LPSC
March 16–20, 2015
The Woodlands, Texas
#LPSC2015

46th
Lunar and Planetary Science Conference

PROGRAM OF TECHNICAL SESSIONS
FORTY-SIXTH LUNAR AND PLANETARY SCIENCE CONFERENCE

PROGRAM OF TECHNICAL SESSIONS

MARCH 16–20, 2015

The Woodlands Waterway Marriott Hotel and Convention Center
The Woodlands, Texas

INSTITUTIONAL SUPPORT

Universities Space Research Association
Lunar and Planetary Institute
National Aeronautics and Space Administration

CONFERENCE CO-CHAIRS

Stephen Mackwell, Lunar and Planetary Institute
Eileen Stansbery, NASA Johnson Space Center

PROGRAM COMMITTEE CHAIR

David Draper, NASA Johnson Space Center

PROGRAM COMMITTEE

Doug Archer, NASA Johnson Space Center
Aaron Bell, University of New Mexico
Katherine Bermingham, University of Maryland
Aaron Burton, NASA Johnson Space Center
Paul Byrne, Lunar and Planetary Institute
Roy Christoffersen, Jacobs Technology
Kate Craft, Johns Hopkins University, Applied Physics Laboratory
Deepak Dhingra, University of Idaho
Steve Elardo, Carnegie Institution of Washington
Ryan Ewing, Texas A&M University
Marc Fries, NASA Johnson Space Center
Juliane Gross, Rutgers University
John Gruener, NASA Johnson Space Center
Justin Hagerty, U.S. Geological Survey
Kristen John, NASA Johnson Space Center
Georgiana Kramer, Lunar and Planetary Institute
Tom Lapen, University of Houston
Francis McCubbin, University of New Mexico
Andrew Needham, Lunar and Planetary Institute
Debra Hurwitz Needham, Lunar and Planetary Institute
Paul Niles, NASA Johnson Space Center
Lan-Anh Nguyen, NASA Johnson Space Center
Dorothy Oehler, NASA Johnson Space Center
Noah Petro, NASA Goddard Space Flight Center
Ross Potter, Brown University
Liz Rampe, Aerodyne Industries, Jacobs JETS at NASA Johnson Space Center
Jennifer Rapp, NASA Johnson Space Center
Christine Shupla, Lunar and Planetary Institute
Axel Wittman, Washington University, St. Louis
James Wray, Georgia Institute of Technology
Mike Wong, University of California, Berkeley

Produced by the Lunar and Planetary Institute (LPI), 3600 Bay Area Boulevard, Houston TX 77058-1113, which is supported by NASA under Award No. NNX08AC28A. Logistics, administrative, and publications support for the conference were provided by USRA Houston Meeting Planning Services.
ABOUT LPSC

The Lunar and Planetary Science Conference brings together international specialists in petrology, geochemistry, geophysics, geology, and astronomy to present the latest results of research in planetary science. The five-day conference is organized by topical symposia and problem-oriented sessions.

LOGISTICAL INFORMATION

Venue Address and Phone Number
The conference is being held at The Woodlands Waterway Marriott Hotel and Convention Center, which is located at 1601 Lake Robbins Dr., The Woodlands TX 77380. The phone number for the hotel is 281-367-9797. Messages may be left for conference attendees by phoning the hotel and asking for the conference registration desk.

Please note that copy and printing services are not available at the conference registration desk, and must be arranged through the hotel business center. For your convenience, a minimal number of laptops and printers will be available in the Wi-Fi access rooms (see below).

Registration
Conference registration and check-in will be held on Sunday, March 15, from 4:00 to 8:00 p.m., and from 8:00 a.m. to 5:00 p.m. Monday through Friday, March 16 through 20. Conference badges provide access to all technical sessions, special events, and shuttle service.

Internet Access
Complimentary Wi-Fi service will be available throughout the duration of the conference in selected public areas, including the Town Center Exhibit Area and immediate vicinity. As in previous years, Wi-Fi service will NOT be available in the oral session rooms for anyone other than the selected LPSC microbloggers. This restriction is (and has been) in place to curtail activities that could be distracting to speakers during their presentations.

Conference Shuttle Service
Conference shuttle bus service between the venue and the approved list of hotels will be provided on Sunday evening during the registration time and throughout the duration of the conference. Shuttle service will run before and immediately following all technical sessions. Detailed shuttle schedules are available in the registration area and on the LPSC website at www.hou.usra.edu/meetings/lpsc2015/travel/shuttleInfo.

Poster Printing Available
AlphaGraphics will have a staffed booth at The Woodlands Waterway Marriott, just outside the Town Center Exhibit Area. Poster presenters can pick up pre-ordered posters or place orders for posters beginning on Sunday, March 15. The desk is located just outside the Town Center Exhibit Area on the first floor. For more information, visit their website at www.txagprinting.com.

Personal Schedule
Create your own personal meeting schedule using the Personal Schedule tool found in the USRA Meeting Portal at https://www.hou.usra.edu/meeting_portal/schedule/. Select the sessions you want to attend or talks you want to hear, then create a shareable schedule that can be viewed on your smart phone or shared with a colleague.
LIST OF EXHIBITORS

**Arecibo Observatory/USRA**

http://www.naic.edu  
HC 3 Box 53995  
Arecibo Observatory  
Arecibo, Puerto Rico 612

Contact: Linda Rodriguez-Ford  
lford@naic.edu

Arecibo Observatory is the world’s largest radio telescope and the world’s most sensitive planetary radar system. It produces detailed maps and images of the terrestrial planets, asteroids, and comets.

**Boeing**

http://www.buildsomethingbetter.com/space  
3700 Bay Area Blvd.  
Houston TX 77058

Contact: Michael Elsperman  
michael.s.elsperman@boeing.com

Space exploration represents an eternal quest for knowledge, beckoning us with clues about the origins of the universe and our place in it. For more than 50 years, Boeing has been a leading provider of spacecraft systems and services. We are passionate about our spacecraft, proven platforms that enable investigation of Earth’s celestial neighbors. Together, we will shape the future through scientific discovery.

**Cambridge University Press**

www.cambridge.org/us/academic  
Cambridge University Press  
32 Avenue of the Americas  
New York NY 10013

Contact: Emma Kiddle  
ekiddle@cambridge.org

Cambridge’s publishing in books and journals combines state-of-the-art content with the highest standards of scholarship, writing and production. Visit our stand to browse new titles, available at a 20% discount, and to pick up sample issues of our journals. Visit our website to see everything we do: www.cambridge.org/us/academic.

**Centre for Planetary Science and Exploration (CPSX)**

http://cpsx.uwo.ca  
University Western Ont Dept Earth Sci  
1151 Richmond St  
London ON N6A 5B7

Contact: Melissa Battler  
mbattle@uwo.ca

The Centre for Planetary Science and Exploration at Western University is the hub for planetary science and exploration research in Canada. Our mantra is “excellence in research, education and outreach.” The Centre hosts Canada’s only graduate program in planetary science and provides national leadership by offering short courses, workshops and field trips, and by leading Canada’s membership in NASA’s SSERVI and NAI.
Radioisotope power systems can heat and power autonomous machinery for extended operation periods. INL assembles such generators by adding the radioactive power source. A team of INL experts then conducts extensive testing to ensure the device will be able to withstand conditions it will experience during the rocket launch and deep space journey. Generators fueled and tested at INL are currently powering the New Horizons mission to Pluto and the Mars Science Laboratory’s Curiosity rover.

Jacobs

www.jacobs.com
2224 Bay Area Boulevard, Suite 200
Houston TX 77058

Contact: Sara Stanley
sara.stanley@nasa.gov

Jacobs is one of the world’s largest and most diverse providers of technical, professional, and constructions services, including all aspects of engineering and scientific services. With more than 65 years of experience supporting government and commercial clients across multiple markets and geographies, we have earned a reputation for excellence and outstanding technical and managerial achievements in quality, performance, and safety. Jacobs provides comprehensive planetary science research and analysis services for the NASA Johnson Space Center.

JHU/Applied Physics Laboratory

http://civspace.jhuapl.edu/
11100 Johns Hopkins Road
MS 200-W569
Laurel MD 20723

Contact: Margaret Simon
margaret.simon@jhuapl.edu

The Johns Hopkins University’s Applied Physics Laboratory (APL) leads several NASA missions and conducts significant grant-based research on planetary, space, and Earth science interests. APL built over 60 spacecraft and instruments, including New Horizons, MESSENGER, STEREO, the Van Allen Probes, and an operational cubesat.

JMARS — Mars Space Flight Facility — Arizona State University

http://jmars.mars.asu.edu
201 E. Orange Mall
Tempe AZ 85287

Contact: Scott Dickenshied
sdickens@mars.asu.edu

JMARS (Java Mission-planning and Analysis for Remote Sensing) is a free, open-source, Java-based geospatial information system developed by the Mars Space Flight Facility at Arizona State University. It is currently used for mission planning and scientific data analysis by several NASA missions, including Mars Odyssey, Mars Reconnaissance Orbiter, the Lunar Reconnaissance Orbiter, and the upcoming OSIRIS-REx mission.

Lockheed Martin

12257 S Wadsworth Blvd, M.S. 80110
Littleton CO 80125

Contact: Scott Hovarter
scott.e.hovarter@lmco.com

Expanding our knowledge and understanding of the universe is a challenging endeavor that Lockheed Martin has been actively engaged in for more than five decades. We have developed and deployed numerous spacecraft and products supporting our understanding of Earth and planetary science, heliophysics, and astrophysics. We’re accountable to one standard — 100% mission success. We understand the risks and will not shy away from the hard challenges associated with this mission.
**LPI-JSC Center for Lunar Science and Exploration**

www.lpi.usra.edu/exploration  
3600 Bay Area Blvd.  
Houston TX 77058  
Contact: Jennifer Steil  
steil@lpi.usra.edu  

The LPI-JSC Center for Lunar Science and Exploration is one of the founding members of the Solar System Exploration Research Virtual Institute (SSERVI). At LPSC, the Center will help faculty find classroom resources, advise university students about future training opportunities, and distribute educational and public outreach materials.

**Lunar Reconnaissance Orbiter Camera SOC — Lunaserv**

http://lroc.sese.asu.edu  
1100 S. Cady Mall  
P.O. Box 873603  
Tempe AZ 85287-3603  
Contact: Nick Estes  
nme@ser.asu.edu  

The Lunar Reconnaissance Orbiter Camera Science Operations Center (LROC SOC) operates the LROC instrument on the Lunar Reconnaissance Orbiter. The LROC SOC has developed Lunaserv as a planetary-capable WMS software package that anyone can use to integrate their planetary GIS data with WMS compatible client software.

**Lunar Surface Models**

lunarsurfacemodels.com  
202 W. 107th St. Apt. 6W  
New York NY 10025  
Contact: Howard Fink  
howard.fink@nyu.edu  

lunarsurfacemodels.com is dedicated to furthering the exploration of the Moon by providing scaled models of the lunar surface for education, planning, and inspiration.

**Moon Express**

www.moonexpress.com  
19-2060 North Akron Road  
NASA Ames Research Park  
Moffett Field CA 94035  
Contact: Daven Maharaj  
daven@moonexpress.com  

Moon Express, Inc. (MoonEx) is a privately funded commercial space company driven by long-term goals of exploring and developing lunar resources and short-term business on-ramps of providing lunar transportation and data services for government and commercial customers. The company has developed the "MX"-family of scalable single-stage spacecraft/landers capable of reaching the lunar surface and other destinations from Earth orbit on direct or low-energy trajectories.

