return from the Schrödinger and South Pole-Aitken Basins Using the Orion Spacecraft	<b>John Cooper</b> Space Weathering Investigations Enabled by Virtual Energetic Particle Observatory and the Space Physics Data Facility
10:45	<b>Jacob Bleacher</b> Geologist Crew Assignments During Delayed Communication Human Exploration of Solar System Surfaces	<b>Patrick Gasda</b> Laser Space Weathering of Carbon: What Can We Expect from NEO Sample Return?
11:00	<b>Jack Burns</b> Teleoperation of Rovers on Planetary Surfaces	<b>Charles El Mir</b> Origin and Evolution of Regolith on Airless Bodies: The Role of Thermal Fatigue
11:15	<b>Lilian Ostrach</b> Characterization of Smooth Deposits Within South-Pole Aitken Basin: The Search for Impact Melt Deposits	<b>Brett Denevi</b> Global Variability in Regolith Properties on Vesta
11:30	<b>Clive Neal</b> Using the Moon to Go to Mars: Why Lunar Exploration Should Not be Ignored	<b>Kris Zacny</b> PlanetVac: Pneumatic Sample Acquisition and Delivery System for Asteroids
11:45	<b>Young-Jun Choi</b> Scientific Aspects for Korean Lunar Exploration	<b>Lawrence Taylor</b> Understanding Lunar Soils: An Apollo Perspective
12:00-1:30	LUNCH / POSTER VIEWING	

# AGENDA DAY 3

Wednesday, July 23, 2014

	<p>PARALLEL SESSION #7 (Continued)            HUMAN EXPLORATION AND DESTINATION DRIVERS  <b>Chairs: William Farrell, Darlene Lim</b>            Building 152 MAIN ROOM</p>	<p>PARALLEL SESSION #8 (Continued)            REGOLITH &amp; DUST  <b>Chairs: Daniel Britt, Tobin Munsat</b>            Building 152 ROOM 117</p>
1:30	<b>Brent Barbee</b> The Near-Earth Object Human Space Flight Accessible Targets Study (NHATS)	<b>Mihaly Horanyi</b> Lunar Impact Ejecta Clouds Observed by LDEX
1:45	<b>William Farrell</b> Spacecraft-NEO Water Interaction During the Asteroid Redirect Mission (ARM)	<b>Jamey Szalay</b> LADEE/LDEX Observations of Meteor Streams at the Moon
2:00	<b>Kurt Klaus</b> The Space Launch System and the Path to Mars	<b>Brendan Hermalyn</b> Dust Around the Moon: Preliminary Results from the LADEE Ultraviolet Visible Spectrometer
2:15	<b>Margaret Race</b> Planetary Protection for Future Human Missions -- Addressing Science Gaps and Providing Input for Future Systems, Operations and Equipment for Mars	<b>Eberhard Gruen</b> Dynamical and Collisional Timescales of Meteoroids Released From Jupiter Family Comets
2:30	<b>Brian Shiro</b> Geological Field Activities at the HI-SEAS Planetary Surface Analog Mission Simulation in Hawai'i	<b>Carle Pieters</b> The Special Environment of Lunar Swirls
2:45	<b>Darlene Lim</b> Managing, Mitigating and Adapting to the Impact of Communication Latencies on Human-robotic Scientific Exploration – Lessons from Pavilion Lake Research Project Field Deployments	<b>Timothy Glotch</b> Spectral and Thermophysical Properties of Phobos from the Mars Global Surveyor Thermal Emission Spectrometer
3:00	Transition to Main Room	
3:10	PLENARY SESSION VII: Developing Missions, Student Awards and Closings <b>Chair: Yvonne Pendleton</b>	
TIME	EVENT	LOCATION
3:10	<b>Julia Castillo-Rogez</b> Developing Mission Talk - Reconnaissance of a Human Exploration Target with the NEA Scout Mission (Invited)	Building 152 MAIN ROOM
3:30	<b>Barbara Cohen</b> Developing Mission Talk - Lunar Flashlight: Mapping Lunar Surface Volatiles Using a Cubesat (Invited)	Building 152 MAIN ROOM
3:50	Student Poster Awards	Building 152 MAIN ROOM
4:00	<b>Jim Head</b> Keynote Talk - Scientific Goals for Human Exploration Destinations (Invited)	Building 152 MAIN ROOM
4:30	CLOSING REMARKS	



## Stakeholder Engagement on the Global Exploration Roadmap: Focus on Science

The special session on the Global Exploration Roadmap (GER) will enable discussion between the NASA human space exploration planning team and solar system exploration scientists. NASA is requesting science community input and feedback on a proposed International Space Exploration Coordination Group (ISECG) white paper on science enabled by missions like those in the GER. Please consider attending this special session to help develop potential science opportunities enabled by human missions.