**NASA**

NASA.gov  
NASA Planetary Sciences Division  
Washington DC 20546-0001  
202-358-0000  

NASA Glenn Research Center  
Cleveland OH 44136  
Contact: Daniel Vento  
216-433-2834  
Daniel.M.Vento@nasa.gov  

NASA Jet Propulsion Laboratory  
4800 Oak Grove Drive  
Mail Stop 180-112  
Pasadena CA 91109-8001  
Contact: Eddie Gonzales  
818-354-2326  
eddie.gonzales@jpl.nasa.gov  

NASA leads the nation on a great journey of discovery, seeking new knowledge and understanding of our planet Earth, our Sun and solar system, and the universe out to its farthest reaches and back to its earliest moments of existence. Come and explore with us, with hands-on demonstrations of missions and technologies that make space exploration possible.
**PDS Geosciences Node**

http://geo.pds.nasa.gov/

One Brookings Drive
Campus Box 1169

Contact: Daniel Scholes
scholes@wunder.wustl.edu

The Geosciences Node of NASA’s Planetary Data System (PDS) archives and distributes digital data related to the study of the surfaces and interiors of terrestrial planetary bodies. We work directly with NASA missions to help them generate well-documented, permanent data archives. We provide data to NASA-sponsored researchers along with expert assistance in using the data. All our archives are online and available to the public.

**Purdue University**

http://www.eaps.purdue.edu/

550 Stadium Mall Dr
West Lafayette IN 47907

Contact: Sheridan Ackiss
sackiss@purdue.edu

Purdue’s Department of Earth, Atmospheric, and Planetary Sciences (EAPS) is dedicated to the scientific study of physical, chemical, and dynamic processes that include a broad range of phenomena — from tectonics to asteroid impacts to severe weather. Come learn about the outstanding opportunities awaiting students interested in our department.

**Regional Planetary Image Facility Network**

https://www.facebook.com/RPIFN

USGS Astrogeology Science Center
2255 N. Gemini Dr.
Flagstaff AZ 86001

Contact: David Portree
dportree@usgs.gov

NASA’s worldwide Regional Planetary Image Facility (RPIF) Network preserves and makes widely available images, maps, supporting documentation, educational materials, and many other hard-to-find data products related to the exploration of the solar system. Each RPIF is a little different from the others; together they form a unique resource for researchers and the public.
**LPSC WEEK AT A GLANCE**

*The session code appears in bold brackets above each session title.*

<table>
<thead>
<tr>
<th>Day and Time</th>
<th>Waterway Ballroom 1</th>
<th>Waterway Ballroom 4</th>
<th>Waterway Ballroom 5</th>
<th>Waterway Ballroom 6</th>
<th>Montgomery Ballroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday Afternoon, 1:30 p.m.</strong></td>
<td></td>
<td>[M140] Masursky Lecture and Award Presentations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monday Evening, 5:30 p.m.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NASA Headquarters Briefing</td>
</tr>
<tr>
<td><strong>Tuesday Evening, 6:00 p.m.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Town Center Exhibit Area  Poster Session I</td>
</tr>
</tbody>
</table>

*Continued on reverse*
LPSC Week at a Glance (Continued)

The session code appears in bold brackets above each session title.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Session Title</th>
<th>Session Title</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday Evening, 6:00 p.m.</td>
<td>Town Center Exhibit Area Poster Session II</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Monday, March 17, 2014

SPECIAL SESSION: NEW PERSPECTIVES OF THE MOON:
ENABLING FUTURE LUNAR MISSIONS
8:30 a.m. Waterway Ballroom 1

Chairs: Richard Elphic
Maria Zuber

8:30 a.m. Cook A. M. * Wooden D. H. Colaprete A. Glenar D. A. Stubbs T. J.
First Detection of Dust in the Lunar Tail: LADEE UVS Measurements [2147]
The LADEE UVS (Lunar Atmosphere and Dust Environment Explorer UV/Visible Spectrometer) Team presents the first evidence that the Moon’s tail may contain dust.

8:45 a.m. Horanyi M. * Szalay J. Kempf S. Schmidt J. Gruen E. et al.
LDEX Observation of the Dust Environment of the Moon [1684]
The talk will report on the analysis of the observations of Lunar Dust Experiment (LDEX) onboard the recently completed LADEE mission.

9:00 a.m. Stubbs T. J. * Glenar D. A. Wang Y. Sarantos M. Colaprete A. et al.
Influence of Meteoroid Streams on the Lunar Environment: Results from LADEE [2984]
The meteoroid stream mass fluxes and ejecta production rates are estimated and compared with observations from the LADEE mission.

9:15 a.m. Colaprete A. * Wooden D. Cook A. Shirley M.
An Examination of LADEE UVS Spectral Variability Associated with the Geminid Meteor Shower [2364]
UVS spectra taken at around the time of the Geminid meteor showers are compared, showing changes in some emission line strengths.

9:30 a.m. Hurley D. M. * Benna M. Cook J. C. Halekas J. S. Grava C. et al.
Comparing LAMP Polar Measurements to LADEE Equatorial Measurements of Helium in the Lunar Exosphere [2844]
We compare three datasets relating to helium in the lunar exosphere. A model is used to interpret the spatial and temporal variability of lunar helium.

9:45 a.m. Matsumoto K. * Yamada R. Kikuchi F. Kamata S. Ishihara Y. et al.
Internal Structure of the Moon Inferred from Apollo Seismic Data and Selenodetic Data from GRAIL and LLR [1696]
A lunar internal structure model from Apollo seismic data and the latest selenodetic data indicates at least 50-km-thick low-velocity zone above the CMB.

10:00 a.m. Milbury C. * Johnson B. C. Melosh H. J. Collins G. S. Blair D. M. et al.
The Effect of Pre-Impact Porosity on the Gravity Signature of Lunar Craters [1966]
Impact modeling/Porosity, gravity/Mantle uplift, yes!

The measured densities of Apollo impact melt breccias provide an important context for interpreting GRAIL gravity observations of lunar impact basins.
The Endgame mapping strategy was designed to provide highest-resolution coverage over the Orientale basin to yield a gravity map of a multi-ring impact basin.

10:45 a.m. Keane J. T. * Matsuyama I. *Cleaning Up Degree-2: The Contribution of Impact Basins and Mascons to the Gravity Fields of the Moon, Mercury, and Other Terrestrial Planets* [#2967]
Impact basins and mascons complicate the degree-2 gravity fields of the Moon and Mercury, and obscure past histories of true polar wander.

We assess how the evolution and loss of volatiles affects lunar shallow magmatic intrusion density and compare to GRAIL observations.

GRAIL data applied to detect, characterize, and validate the presence of buried craters. Forward modeling supports the detection and validates their existence.

11:30 a.m. Goossens S. * Lemoine F. G. Sabaka T. J. Nicholas J. B. Mazarico E. et al. *Global and Local Gravity Field Models of the Moon Using GRAIL Primary and Extended Mission Data* [#1395]
We present updated global and local gravity field models of the Moon using GRAIL data only.

11:45 a.m. Li H. * Li C. L. Liu J. J. Zhang H. B. Su Y. et al. *The Chang'e 3 Mission: One Year Overview* [#1732]
Chang'e-3 has accomplished its yearlong nominal mission. We summarize preliminary results obtained by each science instrument as well as data accessibility.

---

**Monday, March 16, 2015**

**GALE CRATER, MARS: GEOMORPHOLOGY AND GEOCHEMISTRY**

**8:30 a.m. Waterway Ballroom 4**

**Chairs:**
Douglas Ming
Ashwin Vasavada

Curiosity’s study of ancient fluvial and lacustrine environments within Gale Crater has placed new constraints on Mars’ ancient climate.

8:45 a.m. Lewis K. W. * Dietrich W. E. Edgar L. A. Grotzinger J. P. Gupta S. et al. *Physical Stratigraphy Along the Curiosity Traverse and the Transition to Mount Sharp* [#2698]
Orbital and rover-based observations are combined to understand the transition between the sediments of the Gale Crater plains and the base of Mount Sharp.
MSL Curiosity’s first analysis of the sedimentology and stratigraphy of lower Mount Sharp strata.

We use MSL ChemCam and APXS data to determine chemostratigraphic trends at Pahrump Hills for comparison to orbital CRISM signatures of hydrated phases.

The APXS compositions of the sedimentary strata at the base of Mount Sharp, reveal information regarding their regional context and post-depositional history.

9:45 a.m. Gellert R. * Berger J. A. Boyd N. Campbell J. L. Desouza E. D. et al. * Chemical Evidence for an Aqueous History at Pahrump, Gale Crater, Mars, as Seen by the APXS [#1855]
Pahrump is different from previous areas in Gale. Lower Mg, Ca, Fe, higher Al, Si, P, elevated Se and Pb and MgSO₄ features indicate multiple aqueous events.

10:00 a.m. Cavanagh P. D. * Bish D. L. Blake D. F. Vaniman D. T. Morris R. V. et al. * Confidence Hills Mineralogy and CheMin Results from Base of Mt. Sharp, Pahrump Hills, Gale Crater, Mars [#2735]
The MSL/CheMin X-ray diffractometer completed five nights of analysis on the Confidence Hills sample. Analysis and quantitative mineralogy are presented.

Crystal clusters and dendrites at Pahrump, Gale Crater, result from interparticle crystal growth of diagenetic fluids through a mudstone matrix.

10:30 a.m. Wiens R. C. * Maurice S. Gasnault O. Clegg S. M. Fabre C. et al. * Centimeter to Decimeter Size Spherical and Cylindrical Features in Gale Crater Sediments [#1249]
Hollow, dark-toned multi-centimeter spheres and larger cylindrical features suggest gas bubbles and collapse pipes, respectively, in Gale sediments.

We discuss trends in the major volatiles observed in SAM evolved gas analyses of Gale Crater samples to date and their implications.

11:00 a.m. Franz H. B. * The Isotopic Composition of Martian Atmospheric CO₂: Measurements with the Sample Analysis at Mars (SAM) Quadrupole Mass Spectrometer [#3005]
One Mars year of observations suggests a seasonal cycle in CO₂ isotopes.

11:15 a.m. Niles P. B. * Archer P. D. Heil E. McAdam A. Sutter B. et al. * Investigating CO₂ Reservoirs at Gale Crater and Evidence for a Dense Early Atmosphere [#2840]
Based on results from the MSL rover, the total amount of CO₂ in the Gale samples is lower than expected. It is possible that CO₂ exists in a more exotic form.
11:30 a.m. Thomson B. J. * Fassett C. I. Buczkowski D. L. Seelos K. D.  
*How Much of the Sediment in Gale Crater’s Central Mound was Fluvially Transported? [#2280]*  
Water, gently flowing on the ground. Can’t move enough dirt to build a tall mound.

11:45 a.m. Parker T. J. * Dietrich W. E. Palucis M. C. Calef F. J. Newsom H. E.  
*Banding and Terracing in Lower Mount Sharp (Aeolis Mons), Gale Crater: Comparisons to Recently-Exposed Strandlines in Lake Mead, SW USA [#3003]*  
Terracing in lower Mount Sharp, generally interpreted as stratigraphy, is similar in planform and profile shape to very young terrestrial strandlines.

---

**Monday, March 16, 2015**  
**SPECIAL SESSION: ROSETTA**  
**8:30 a.m. Waterway Ballroom 5**  

**Chairs:** Matt Taylor  
Kathleen Mandt

8:30 a.m. Mottola S. * Jaumann R. Schröder S. Arnold G. Grothues H. G. et al.  
Investigation of the First Touchdown Site on Comet 67P Derived from ROLIS High Resolution Imaging [#2308]  
The Agilkia landing site has been imaged by the ROLIS instrument during the Philae descent onto 67P. The properties of the surface regolith are discussed.

8:45 a.m. Wright I. P. * Andrews D. J. Barber S. J. Sheridan S. Morgan G. H. et al.  
First Measurements of the Surface Composition of 67P Using the Ptolemy Mass Spectrometer [#1970]  
Land, bounce, mass spectra/Land, bounce, land, stop holding breath/Loads of organics.

9:00 a.m. Bibring J.-P. Carter J. * Eng P. Gondet B. Jorda L. et al.  
First In Situ Observations of the Nucleus of 67P by Philae/CIVA-P [#2525]  
We shall present the first results derived from the CIVA images.

9:15 a.m. Ciarletti V. * Levasseur-Regourd A.-C. Lasue J. Statz C. Plettemeier D. et al.  
Revealing the Possible Existence of a Near-Surface Gradient in Local Properties of 67P/Churyumov-Gerasimenko Nucleus Through CONSERT Measurements [#2682]  
We show how CONSERT data acquired at grazing angles during a single Rosetta flyby can be used to characterize the local permittivity gradient of the nucleus.

9:30 a.m. Sierks H. *  
Nucleus Morphology and Activity of Comet 67P/Churyumov-Gerasimenko [#2194]  
The paper discusses the morphology and activity of the nucleus of Comet 67P/C-G.

Evolution of Cometary Activity at 67P/Churyumov-Gerasimenko as Seen by ROSINA/Rosetta from Mid-November 2014 Until End of February 2015 [#1702]  
We will discuss the evolution of the cometary activity of 67P/C-G from mid-November 2014 until end of February 2015 as seen with the ROSINA experiment.

10:00 a.m. Schindhelm E. R. * A’Hearn M. F. Bertaux J. L. Feaga L. M. Feldman P. D. et al.  
Investigating Ultraviolet Excitation Processes in 67P/Churyumov-Gerasimenko [#2189]  
We report analysis of far-UV spectra of coma emission of 67P/Churyumov-Gerasimenko taken by the Alice imaging spectrograph onboard the Rosetta spacecraft.
*Millimeter and Submillimeter Observations of Comet 67P/C-G with the MIRO Instrument [#2595]*
Millimeter and submillimeter observations of the comet are used to understand the physical processes that create the coupled nucleus-coma system.

10:30 a.m. Capaccioni F. * Bockelée-Morvan D. Filacchione G. Erard S. Leyrat C. et al. 
*Water Vapour and Carbon Dioxide IR Emissions in 67P/CG Coma: First Detection by Rosetta/VIRTIS-M [#2494]*
The paper describes the detection of water vapor and carbon dioxide in the coma of 67P, and their spatial distribution as a function of altitude and local time.

10:45 a.m. Hilchenbach M. Langevin Y. Engrand C. * Merouane S. Stenzel O. et al. 
*In-Situ Cometary Particle Measurements in the Inner Coma of Comet 67P/Churyumov-Gerasimenko [#1936]*
Comet 67P/Churyumov-Gerasimenko has a dusty inner coma and particle morphology assembles agglomerates.

11:00 a.m. Fulle M. * Della Corte V. Rotundi A. Accolla M. Ferrari M. et al. 
*Dust Measurements in the Coma of Comet 67P/Churyumov-Gerasimenko Inbound to the Sun Between 3.7 and 3.4 AU [#2420]*
GIADA and OSIRIS dust data, combined with data from MIRO and ROSINA instruments onboard Rosetta, from 3.7 to 3.4 AU inbound provide a dust/gas ratio of 4 ± 2.

*First Results at 67P/Churyumov-Gerasimenko with the Rosetta Plasma Consortium [#2312]*
We will present a summary of both predicted and unexpected cometary plasma activity observations made by the five Rosetta Plasma Consortium (RPC) sensors.

11:30 a.m. A'Hearn M. F. * Feaga L. M. 
*D/H and the Origin of Earth’s Water [#2328]*
Measurements by ROSINA imply that 67P/ formed very cold. Thus JF comets formed in a much wider region, but one containing the formation of Oort cloud comets.

---

Monday, March 16, 2015 [M104]

**MERCURY: SWING LOW, SWEET CHARIOT**

8:30 a.m. Waterway Ballroom 6

Chairs: Paul Byrne
Debra Buczkowski

8:30 a.m. Johnson C. L. * Purucker M. E. Philpott L. C. Korth H. Anderson B. J. et al. 
*Evidence for Remanent Magnetic Fields on Mercury from MESSENGER’S Low-Altitude Campaign [#1205]*
Low-altitude magnetic field measurements made by MESSENGER at Mercury show evidence for regional-scale fields interpreted to result from remanent magnetization.

8:45 a.m. Mazarico E. * Genova A. Goossens S. Lemoine F. G. Smith D. E. et al. 
*The Gravity Field of Mercury After the MESSENGER Low-Altitude Campaign [#1385]*
During its low-altitude gravity campaign, MESSENGER was tracked to altitudes down to 25 km. We present an updated, higher-resolution gravity field of Mercury.
MON ORALS

9:00 a.m. Murchie S. L. * Klima R. L.  Denevi B. W.  Ernst C. M.  Keller M. R.  et al.
Orbital Multispectral Mapping of Mercury by MESSENGER:  Evidence for the Origins of Plains Units and Low-Reflectance Material [#1606]
Orbital multispectral mapping of Mercury reveals stratigraphic relations of plains units and evidence for origin of low-reflectance material.

Global Maps of Mercury’s Elemental Composition:  New Results from Epithermal and Fast Neutrons [#1833]
New maps of epithermal and fast neutrons across Mercury’s northern hemisphere show hydrogen and average atomic mass compositional heterogeneities.

High-Resolution Measurements of Mercury’s Surface Composition with the MESSENGER X-Ray Spectrometer [#1949]
We present updates to major-element maps of Mercury using low-orbit observations from MESSENGER’s X-Ray Spectrometer.

Resolving the Surfaces of Mercury’s Low-Reflectance Polar Deposits with Images from MESSENGER’s Low-Altitude Campaign [#1274]
Low-altitude images of Mercury’s permanently shadowed craters provide new details on the surface morphology and evolution of the low-reflectance deposits.

10:00 a.m. Izenberg N. R. *  Thomas R. J.  Blewett D. T.  Nittler L. R.
Are There Compositionally Different Types of Hollows on Mercury? [#1344]
We investigate differences between Mercury hollows associated with different materials, such as low reflectance materials or pyroclastic deposits.

10:15 a.m. Harris R. S. *  Schultz P. H.  Bruck Syal M.
Preservation of Cometary and Asteroidal Volatiles in Impact Melt:  An Overlooked Reservoir for Hollow Formation on Mercury [#2585]
Hydrous impact melts must be considered as a source of volatiles available for the formation of hollows on Mercury.

10:30 a.m. Kreslavsky M. A. *  Head J. W.
A Thicker Regolith on Mercury [#1246]
The scale-dependence of roughness contrasts and the morphology of small craters in smooth plains suggest that regolith on Mercury is thicker than on the Moon.

Near-Synchronous End to Global-Scale Effusive Volcanism on Mercury [#1731]
Lava eruptions on Mercury shut off by global contraction.

11:00 a.m. Vander Kaaden K. E. *  McCubbin F. M.  Nittler L. R.  Weider S. Z.
Petrologic Diversity of Rocks on Mercury [#1364]
Current XRS and GRS measurements of Mercury’s surface by MESSENGER reveal a diverse set of rocks on the planet from komatiites to alkali-rich boninites.

Phase Equilibria Constraints on Mercury Melting Conditions [#2345]
Phase equilibria experiments at low oxygen fugacity and high sulfur contents are used to constrain the formation of Mercury lava compositions.
11:30 a.m.   Evans A. J. *   Brown S. M.   Solomon S. C.

Characteristics of Early Mantle Convection and Melting on Mercury [#2414]
Investigation of mercurian mantle stratification on form and vigor of mantle convection and the extent and duration of partial melting.

Monday, March 16, 2015
MASURSKY LECTURE AND AWARD PRESENTATIONS
1:30 p.m.   Waterway Ballroom 1

Chairs:   Eileen Stansberry
Stephen Mackwell

Presentation of the 2014 GSA Stephen E. Dwornik Award Winners —

Best Graduate Oral Presentation:

Honorable Mention (Graduate Oral)
Michelle S. Thompson, University of Arizona, “Nanoscale Analysis of Space-Weathering Features in Soils from Itokawa”

Best Graduate Poster
Yuyan "Sara" Zhao, Stony Brook University, “Photochemical Influences on Bromine and Chlorine Geochemistry on the Martian Surface”

Honorable Mention (Graduate Poster)

Best Undergraduate Oral Presentation
George D. McDonald, Cornell University, “Examining Effects of Orbital Forcing on Titan's Dune Orientations”

Presentation of the 2015 Pierazzo International Student Travel Award —
Edgar Steenstra, University of Amsterdam

Presentation of the 2015 LPI Career Development Award Winners —
Jaclyn Clark, Westfälische Wilhelms-Universität Münster
Ryan N. Clegg, Washington University
R. Terik Daly, Brown University
Christopher Hamann, Museum für Naturkunde, Berlin
Patrick Hill, University of Western Ontario
Christine E. Jilly-Rehak, University of Hawaii
George D. McDonald, Georgia Tech
Nicola Potts, Open University
Adkam Sarafian, Woods Hole Oceanographic Institute
Sarah Simpson, University of Glasgow
Rebecca Thomas, Open University
Francois L. H. Tissot, University of Chicago
Kathleen Vander Kaaden, University of New Mexico
Masursky Lecture —

Borg L. *

*Insights into the Evolution of the Solar System from Isotopic Investigations of Samples*

There are three general scientific subdisciplines associated with solar system exploration, including (1) remote observations, (2) theoretical and analog investigations, and (3) sample analysis. Continued development of engineering technology will make missions to return samples to Earth progressively more feasible. Although there are many aspects of solar system evolution that can only be addressed with samples, this approach is not applicable to all questions regarding the evolution of the solar system. These aspects of sample science will be illustrated using examples from isotopic investigations of primitive meteorites, martian meteorites, and lunar samples.

Dr. Lars Borg is a staff chemist at Lawrence Livermore National Laboratory (LLNL) in Livermore, California. He received a Ph.D. in Isotope Geochemistry from the University of Texas at Austin in 1995; an M.A. in Igneous Petrology from the University of Texas at Austin in 1989; and a B.A. in Earth Science and Paleontology from the University of California, Berkeley, in 1985. Prior to joining LLNL in 2006, Borg was a professor at the University of New Mexico from 1999 to 2006 and a postdoctoral associate at NASA Johnson Space Center from 1996 to 1999. His primary research interest is constraining the origin and evolution of the solar system by applying stable and radiogenic isotope systems to primitive meteorites, martian meteorites, and lunar samples. In addition to his research, Borg has served on a number of NASA advisory committees, including the Planetary Sciences Subcommittee of the NASA Advisory Council, the Lunar Allocation Subcommittee for the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM), and the Mars Exploration Program and Analysis Group (MEPAG).
**MON ORALS**

**Monday, March 16, 2015**

**LUNAR VOLATILES**

2:30 p.m.  Waterway Ballroom 1

**Chairs:** Georgiana Kramer  
G. Jeffrey Taylor

**2:30 p.m.**  
Hui H. *  Guan Y.  Chen Y.  Peslier A. H.  Zhang Y.  et al.  
*SIMS Analysis of Water Abundance and Hydrogen Isotope in Lunar Highland Plagioclase* [#1927]  
We have measured water concentrations and hydrogen isotope ratios in lunar highland plagioclase using SIMS.

**2:45 p.m.**  
Hauri E. H. *  Saal A. E.  Rutherford M. J.  Van Orman J. A.  
*Volatile Abundances in Apollo 12 Red Volcanic Glass* [#2454]  
A12 red volcanic glass, together with other glass groups, show shifts in S/Dy at constant F/Nd that may be a signature of degassing of the lunar magma ocean.