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### Agenda: Thursday July 24, 2014 in the Main Room of Building 152

- 8:30 am Overview, *Roland Martinez/Juergen Hill/Francois Spiero*
- 9:30 am Humans in Cis-Lunar Space, *Kathy Laurini*
- 10:45 am Humans on the Lunar Surface, *Clive Neal*
- 12:00 pm Lunch Break
- 1:15 pm Small Bodies/Phobos/Deimos, *Dan Britt*
- 2:30 pm Lunar Polar Volatiles, *Kathy Laurini*
- 4:00 pm Wrap up and Conclusions, *Kathy Laurini/Greg Schmidt*

## Monday, July 21, 12:20-1:30

**Solar System Bombardment** ..... **Building 152, Room 103**  
**Chair: William Bottke** The Moon’s surface has recorded and preserved the impact history of the inner Solar System since the Moon’s formation. Studies of asteroid populations and the impact record on the Moon can give valuable insights into the ultimate evolution of the Solar System.

**ALSEP Data Recovery**.....**Building 152, Room 108**  
**Chair: Seiichi Nagihara** The ALSEP experiments on the Moon’s surface returned a wide variety of scientific data that is valuable to further exploration and characterization of the lunar surface. This focus group is finding data that are being brought to light for the first time in 4 decades, and which will greatly enhance the scientific archives for all lunar scientists.

**Dust, Atmosphere, and Plasma**..... **Building 152, Room 117 (Parallel Session Room)**  
**Chairs: Mihaly Horanyi and William Farrell** Understanding the dust and plasma environment on and near the surface of airless bodies will allow us to better define requirements for surface operations, dust mitigation and radiation protection.

## Tuesday, July 22, 12:20-1:30

**Volatiles**..... **Building 152, Room 117 (Parallel Session Room)**  
**Chair: Dana Hurley** Volatiles are becoming increasingly more important to both the scientific and exploration community. Discussions on volatile sources, states, abundances, mobility and distribution as they pertain to ISRU and accessibility will be the primary focus of this group.

**South Pole-Aitken Basin** .....**Building 152, Room 103**  
**Chair: Noah Petro** The South Pole-Aitken (SPA) Basin is the largest known impact basin in the Solar System. With a diameter of 2500 km, SPA provides great scientific potential for extracting native lunar mantle material and determining bulk lunar composition. This Focus Group will discuss potential landing sites for a future MoonRise mission.

**Commerce**.....**Building 555 (Space Portal), Main Conference Room**  
**Chair: Bruce Pittman** Continued exploration and scientific research produces emerging markets and new opportunities to expand human commerce to the Moon and beyond. Efforts spawned from the Google Lunar X-Prize offer significant new opportunities for the exploration science community.

**Mission Concepts and Instrumentation**.....**Building 152, Room 108**  
**Chair: Pamela Clark** Future NASA, international and commercial missions will need findings and analysis for scientific payloads designed to fill gaps in our current knowledge of the state of the space environment as well as surface operations. New mission instrumentation and payload concepts will be discussed.

# ORGANIZING COMMITTEES

## **SCIENTIFIC ORGANIZING COMMITTEE**

### **Co-Chairs**

*Nancy Chabot, The Johns Hopkins University/Applied Physics Laboratory*

*Dana Hurley, The Johns Hopkins University/Applied Physics Laboratory*

### **SSERVI Central Office, Senior Management**

*Yvonne Pendleton, NASA Ames Research Center*

*Greg Schmidt, NASA Ames Research Center*

*Brad Bailey, NASA Ames Research Center*

*Doris Daou, NASA Ames Research Center*

### **Members**

*Sarah Braden, Arizona State University*

*Daniel Britt, University of Central Florida*

*Thomas Burbine, University of Massachusetts*

*Sarah Crites, Hawai'i Institute of Geophysics and Planetology*

*Rosemary Killen, NASA Goddard Space Flight Center*

*Stan Love, NASA Johnson Space Center*

*Amy Mainzer, Jet Propulsion Laboratory, California Institute of Technology*

*Tobin Munsat, University of Colorado, Boulder*

*Hanna Nekvasil, Stony Brook University, NY*

*Jeff Plescia, The Johns Hopkins University/Applied Physics Laboratory*

*Derek Sears, NASA Ames Research Center*

*Paul Spudis, Lunar and Planetary Institute*

*Angela Stickle, The Johns Hopkins University/Applied Physics Laboratory*

*Driss Takir, Ithaca College*

## **LOCAL ORGANIZING COMMITTEE, SSERVI Central Office Staff**

*Shirley Berthold, Chair*

*Jennifer Baer*

*Marco Boldt*

*Brian Day*

*Ricky Guest*

*Yael Kovo*

*Maria Leus*

*Joe Minafra*

*Ashcon Nejad*

*Teague Soderman*

*Chris Wilson*