**3:00 p.m.**  
Le Voyer M. *  Hauri E. H.  Saal A. E.  
*Large Variations in the Volatile Content of Olivine-Hosted Melt Inclusions from Lunar Magmas* [#2446]  
New volatile analyses of lunar melt inclusions from A17 orange glass extend the range to higher Cl, F, and S contents, and first document their C contents.

**3:15 p.m.**  
Martinez M. H. *  Thiemens M. H.  
*Oxygen Isotopic Analyses of Water Extracted from Selected Lunar Samples* [#1612]  
Water was extracted from several lunar samples, and its oxygen isotopic composition (δ17O and δ18O) was measured.

**3:30 p.m.**  
*Volatile in the Lunar Crust — An Evaluation of the Role of Metasomatism* [#1352]  
We report H and Cl isotopic data from apatites in two Apollo 17 samples that likely record post-crystallization metasomatic alteration.

**3:45 p.m.**  
Taylor G. J. *  Robinson K. L.  
*Radically Heterogeneous Distribution of Volatiles in the Moon* [#2815]  
The Moon contains two drastically different chemical reservoirs, one like the dry regions of Earth’s mantle and the other highly depleted in volatiles.

**4:00 p.m.**  
Lemelin M. *  Lucey P. G.  Greenhagen B.  Paige D. A.  Schorghofer N.  et al.  
*A Search for Transient Water Frost at the Lunar Poles Using the Lunar Orbiter Laser Altimeter* [#1879]  
We search for areas that may “load” with surface frost during the lunar night causing increased reflectance, and unload during the day reducing the reflectance.

**4:15 p.m.**  
*The Quest for a Diurnal Effect in Lunar Hydrogen Abundance* [#1786]  
We will show that LPNS epithermal neutron count rates show diurnal variations that are correlated with variations in instrumental and subsurface temperatures.

**4:30 p.m.**  
*Epithermal Neutron Evidence for a Diurnal Surface Hydration Process in the Moon’s High Latitudes* [#2019]  
Epithermal neutron observations from the LRO’s LEND detector is used to derive evidence of an active diurnal hydration process in the Moon’s high latitudes.
Monday, March 16, 2015

MARS POLAR PROCESSES
2:30 p.m. Waterway Ballroom 4

**Chairs:** Isaac Smith
Timothy Titus

2:30 p.m. Landis M. E. * Byrne S. Daubar I. J. Herkenhoff K. E. Dundas C. M.
*Reinterpreting the Impact Craters of the North Polar Layered Deposits, Mars [#1294]*
We re-examine the crater population of the NPLD using pi-group scaling and an updated isochrone in order to better constrain the surface age of the deposit.

2:45 p.m. Smith I. B. * Putzig N. E. Phillips R. J. Holt J. W.
*Recent Climate Change Detected on Mars: Implications for the Planetary Ice Budget [#2574]*
We find evidence at the north pole of Mars for recent accumulation and climate change. Our results quantify the planetary ice budget for the last ~400 k.y.

3:00 p.m. Ramsdale J. D. Balme M. R. Conway S. J. Costard F. Gallagher C. et al.
Grid mapping provides a new, efficient and scalable approach to collecting data on large quantities of small landforms over large areas.

3:15 p.m. Nerozzi S. * Holt J. W.
*Stratigraphic Structures and Depositional Patterns of the Lowermost NPLD, Mars, from SHARAD Mapping [#1670]*
Stratigraphic mapping of Planum Boreum based on SHARAD profiles shows depositional anomalies and limited areal extent in the lowermost NPLD radar layers.

3:30 p.m. Becerra P. * Byrne S. Sutton S. Pelletier J. D. Sori M. et al.
*Martian Polar Stratigraphy from HiRISE Stereo Topography [#1729]*
We perform a comprehensive morphology-based description of PLD stratigraphy, examining and correlating depth-varying properties of layers throughout the PLD.

*Enhanced Radar Visualization of Structure in the South Polar Deposits of Mars [#2366]*
SHARAD radar sounding data provide a powerful new perspective on unit mapping for the south polar layered deposits of Mars.

4:00 p.m. Philippe S. P. * Schmitt S. B. Beck P. B. Brissaut O. B.
*Sublimation of CO$_2$ Ice with H$_2$O Ice Contamination: Analogy with the Sublimation of Mars Seasonal Caps [#2559]*
Experimental studies are needed to fully understand the microprocesses that occur on Mars during growth and retreat of the seasonal caps.

4:15 p.m. Titus T. N. * Cushing G. E.
*The Mars Diurnal CO$_2$ Cycle as Observed in the Tharsis Region [#1181]*
This presentation will focus on the diurnal exchange of surface CO$_2$ ice with the atmospheric at the higher elevations of the Tharsis region.

4:30 p.m. Byrne S. Hayne P. O. Becerra P. HiRISE Team
*Evolution and Stability of the Residual CO$_2$ Ice Cap [#1657]*
We tie observations of the surface and atmosphere together with landscape evolution models that predict a polar cap that waxes and wanes over timescales of ~100 yrs.
We report the occurrence, oxygen isotope compositions, REE geochemistry, and SIMS U-Pb dating results of apatite in a carbonaceous chondrite DaG 978.

Effects of Secondary Processing on Presolar Grain Abundances and Compositions in the Unique Carbonaceous Chondrite Miller Range 07687 [#1004]
MIL 07687 experienced localized aqueous alteration under oxidizing conditions, leading to lower Fe contents in presolar silicates and partial destruction of SiC.

Distribution and Abundance of Presolar Silicate and Oxide Stardust in CR Chondrites [#1874]
We identified 81 presolar O-anomalous grains in several CR chondrites. Abundances range from 2 to 125 ppm, reflecting secondary alteration processes.

Processes Affecting the CR Chondrites Parent Body: Petrology, Mineralogy and Chemical Composition of the Matrices of Antarctic CR Carbonaceous Chondrites [#2561]
TEM study of CR2 matrices shows bulk compositional and micron petrologic indicators of aqueous alteration are not good predictors for secondary matrix phases.

Oxygen Isotopes in Secondary Minerals in CR Chondrites: Comparing Components of Different Petrologic Type [#1662]
Isotope data from samples across the aqueous alteration spectrum imply low temperatures and heterogeneous fluids, explaining inconsistencies to the bulk trend.

OH, F-Bearing Apatite, Merrillite, and Halogen — Poor Fluids in Allende (CV3) [#2927]
Both apatite and merrillite are identified in Allende using NanoSIMS volatile analyses and EBSD. The apatite chemistry implies a halogen-poor metamorphic fluid.

Evidence for Impact Shock Melting in CM and CI Chondrite Regolith Samples [#2261]
We describe evidence for impact melting in CI and CM chondrites.

Impact Melting of CV and CM Chondrites [#2076]
An examination of carbonaceous chondrite impact clasts and the potential roles of degassing and redox chemistry during impact melting of oxidized chondrites.

Redox Reactions Between Cu-Al Metal and Silicates in the Khatyrka Meteorite [#2394]
Reaction zones between Cu-Al alloys and silicates in the Khatyrka meteorite demonstrate the assemblage is cogenetic, not an accidental juxtaposition.
Monday, March 16, 2015

GEODYNAMICS: THE FORCE AWAKENS
2:30 p.m. Waterway Ballroom 6

Chairs: Christian Klimeczak
         Amanda Nahm

2:30 p.m. Plesa A. C. *  Tosi N.  Grott M.  Breuer D.
How Large are Present-Day Surface Heat Flow Variations Across Mars’ Surface? [#2375]
We investigate the spatial variations of the martian surface heat flow and elastic thickness by running
thermal evolution models in 3D spherical geometry.

2:45 p.m. Audouard J. *  Piqueux S.  Poulet F.  Vincendon M.  Arvidson R. E.  et al.
Analysis of Curiosity GTS/REMS Surface Temperature Measurements [#2060]
We study MSL surface temperature data. Our work reveals a thermal anomaly not accounted for in
usual simulation tools and we discuss potential contributors.

3:00 p.m. Caine J. S.  Anderson R. B. *  Herkenhoff K.  Perrett G. M.
Evidence for Outcrop-Scale Deformation Band Faults on Mars from Curiosity Rover Imagery [#2919]
Curiosity imagery and chemistry from Sol 399 provide data on ladder-like, discrete structures,
indicating they are deformation band faults rather than veins.

3:15 p.m. Beddingfield C. B. *  Burr D. M.  Dunne W. M.
Low-Angle Normal Faults on Saturn’s Moons: Evidence for Viscous Relaxation [#1157]
We hypothesize that icy satellite, normal fault dips are consistent with laboratory results. The
hypothesis is supported for Dione but not for Tethys or Rhea.

3:30 p.m. Rhoden A. R. *  Tajeddine R.  Henning W.  Hurford T. A.
Testing the Mimas Ocean Hypothesis Using Tidal-Tectonic Theory [#2379]
Orbit eccentric/If ocean lurks within/Where are the fractures?

3:45 p.m. Hammond N. P. *  Barr A. C.  Hirth G.  Parmentier E. M.
The Fatigue of Icy Satellite Lithospheres By Diurnal Tidal Forces [#1511]
We hypothesize that the near-surface of an icy satellites can become fatigued due to repeated tidal
stresses, which will substantially weaken the lithosphere.

4:00 p.m. Wyrick D. Y. *  Buczkowski D. L.
Asteroid Tectonics: Implications for Formation Processes and the Internal Structure of
Solid Bodies [#2626]
Asteroids represent the smallest tectonic bodies and thus provide important data on the spectrum of
tectonic styles and processes that operate on solid bodies.

4:15 p.m. Scully J. E. C. *  Russell C. T.  Yin A.  Bowling T. J.
Faulting as an Expression of Planetary-Type Processes on Vesta [#1286]
Here we show that large-scale faulting, induced by large impacts, is an example of planetary-type
processes that characterize Vesta as an intact protoplanet.

4:30 p.m. Klimeczak C. *  Byrne P. K.
Depth of Jointing and the Transition to Normal Faulting in the Lithospheres of Solid
Solar System Bodies [#1430]
Large joints become faults/Transition depends on g/If g low, faults deep.
Tuesday, March 17, 2015
SPECIAL SESSION: HOW YOUNG IS YOUNG?
8:30 a.m.  Waterway Ballroom 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Chair(s)</th>
<th>Speakers</th>
<th>Title</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Carolyn van der Bogert, Emerson Speyerer</td>
<td>Robbins S. J. *</td>
<td>The Lunar Crater Chronology: History, Current Knowledge, and Holes</td>
<td>#2629</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td></td>
<td>Quantin-Nataf C. *</td>
<td>The Lunar Cratering Rate Over the Last 1 GY Inferred from the Age of the Lunar Rayed Craters</td>
<td>#2692</td>
</tr>
<tr>
<td>8:45 a.m.</td>
<td></td>
<td>Mazrouei S. *</td>
<td>Has the Lunar Impact Flux Rate Changed in the Past Billion Years?</td>
<td>#2331</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td></td>
<td>McEwen A. *</td>
<td>Current Impact Rate on Earth, Moon, and Mars</td>
<td>#1854</td>
</tr>
<tr>
<td>9:15 a.m.</td>
<td></td>
<td>Speyerer E. J. *</td>
<td>Dynamic Moon Revealed with High Resolution Temporal Imaging</td>
<td>#2325</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td></td>
<td>Neumann G. A. *</td>
<td>Copernican-Age Craters and LOLA Decameter-Scale Roughness</td>
<td>#2218</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td></td>
<td>Du J. *</td>
<td>Dating Radar Dark Halo Craters Based on Postimpact Gardening Process of Crater Ejecta</td>
<td>#1346</td>
</tr>
<tr>
<td>10:15 a.m.</td>
<td></td>
<td>van der Bogert C. H. *</td>
<td>Effects of Count Area Size on Absolute Model Ages Derived from Random Crater Size-Frequency Distributions</td>
<td>#1742</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td></td>
<td>Kirchoff M. R. *</td>
<td>The Effects of Terrain Properties on Determining Crater Model Ages of Lunar Surfaces</td>
<td>#2121</td>
</tr>
</tbody>
</table>
10:45 a.m. Zanetti M. * Stadermann A. Jolliff B. L. van der Bogert C. H. Hiesinger H. et al. 
*Auto-Secondary Cratering vs. Target Property Effects on Ejecta Blankets of Copernican Craters: What are the Implications for Age Dating Using Small-Diameter Crater Statistics?* [#1209] 
Ghost craters in impact melt ponds and small-diameter crater statistics on melt ponds and ejecta suggest auto-secondary contamination affects crater statistics.

11:00 a.m. Plescia J. B. * Robison M. S. 
*Lunar Self-Secondary cratering: Implications for cratering and chronology* [#2535] 
Self-secondary craters (secondary craters formed on the primary during cratering) are common on the Moon and have implications for crater-based chronologies.

11:15 a.m. Mahanti P. * Robinson M. S. Stelling R. 
*How old are small lunar craters? A depth-to-diameter ratio based analysis* [#1615] 
Time-dependent degradation state of small lunar craters is modeled from measurements obtained from LRO Narrow Angle Camera based digital elevation models.

*Young lunar mare deposit at Flamsteed indicated from surface radar echo and crater degradation state* [#1320] 
We propose a unique method to derive relative ages for lunar mare deposits using SELENE (Kaguya) LRS echo data.

11:45 a.m. Hiesinger H. * Simon I. van der Bogert C. H. Robison M. S. Plescia J. B. 
*New crater size-frequency distribution measurements for cone crater at the Apollo 14 landing site* [#1834] 
We performed new crater size-frequency distribution measurements for Cone Crater and compared these ages with previous absolute model ages and exposure ages.

---

**Tuesday, March 17, 2015**

**GEOCHEMISTRY AND PETROLOGY OF MARTIAN METEORITES**

*8:30 a.m. Waterway Ballroom 4*

**Chairs:** Aaron Bell Minako Righter

8:30 a.m. Hewins R. H. * Zanda B. Pont S. Humayun M. Assayag N. et al. 
*NWA 8694, a ferroan chassignite* [#2249] 
NWA 8694 has olivine Fo53, intermediate to Chassigny and nakhlites. Although chassignites are fractionated and distinct in Fe/Mg, the REE concentrations overlap.

8:45 a.m. Balta J. B. * McSween H. Y. Tucker K. Wadhwa M. 
*Petrology and geochemistry of new antarctic shergottites: LAR 12011, LAR 12095, and LAR 12240* [#2294] 
Characterization of three new Antarctic shergottites. LAR 12011 is paired with LAR 06319, LAR 12095 and LAR 12240, are paired and their petrogenesis is characterized.

9:00 a.m. Castle N. * Herd C. D. K. 
*Petrogenesis of the LAR 12095/12240 martian meteorite: Comparisons with Tissint and other depleted olivine-phric shergottites* [#1975] 
We demonstrate that LAR 12095 is similar to other olivine-phric shergottites in terms of REE pattern, bulk Mg#, and redox history.
9:15 a.m. Righter M. * Andreasen R. Lapen T. J.
*Lu-Hf and Sm-Nd Systematics of Martian Meteorites Larkman Nunatak 12011 and 12095 [#2889]
We present Sm-Nd and Lu-Hf isotopic data of two newly found martian meteorites, enriched shergottite LAR 12011 and depleted shergottite LAR 12095.

9:30 a.m. Tait K. T. * Day J. M. D. Liu Y.
Update on Highly-Siderophile Element Abundances and Re-Os Isotopic Systematics of Martian Meteorites [#2138]
We report new $^{187}\text{Re}/^{187}\text{Os}$ and highly siderophile element abundances, along with complementary major- and trace-element abundance data on nine shergottites.

High-Precision $^{182}\text{W}$ Measurements of Martian Meteorites for Constraining the Early Evolution of Mars [#1928]
We report the first results of a high-precision W isotope study of martian meteorites aimed at assessing the full extent of $^{182}\text{W}$ variability within Mars.

10:00 a.m. Kayzar T. M. * Borg L. Kruijer T. S. Kleine T. Brennecka G. et al.
Neodymium and Tungsten Isotope Systematics of Mars Inferred from the Augite Basaltic Meteorite NWA 8159 [#2357]
Neodymium and tungsten compositions of NWA 8159 differ from nakhlite, shergottite, and Chassigny compositions. We relate NWA 8159 evolution to martian planetary differentiation.

10:15 a.m. Andreasen R. * Lapen T. J. Righter M. Irving A. J.
Constraints on the Isotopic Composition of the Shergottite Mantle Sources — From Observation Based on the Expanding Rock Record [#2976]
The Rb/Sr, Lu/Hf, and Sm/Nd source characteristics of shergottites are evaluated in terms of the constraints on the mantle source composition.

10:30 a.m. Shearer C. K. * Bell A. S. Burger P. V. McCubbin F. M. Agee C. et al.
The Mineralogical Record of $f_\text{O}_2$ Variation and Alteration in Northwest Africa 8159 (NWA 8159). Evidence for the Interaction Between a Mantle Derived Martian Basalt and a Crustal Component(s) [#1483]
The unique characteristics of NWA 8159 provide an additional perspective for deciphering the petrogenesis of martian basalts and the nature of the martian crust.

10:45 a.m. Bell A. S. * Burger P. V. Shearer C. K. Papke J. J.
Decoding the Redox History Recorded in the Olivine Megacrysts of Y98 with Chromium K-Edge XANES [#2421]
Cr valence in olivine can serve as a high fidelity recorder of the Cr valence ratio and the $f_\text{O}_2$ of the melt from which it grew.

11:00 a.m. Santos A. R. * Agee C. B. McCubbin F. M. Shearer C. K.
Petrology of Iron, Titanium, and Phosphorus Rich Clasts Within Martian Meteorite Northwest Africa 7034 [#1941]
We have characterized igneous clasts within martian meteorite NWA 7034 derived from a lithology similar to terrestrial FTP rocks to examine their petrogenesis.

11:15 a.m. MacArthur J. L. * Bridges J. C. Hicks L. J. Gurman S. J.
The Thermal and Alteration History of NWA 8114 Martian Regolith [#2295]
Using SEM, EPMA, XANES to determine the thermal history of a large regolith blanket on Mars; finding oxidation by fluid at high temperature with slow cooling.
11:30 a.m.  Leroux H. *  Marinova M.  Jacob D.  Hewins R. H.  Zanda B.  et al.

A TEM Study of the Fine-Grained Material of the NWA 7533 Martian Regolith Breccia [1832]

The matrix of NWA 7533 is a submicrometer granoblastic assemblage, partly sintered. The grain boundaries show evidence for a late-stage destabilization.

11:45 a.m.  Cassata W. S. *  Borg L. E.

40Ar/39Ar Systematics of Shergottite NWA 4468 [2742]

Ar isotope data from NWA 4468 yield an age of 188 ± 8 Ma and are used to illustrate the sensitivity of some Shergottite 40Ar/39Ar ages to cosmogenic corrections.

---

CERES AND DAWN: YOUR LAST CHANCE TO TALK ABOUT CERES
BEFORE DAWN DATA WRECK YOUR THEORIES
Tuesday, March 17, 2015
8:30 a.m.  Waterway Ballroom 5

Chairs:  Mark Sykes
       Vishnu Reddy


Dawn Arrives at Ceres: Better than Hubble Resolution [1131]

Dawn is now obtaining better images of Ceres than HST obtains. We examine those images and discuss the mapping for the rest of the mission.

8:45 a.m.  Nathues A. *  Sykes M. V.  Büttner I.  Buczkowski D. L.  Carsenty U.  et al.

Dawn Framing Camera Clear Filter Imaging on Ceres Approach [2069]

Better-than-Hubble imagery by the Dawn Framing Camera will reveal a new planetary surface and address viscous relaxation, mantle convection, and water activity.

9:00 a.m.  Zambon F. *  De Sanctis M. C.  Tosi F.  Longobardo A.  Palomba E.  et al.

Identification of Homogeneous Units on Ceres. First Results by Dawn [1365]

In this work we analyze the first Ceres data provided by the VIR spectrometer onboard Dawn. We focalized on detection and spectral analysis of homogeneous units.

9:15 a.m.  Ehlmann B. L. *  Brown M. E.

First Keck Adaptive Optics Global Infrared (2.2–4.1 μm) Spectral Map of Ceres: Results and a Review of Key Questions in Advance of Dawn’s Exploration [2807]

We show spectral/thermal heterogeneities in our Keck AO global infrared spectral dataset and review key questions prior to Dawn’s arrival at Ceres.


The Potential for Volcanism on Ceres Due to Crustal Thickening and Pressurization of a Subsurface Ocean [2831]

The thickening of an icy crust on Ceres can lead to increased pressure in a subsurface ocean and possible eruption of water onto its surface.

9:45 a.m.  Travis B. J. *  Bland P. A.  Feldman W. C.  Sykes M. V.

Unconsolidated Ceres Model has a Warm Converting Rocky Core and a Converting Mud Ocean [2360]

Numerical modeling suggests that hydrothermal convection in a rocky core and a mud ocean could have occurred in Ceres’ past, and may still be active today.
10:00 a.m. Zolotov M. Yu. * Mironenko M. V.  
*Metasomatism on Early Ceres: A Global Rock Alteration and Fluid Transfer [#1466]*  
Ceres could have experienced leaching of elements from dehydrating rocks, redox transformation of organics, and separation of Na-C-Cl-S gas-rich aqueous fluids.

10:15 a.m. Neveu M. * Desch S. J. Castillo-Rogez J. C.  
*Modeling the Aqueous Geochemistry of Ceres and Other Dwarf Planets [#2526]*  
We model the geochemistry of possible water-rock interactions in the interiors of dwarf planets, focusing on the feedbacks on geophysics.

10:30 a.m. Titus T. N. *  
*Ceres Surface Thermal Inertia: Predictions for Near-Surface Water Ice Stability and Implications for Plume Generating Processes [#1183]*  
We present results from thermal models of Ceres that constrain the possible sources and processes of the recently observed H₂O vapor plumes.

10:45 a.m. Schorghofer N. *  
*Predictions of Depth to Ice on Asteroid Ceres [#1091]*  
An asynchronously coupled numerical model is used to calculate desiccation rates on Ceres. In the polar regions, predicted depths to ice are very shallow.

11:00 a.m. Formisano M. * De Sanctis M. C. Capria M. T. Ammannito E. Capaccioni F. et al.  
*Water Sublimation and Surface Temperature Simulations of Ceres [#2405]*  
Ceres is one of the major objects of the main belt. Using a cometary-like model, we study the water sublimation and the surface temperature.

11:15 a.m. Hibbitts C. A. * Cheng A. Espiritu R. Young E.  
*Characterizing the Hydration Absorption Feature on Ceres Using the BOPPS Infrared Camera [#2928]*  
The NASA BOPPS mission measured the 3-µm absorption feature on Ceres. Preliminary analyses show no evidence for well-ordered hydroxylated minerals.

*Impact Bombardment of Ceres [#2116]*  
Impacts on Ceres/Model crater formation/See below surface.

---

**Tuesday, March 17, 2015**  
**ORIGINS OF THE SOLAR SYSTEM: ISOTOPE COSMOCHEMISTRY**  
8:30 a.m. Waterway Ballroom 6

**Chairs:** Katherine Bermingham  
Yuri Amelin

8:30 a.m. Wasserburg G. J. * Trippella O. Busso M.  
*Isotopic Anomalies in Cr, Fe and Ni from “s” Processing in AGB Stars [#1204]*  
The Fe group nuclei ⁵⁴Cr, ⁵⁶Fe, and ⁶⁰Ni are readily produced in AGB stars during “s” processing. These nuclides do not require SNe production.

8:45 a.m. Dauphas N. * Poitras F. Burkhardt C.  
*Nebular Fractionation (not Core Formation) is Responsible for the Heavy Silicon Isotope Compositions of Angrites and Earth [#1417]*  
The heavy Si isotopic compositions of angrites and Earth reflect isotopic fractionation between forsterite and gaseous SiO, rather than core partitioning.
The Galactic Chemical Evolution of Silicon: A Survey of Interstellar Silicon Isotope Abundances [#2877]
A survey of interstellar silicon isotope ratios based on the \(J=1-0\) transition of silicon monoxide in active star forming regions across the galaxy.

Nucleosynthetic Strontium Isotope Anomalies in Carbonaceous Chondrites [#1085]
The correlations in \(\mu^{84}\text{Sr}-\varepsilon^{54}\text{Cr}\) diagram for various meteorites cannot be created by a single nebular process, but suggest a complicated nebular history.

Potential Collateral Effects in Stable Hafnium Isotopes Due to the S-Process Production of the Short-Lived Radionuclide \(^{182}\text{Hf}\)? [#2419]
The co-production of stable Hf isotopes and the short-lived \(^{182}\text{Hf}\) by the s-process is assessed to explain the Hf isotope composition of solar system materials.

Comparing Measured and Modeled Ti Isotope Fractionation in CAI SJ101 and Implications for the Origin of CAIs [#2472]
Ti isotope ratios are presented for CAI SJ101. The results are compared to a condensation model for Ti in order to better understand the origin of CAIs.

Nucleosynthetic Anomalies in Palladium from IAB, IVA, and IVB Iron Meteorites [#1265]
Nucleosynthetic anomalies resolved in IVA and IVB iron meteorites while IAB iron meteorite group exhibits no anomalies.

Chromium and Titanium Isotope Systematics of Allende CAIs [#2920]
We report Cr and Ti isotopic data for Allende CAIs and discuss the variability of Cr and Ti anomalies in the context of understanding r-process nucleosynthesis.

The Cadmium Isotopic Composition of Earth and Carbonaceous Chondrites [#2822]
New Cd isotope data for terrestrial rocks and meteorites give insight into the origin of Earth’s volatile budget.

Refinement of the Mo-Ru Isotope Cosmic Correlation Using High Precision Mo and Ru Isotope Data [#1588]
Discussion of the Mo-Ru cosmic correlation and its refinement using new high-precision Mo and Ru data collected using N-TIMS.

Molybdenum Isotope Evidence for Diverse Genetics Among IAB Iron Meteorite Complex Subgroups [#2524]
Nucleosynthetic Mo isotopic differences among IAB iron meteorite complex subgroups are reported, indicating that the complex represents multiple parent bodies.

While iron meteorite parent bodies exhibit variable deficits in s-process Mo isotopes, they feature essentially identical stable Mo isotope compositions.
11:30 a.m.  Meier M. M. M. *  Cloquet C.  Marty B.  
*Towards Mercury (Hg) Cosmochemistry: Variable Contributions of Supernova-Derived Hg, or Mass-Independent Fractionation by Photodegradation? [#1101]*
We have analyzed Hg (concentrations/isotopes) in a suite of chondrites and achondrites. We find isotopic anomalies that might suggest the addition of supernova Hg.

11:45 a.m.  Young E. D. *  
*The Birth Environment of the Solar System Assessed Using a Bayesian Analysis of Radionuclide Concentrations [#1139]*
Bayesian methods are used to show quantitatively that the most likely birth environment of the solar system was a massive self-enriched star-forming region.

---

**Tuesday, March 17, 2015**

**HIT ME UP! IMPACT MODELING AND EXPERIMENTS**

8:30 a.m.  Montgomery Ballroom  
**Chairs:** Ross Potter  
William Bottke

8:30 a.m.  Housen K. R. *  Holsapple K. A.  
*Experimental Measurements of Momentum Transfer in Hypervelocity Collisions [#2894]*
We perform experiments to measure the momentum transferred to a target during hypervelocity collisions.

8:45 a.m.  Throop H. B. *  Durda D. D.  Shu A.  Geiss R. H.  James D.  et al.  
*Experimental Measurement of the Sub-Micron Ejecta from Hypervelocity Impacts into Meteorites [#2258]*
We accelerate tiny dust grains and watch the spray as they crash into a meteorite.

9:00 a.m.  Ohno S. *  Sakaiya T.  Kurosawa K.  Kadono T.  Arai T.  et al.  
*Impact-Induced Melt Droplets Created by Hypervelocity Impact Experiments Using a Laser Gun [#2094]*
We established a new experimental method to collect and analyze the impact-induced melt droplets created by actual impact experiments using a laser gun.

*Experimental Cratering in Carrara Marble: Latest Results from the MEMIN Research Unit [#2447]*
Craters from experiments with marble targets are smaller than expected. This may indicate a greater increase in dynamic strength for marble than silicates.

9:30 a.m.  Collins G. S. *  
*Testing Numerical Models of Simple Crater Formation [#1342]*
New models of simple crater formation on Earth and the Moon are consistent with drill core measurements, Bouguer gravity anomalies, and structural observations.

9:45 a.m.  Movshovitz N. *  Nimmo F.  Koryckansky D. G.  Asphaug E.  
*Examining Impact Disruption Criteria for Mid-Sized Icy Bodies [#2495]*
We use new and old simulation data to construct scaling laws for catastrophic disruption criteria and compare them with ones in existing literature.

10:00 a.m.  Bruck Syal M. *  Schultz P. H.  
*Impact Delivery of Water at the Moon and Mercury [#1680]*
Asteroids provide most (>95%) of the Moon’s impact-delivered water, while cometary micrometeorites contribute most (>99%) of Mercury’s impact-delivered water.
*The Formation of Lunar Multi-Ring Basins [#1362]  
Here we present the first numerical models that directly resolve the development of Orientale’s topographic rings during crater formation.

10:30 a.m.  Potter R. W. K. *  Kring D. A.  Collins G. S.  
Scaling of Basin-Sized Impacts and Implications for the Moon and Early Earth [#1952]  
Data output from a suite of recent lunar basin numerical models is further interrogated to formulate scaling laws specific to basin-scale impacts.

10:45 a.m.  Stewart S. T. *  Lock S. J.  Mukhopadhyay S.  
*How Much of the Mantle Melts in a Giant Impact? [#2263]  
Impact energy is deposited heterogeneously; shock-induced melting of full mantle is rare; mantles may remain partially solid during the giant impact stage.

11:00 a.m.  Lock S. J. *  Stewart S. T.  Leinhardt Z. M.  Mace M.  Ćuk M.  
High-angular momentum impacts lead to fundamentally different post-impact states. Efficient mixing is possible and the Moon forms by partial condensation.

11:15 a.m.  Rufu R. *  Aharonson O.  
*A Multiple Impact Hypothesis for Moon Formation [#1151]  
In order to evaluate the possibility of forming the Moon from a merger of multiple moonlets, we investigate less massive impactors than previously considered.

11:30 a.m.  Bottke W. F. *  Marchi S.  Vokrouhlicky D.  Robbins S.  Hynek B.  et al.  
New Insights into the Martian Late Heavy Bombardment [#1484]  
Using our E-belt model that matches Earth/Moon/asteroid belt constraints, we argue Mars’ observed D > 150 km craters were all made by the LHB 2.6–4.1 G.y. ago.

---

**Tuesday, March 17, 2015 [T251]**  
**TERRESTRIAL IMPACT CRATERING**  
1:30 p.m.  Waterway Ballroom 1

### Chairs:  
Keith Milam  
Haley Sapers

1:30 p.m.  Zanetti M. *  Wilk J.  Kukko A.  Kaartinen H.  Kohv M.  et al.  
The Structure of the Kaali Impact Crater (Estonia) Based on 3D Laser Scanning, Photogrammetric Modeling, and Strike and Dip Measurements [#1211]  
The 110-m-diameter Kaali Main impact crater is mapped in unprecedented detail, quantifying structural modification and the first report of the overturned-flap.

Shatter Cones at the Keurusselkä Impact Structure and Their Relation to Local Jointing [#1376]  
Field work at the Keurusselkä Impact structure, Finland, revealed a close relationship between shatter cone formation and pre-impact joint systems.

2:00 p.m.  Ferrière L. *  Alwmark C.  Holm-Alwmark S.  Ormø J.  Leroux H.  et al.  
The Hummeln Structure (Sweden) — Impact Origin Confirmed and Its Link to the L-Chondrite Parent Body Break-Up Event [#1758]  
The confirmation of the impact origin of the Hummeln structure also strengthens the hypothesis of an increased cratering rate during the Middle Ordovician.
*Revisiting the West Clearwater Lake Impact Structure, Canada [#1621]
Here, we revisit the impactites of the West Clearwater Lake impact structure following a 2014 expedition; the first field study of this structure for 40 years.

2:30 p.m. Biren M. B. * Wartho J-A. van Soest M. C. Hodges K. V. Spray J. G.  
Diachronity of the Clearwater West and Clearwater East Impact Structures Supported by (U-Th)/He Dating [#2690]
The Clearwater Lake structures have long been considered to have coeval formation ages. We report (U-Th)/He zircon dates supporting their possible diachronity.

2:45 p.m. Tikoo S. M. * Swanson-Hysell N. L. Fairchild L. Renne P. R. Shuster D. L.  
Origins of Impact-Related Magnetization at the Slate Islands Impact Structure, Canada [#2474]
Paleomagnetic and rock magnetic data tentatively favor a thermal origin for an impact-related magnetic overprint at the Slate Islands Impact Structure.

3:00 p.m. Simpson S. L. * Boyce A. J. Lambert P. Lee M. R. Lindgren P.  
Stable Isotope Studies of the Rochechouart Impact Structure: Sources of Secondary Carbonates and Sulphides Within Allochthonous and Parautochthonous Impactites [#1740]
Stable isotope analyses and comparison of various post-impact hydrothermal carbonates and sulphides found throughout the Rochechouart impact structure.

Coesite at the Lonar Crater: The Importance of Pre-Impact Alteration and Shock Heterogeneity [#2086]
Secondary/Quartz in a vesicle is shocked/Really weird textures.

Impact-Generated Hydrothermal Activity Beyond the Ries Crater Rim [#2917]
Mineralogical data from surficial suevite sampled at depth from Ries suggest impact-induced hydrothermal activity occurred beyond the crater rim.

Zinc and Copper Isotopes in Central European Tektites and Sediments from the Ries Impact Area — Implications for Material Sources and Loss of Volatile Elements During Tektite Formation [#1951]
New Zn-Cu data shows significantly different isotope fractionation for Zn-Cu during tektite formation.

4:00 p.m. Wasson J. T.  
*An Origin of Splash-Form Tektites in Impact Plumes [#2879]
Australasian splash-form tektites were formed from loess entrained into an impact plume inclined toward the SSE, the direction of the projectile trajectory.

4:15 p.m. Howard K. T. * Bland P. A.  
Biomass Capture and Survival in Meteorite Impacts [#2269]
We explore mechanisms of biomass survival during meteorite impact, explaining our discovery of pristine organics inside 800,000-year-old Darwin glass.

Discovery of Extraterrestrial Component Carrier Phases in Archean Spherule Layers from the Barberton Greenstone Belt, South Africa [#1864]
Study of sedimentary, petrographic, mineralogical, and geochemical characteristics of Archean spherule layers from the Barberton Greenstone Belt, South Africa.
Identifying Extraterrestrial Signatures in Mafic Impactites: An Assessment Based on the Lonar Crater, India

Platinum-group element and Os isotope analyses of impactites from the Lonar crater, India, indicate the presence of a minor but measurable meteoritic component.

Tuesday, March 17, 2015
MARS GEOMORPHOLOGY AND CLIMATE: FIRE AND ICE
1:30 p.m. Waterway Ballroom 4

Chairs: Laura Kerber
Mark Salvatore

1:30 p.m. Dohm J. M. * Spagnuolo M. G. Williams J. P. Viviano-Beck C. E. Karunatillake S. et al. The Mars Plate-Tectonic-Basement Hypothesis #1741
Spatial arrangement of structures, analogous to that of the western U.S., and the recorded Hadean-age-equivalent information of paramount significance.

1:45 p.m. Fastook J. L. * Head J. W. Late Noachian Icy Highlands: Scenarios for Top-Down Melting and Volumes of Meltwater #1552
We present response of supply-limited Late Noachian icy highland ice sheets to transient climates consistent with results from GCMs of an adiabatic atmosphere.

2:00 p.m. Head J. W. III * Cassanelli J. P. Late Noachian-Early Hesperian Flood Volcanism in Hesperia Planum: Large-Scale Lava-Ice Interactions and Generation and Release of Meltwater #2250
Accumulating Hesperia Planum lavas could raise geotherms to melt cryospheric ground ice and surface snow and ice, causing subsidence and meltwater drainage.

2:15 p.m. Bouley S. * Baratoux D. Matsuyama I. Forget F. Costard F. et al. True Polar Wander Recorded by the Distribution of Martian Valley Networks #1887
Martian valley networks distribution suggest a reorientation of Mars’ rotation axis with respect to the mantle, or true polar wander (TPW).

2:30 p.m. Ivanov M. A. * Hiesinger H. Reiss D. Bernhardt B. Erkeling G. et al. The Deuteronilus Contact on Mars: Morphology, Age, Topography #1113
The absolute majority of the mapped Deuteronilus contact in the northern plains (~98%) follows two distinct topographic levels: ~3,900 m and ~3,600 m.

2:45 p.m. Salvatore M. R. * Christensen P. R. Origin and Evolution of the Vastitas Borealis Formation in the Vicinity of Chryse and Acidalia Planitiae, Mars #1457
We test the hypothesis that the Vastitas Borealis Formation formed through the burial, compaction, and expulsion of mud derived from the major outflow channels.

3:00 p.m. Ramsdale J. D. * Balme M. R. Conway S. J. Gallagher C. Ponding, Draining and Tilting of the Cerberus Plains; a Cryolacustrine Origin for the Sinuous Ridge and Channel Networks in Rahway Valles, Mars #1961
Observation: branching channel network, terrace-like forms, sinuous ridges. Interpretation: a rapidly filled and drained lake, probably deeply frozen in places.
3:15 p.m. Jacobsen R. E. * Burr D. M.  
*Wet-to-Dry Hydrological Transition Encapsulated in Fluvial Stratigraphy of Aeolis Dorsa, Mars [#1011]*  
The Aeolis Dorsa region, ~800 km east of Gale Crater, preserves a rich stratigraphy of inverted fluvial deposits, including meander deposits and alluvial fans.

3:30 p.m. Goudge T. A. * Aureli K. L. Head J. W. Mustard J. F. Fassett C. I.  
*Candidate Closed-Basin Lakes on Mars: Insights into Timing and Intensity of Fluvial Activity [#1190]*  
Detailed analyses of candidate closed-basin lakes on Mars indicate young, transient, and low-intensity fluvial activity for the majority of studied basins.

3:45 p.m. Kesztasty L. * Jaeger W. Dundas C. Bray V. Sutton S.  
*Enigmatic Features in Southern Elysium: Evidence for Subsurface Lava-Ice Interactions [#2547]*  
Strange features in southern Elysium Planitia are a puzzlement. We suggest they form by mixing lava, ice, and dirt. You might not agree, but you want to see!

4:00 p.m. Soare R. J. * Conway S. J. Gallagher C. Balme M. R. Dohm J. M.  
*Pre- and Post-Mantle Periglaciation in Argyre Planitia, Mars [#1218]*  
New evidence of periglacialism in Argyre Planitia including gelifluction lobes and non-sorted/sorted polygons separated stratigraphically by an “ice-rich” mantle.

4:15 p.m. Scanlon K. E. * Head J. W.  
*The Recession of the Dorsa Argentea Formation Ice Sheet: Geologic Evidence and Climate Simulations [#2247]*  
We use fluvial fluxes and ice paleotopography calculated from glacial features in the DAF with GCM simulations to examine the climate in which the DAF formed.

4:30 p.m. Kerber L. * Forget F. Wordsworth R.  
*The Marginal Case for Sulfur-Driven Warming in the Early Martian Atmosphere [#2666]*  
Can sulfur warm much?/It depends on the details/But not so likely.

4:45 p.m. Wordsworth R. D. * Kerber L. Pierrehumbert R. T. Forget F. Head J. III  
*Comparison of Warm, Wet and Cold, Icy Scenarios for Late Noachian Mars in a 3D General Circulation Model [#1486]*  
We present a global 3-D modeling comparison between warm, wet and cold, icy scenarios for early Mars. We discuss implications for H2O transport to Gale Crater.

---

**Tuesday, March 17, 2015**

**EXOBIOLOGY: PREBIOTIC CHEMISTRY TO EXTREMOPHILE BIOLOGY**

1:30 p.m. Waterway Ballroom 5

**Chairs:** Michael Callahan  
Heath Mills

1:30 p.m. Aponte J. C. * Dworkin J. P. Elsila J. E.  
*High Abundance of Methylamine in the Orgueil (CI1) Meteorite [#1075]*  
Molecular, isotopic, and enantiomeric analyses of aliphatic organic amines in the Orgueil meteorite.

1:45 p.m. Cooper G. * Rios A. C.  
*Meteoritic Sugar Derivatives: Enantiomer Excesses and Laboratory Attempts at Duplication [#2993]*  
This presentation will include the results of recent analyses of enantiomer ratios of meteoritic compounds as well attempts at laboratory recreation of such excesses.
2:00 p.m. Gerasimov M. V. * Zaitsev M. A. Safonova E. N.
*Peculiarities of Organic Matter Formation in Impact-Induced Vapor Plume [#1839]*
Heterogeneous catalysis on the surface of condensed particles is the main mechanism of organic compounds synthesis in the impact-induced vapor cloud.

2:15 p.m. Callahan M. P. * Cleaves H. J. II
*Complex Nitrogen Heterocycles in Aqueous Cyanide and Formaldehyde Reactions: Implications for Meteoritic and Prebiotic Chemistry [#1444]*
We used DART mass spectrometry to measure N-heterocycles in NH$_4$CN/H$_2$CO reactions and discuss the significance of the data to meteorites and the Miller Paradox.

2:30 p.m. Chevrier V. F. * Singh S. Nna-Mvondo D. Mege D.
*Infrared Properties of Titan Tholins in Liquid Methane and Ethane: Detection of Complex Organics in Titan Lakes [#2936]*
Simulation experiments show that tholins might be potentially detected in liquid hydrocarbons via reflectance spectroscopy in the near-infrared region.

2:45 p.m. Freissinet C. * Glavin D. P. Buch A. Szopa C. Kashyap S. et al.
*First In Situ Wet Chemistry Experiment on Mars Using the SAM Instrument: MTBSTFA Derivatization on a Martian Mudstone [#2934]*
High molecular masses were detected during the first MTBSTFA derivatization experiment with the Sample Analysis at Mars (SAM) instrument onboard Curiosity.

3:00 p.m. Buch A. * Belmahdi I. Szopa C. Freissinet C. Glavin D. P. et al.
*Determination of the Possible Sources of Chlorinated Hydrocarbons Detected During Viking and MSL Missions [#2066]*
This study investigates several propositions for chlorinated hydrocarbon formation, detected by the SAM experiment.

3:15 p.m. Nie N. X. * Dauphas N.
*Iron Isotope Constraints on the Photo-Oxidation Pathway to BIF Formation [#2635]*
Using high-precision Fe isotope measurements, we explore the possibility of a completely abiotic mechanism for BIF precipitation.

3:30 p.m. Cannon K. M. * Mustard J. F.
*Follow the Glass: Preservation and Colonization Potential of Martian Glass-Bearing Impactites [#1900]*
Basaltic glass acts as a biological substrate on Earth, and impact glass can preserve biosignatures. Here we map proximal impact glass deposits on Mars.

3:45 p.m. Sinha N. * Kral T. A.
*Growth of Methanogens on Different Mars Regolith Analogues and Stable Carbon Isotope Fractionation During Methanogenesis [#1628]*
Stable carbon isotope fractionation of methane produced by three different strains of methanogens growing on four different Mars regolith analogues.

4:00 p.m. Mills H. J. * Reese B. K.
*Expanding the Limits of Life into the Ocean Crust: Metabolically Active Microbial Populations Within Mid-Atlantic Ridge Subsurface Basalt [#2849]*
The objective of this study was to provide the first characterization of metabolically active microbial populations within multiple subsurface crustal samples.
4:15 p.m. Wright S. P. *  
Microbial Diversity Analyses of Terrestrial Shocked Basalt and Shocked Basaltic Soil: Implications for Panspermia and Future Exobiology Measurements [#2758]  
Gene sequencing reveal a wealth of bacteria, fungi, and other microbes in Lonar Crater shocked basalt and soil. SNC’s, panspermia, and exobiology are discussed.

4:30 p.m. Pasini J. L. S. * Price M. C.  
Panspermia Survival Scenarios for Organisms that Survive Typical Hypervelocity Solar System Impact Events [#2725]  
Panspermia survival scenarios via icy impact delivery for various micro-organisms on solar system bodies and some example exoplanet super-Earths.
Tuesday, March 17, 2015

PLANETARY DIFFERENTIATION
3:15 p.m. Waterway Ballroom 6

**Chairs:** Richard Walker
Zhicheng Jing

*Onset of a Planetesimal Dynamo and the Lifetime of the Solar Nebular Magnetic Field [#2516]*
Paleomagnetic results from D’Orbigny and Sahara 99555 (~4563.4 Ma) show almost no paleo-field, indicating a delayed dynamo onset and the solar nebular lifetime.

3:30 p.m. Fischer-Gödde M. * Burkhardt C. Kleine T.
*High-Precision Ruthenium Isotope Measurements for Constraining Late Accretion [#2988]*
Nucleosynthetic Ru isotope anomalies in chondrites suggest that none of the known chondrite groups can be the source of the late veneer.

3:45 p.m. McCoy T. J. * Gardner-Vandy K. G. Bullock E. S. Corrigan C. M.
*Low-Temperature, Disequilibrium Partial Melting of CV Chondrites: Insights into the Early Stages of Core Formation [#2393]*
CV chondrite melting produces metal-sulfide melts with spinel if reduced. Possible magnetite-sulfide melts form if oxidized, producing a new type of core.

4:00 p.m. Jing Z. * Han J. Yu T. Wang Y.
Sound velocity and equation of state of Fe-Si and Fe-C liquids were determined at high pressure and high temperature conditions up to 6 GPa and 1973 K.

4:15 p.m. Li Y. L. * Dasgupta R. D. Tsuno K. T. Monteleone B. M. Shimizu N. S.
*Carbon Solubility and Partitioning in Fe-Rich Alloy and Silicate Melt Systems at 3–8 GPa and 1600°–2200°C: Implications for Core-Mantle Differentiation and Degassing of Magma Oceans [#2515]*
Carbon geochemistry in magma oceans, and the fractionation of carbon between core and silicate mantle.

4:30 p.m. Walker R. J. * Toubul M. Puchtel I. S.
*Tungsten Isotope Constraints on Big Events in Earth-Moon History: Current Insights and Limitations [#1857]*
The tungsten isotopic difference between the Earth and Moon has major implications for the putative Moon-forming giant impact and resulting processes.

4:45 p.m. Kruijer T. S. * Kleine T. Fischer-Gödde M. Sprung P.
*High-Precision $^{182}$W Composition of the Moon: Constraints on Late Accretion and Lunar Formation Models [#1885]*
The Moon exhibits a $28 \pm 4$ ppm $^{182}$W excess over the modern terrestrial mantle, consistent with the expected $^{182}$W difference resulting from the late veneer.
Tuesday, March 17, 2015
EARLY SOLAR SYSTEM CHRONOLOGY
1:30 p.m.  Montgomery Ballroom

Chairs:  Rasmus Andreassen
         Glenn MacPherson

1:30 p.m.  Papanastassiou D. A. *
Initial $^{87}$Sr/$^{86}$Sr Chronology: A Journey Through 4.5 Decades [#2243]
The fine-resolution chronology based on initial $^{87}$Sr/$^{86}$Sr is addressed, as well as the possible effects of
$^{84}$Sr isotope anomalies.

1:45 p.m.  Amelin Y. *  Williams C. D.  Wadhwa M.
$U$-$Th$-$Pb$ and $Rb$-$Sr$ systematics of Allende FUN CAI CMS-1 [#2355]
FUN CAI CMS-1 contains 1.2 ppb U and ~500 ppb Th. Extreme U/Th fractionation could be caused by aqueous processing of the precursor.

2:00 p.m.  Iizuka T. *  Yamaguchi T.  Hibiya Y.  Amelin Y.
The Solar Initial Abundance of Hafnium-176 Revealed by Eucrite Zircon [#1602]
We determine the initial abundance of hafnium-176 of the solar system through the first high-precision Lu-Hf isotopic analysis of meteorite zircon.

2:15 p.m.  Lapen T. J. *  Righter M.  Andreassen R.
Lu-Hf and Sm-Nd Isotope Systematics of Non-Cumulate Eucrites [#2863]
We present isotope data that adds to the growing dataset of anomalous Lu-Hf isotope systematics for early solar system achondrites.

2:30 p.m.  Mane P. *  Bose M.  Wadhwa M.
Resolved Time Difference Between Calcium Aluminum Rich Inclusions and Their Wark Lovering Rims Inferred from Al-Mg Chronology of Two Inclusions from a CV3 Carbonaceous Chondrite [#2898]
Al-Mg chronology of 2 CAIs and their Wark Lovering rims from a CV3 meteorite reveals a time difference in formation.

Supra-Canonical Initial $^{26}$Al/$^{27}$Al from a Reprocessed Allende CAI [#2918]
High-precision LA-MC-ICPMS Al-Mg study of two transects across the melilite mantle of an Allende B1 CAI.

3:00 p.m.  Bullock E. S. *  Tenner T. J.  Nakashima D.  Kita N. T.  MacPherson G. J. et al.
High Precision Al-Mg Systematics of Forsterite-Bearing Type B CAIs [#1971]
Melted inclusions/From early solar system/Help constrain timing.

3:15 p.m.  Tang H. *  Liu M.-C.  McKeegan K. D.  Dauphas N.
$^{26}$Al-$^{26}$Mg Systematics in Chondrules of an Ungrouped Type 3.05 Chondrite NWA 5717 [#2245]
We analyzed Al-Mg systematics in the chondrules from NWA 5717 to constrain their formation ages and back-calculate a $^{56}$Fe upper limit in the early solar system.

3:30 p.m.  Liu M.-C. *
A Search for Synchronicity Between Aluminum-26 and Calcium-41 in the Early Solar System [#1282]
Isotopic analyses of a compact Type A CAI were performed in hopes of constraining the concordant decay between $^{26}$Al and $^{41}$Ca.
3:45 p.m. MacPherson G. J. * Nagashima K. Krot A. N. Doyle P. M. Ivanova M.  
$^{53}$Mn-$^{55}$Cr Systematics of Ca-Fe Silicates in CV3 Chondrites [#2760]  
Mn-Cr isotope analyses of kirschsteinite in CV3 chondrites yields $^{53}$Mn/$^{55}$Mn = $(3.37 \pm 0.43) \times 10^{-6}$, indicating formation on the parent body ~3 Ma after CAIs.

4:00 p.m. Budde G. * Kleine T. Kruijer T. S. Metzler K.  
Hafnium-Tungsten Age of Allende Chondrules and Matrix [#2262]  
Allende chondrules have a Hf-W age of 4 ± 1 Ma after CAI formation. Matrix and chondrules show large and complementary nucleosynthetic W isotope anomalies.

4:15 p.m. Archer G. J. * Touboul M. Walker R. J. Wasson J. T.  
$^{182}$Hf-$^{182}$W Isotopic Systematics of H Chondrites: Thermal History of the H Chondrite Parent Body [#2172]  
The $^{182}$Hf-$^{182}$W isotopic system constrains the thermal evolution of the H chondrite parent body. Size-sorted metal grains may have different thermal histories.

4:30 p.m. Marks N. E. * Borg L. E. Hutcheon I. D. Jacobsen B. Clayton R. N. et al.  
Samarium-Neodymium Chronology of an Allende Type A CAI AINO 1-16 [#2793]  
Sm-Nd chronology of a Type A CAI from Allende is concordant with chronology of a Type B CAI, implying that common types of CAIs crystallized contemporaneously.
Wednesday, March 18, 2015
LUNAR SAMPLES, PETROLOGY, AND GECHEMISTRY:
LITTLE SLICES OF TRUTH AND BEYOND
8:30 a.m. Waterway Ballroom 1

Chairs: Bradley Jolliff
Jennifer Rapp

8:30 a.m. Kohl I. E. * Warren P. H. Young E. D.
*Earth and Moon are Indistinguishable in $\Delta^{17}O$ to Several Parts Per Million [#2867]*
Moon (BSM) and Earth (BSE) are indistinguishable in $\Delta^{17}O$ at the 2 ppm level; $-\Delta^{17}O$ values in a
highland anorthositic troctolite show mass fractionation.

8:45 a.m. Snape J. F. * Nemchin A. A. Bellucci J. J. Whitehouse M. J.
The "Rusty Rock" and Lunar Pb [#1827]
U-Pb SIMS analyses of Ca-phosphates in the sample 66095 are used to provide key information about
the evolution of the Moon and initial lunar Pb compositions.

9:00 a.m. Bell A. S. * Shearer C. K. deMoor J. M. Provencio P.
Using the Sulfide Replacement Textures in Lunar Breccia 67915 to Construct a Thermodynamic Model
of H-S-O-C Fluids in the Lunar Crust [#2479]
Using sulfide replacement textures in lunar breccia 67915, we have calculated the temperature, $fO_2$, and
$fS_2$, and bulk composition of a lunar crustal fluid.

9:15 a.m. Gaffney A. M. * Borg L. E. Shearer C. K. Burger P. V.
Chronology of 15445 Norite Clast B and Implications for Mg-Suite Magmatism [#1443]
15445 norite clast B yields a $^{147}$Sm-$^{143}$Nd age of 4332 ± 79 Ma and $^{142}$Nd-$^{143}$Nd internal isochron age
of 4320 +82/–196 Ma. Rb-Sr and Lu-Hf systems are disturbed.

9:30 a.m. Shearer C. K. * Burger P. V. Bell A. S. Guan Y. Neal C. R.
Exploring the Moon’s Surface for Remnants of the Lunar Mantle 1. Dunite Xenoliths in Mare Basalts.
A Crustal or Mantle Origin? [#1426]
We assess the presence of deep crustal and mantle material on or near the lunar surface. Here, we
report on the petrogenesis of dunite xenoliths in A17 basalts.

9:45 a.m. Wittmann A. * Korotev R. L. Jolliff B. L.
Lunar Mantle Spinel in Dhofar 1528? [#1460]
Dhofar 1528 contains mineral assemblages that could have originally crystallized as cumulates in the
mantle of the Moon.

10:00 a.m. Elardo S. M. * Shearer C. K. Vander Kaaden K. E. McCubbin F. M. Bell A. S.
Petrogenesis of Primitive and Evolved Basalts in a Cooling Moon: Experimental Constraints from the
Youngest Known Lunar Magmas [#2155]
Petrologic experiments on two basaltic lunar meteorite compositions are used to constrain their origin
and the pressure and temperature conditions of melting.

10:15 a.m. Valencia S. N. * Jolliff B. L. Korotev R. L. Seddio S. M.
New Compositional Data for Apollo 12 Samples 12013 and 12033: Insights into Proto-
Lithologies [#2884]
For 12013/A three-component system/New data to see.
<table>
<thead>
<tr>
<th>Time</th>
<th>Name(s)</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cl-rich glasses in 15382 and 15386 suggest a link between Cl and KREEP.</td>
<td></td>
</tr>
<tr>
<td>10:45 a.m.</td>
<td>Roberts S. E., Neal C. R. *</td>
<td>VHK Basalt Petrogenesis via Magma Chamber and Impact Processes [1297]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Detailed examination of VHK basalt clasts from breccias indicate communication between the basalt and matrix that has implications for the VHK signature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A new look at olivine-melt Fe-Mg exchange using lunar ultramafic magma experiments reveals the importance of network modifying melt species.</td>
<td></td>
</tr>
<tr>
<td>11:15 a.m.</td>
<td>Rapp J. F., Lapen T. J., Draper D. S.</td>
<td>REE Partitioning in Lunar Materials [2878]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>We present the first experimentally derived plagioclase/melt partition coefficients in lunar compositions covering the entire suite of REE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>An overview of the petrography, mineral chemistry, bulk chemistry, and oxygen isotopic composition of lunar meteorite Dhofar 1983.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Monday, March 16, 2015**

<table>
<thead>
<tr>
<th>Time</th>
<th>Name(s)</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cl-rich glasses in 15382 and 15386 suggest a link between Cl and KREEP.</td>
<td></td>
</tr>
<tr>
<td>10:45 a.m.</td>
<td>Roberts S. E., Neal C. R. *</td>
<td>VHK Basalt Petrogenesis via Magma Chamber and Impact Processes [1297]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Detailed examination of VHK basalt clasts from breccias indicate communication between the basalt and matrix that has implications for the VHK signature.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A new look at olivine-melt Fe-Mg exchange using lunar ultramafic magma experiments reveals the importance of network modifying melt species.</td>
<td></td>
</tr>
<tr>
<td>11:15 a.m.</td>
<td>Rapp J. F., Lapen T. J., Draper D. S.</td>
<td>REE Partitioning in Lunar Materials [2878]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>We present the first experimentally derived plagioclase/melt partition coefficients in lunar compositions covering the entire suite of REE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>An overview of the petrography, mineral chemistry, bulk chemistry, and oxygen isotopic composition of lunar meteorite Dhofar 1983.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Wednesday, March 18, 2015**

<table>
<thead>
<tr>
<th>Time</th>
<th>Name(s)</th>
<th>Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Dundas C. M., McEwen A. S., Sutton S.</td>
<td>New Constraints on the Locations, Timing and Conditions for Recurring Slope Lineae Activity on Mars [2327]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observations and modeling provide new constraints on the conditions for RSL activity on Mars.</td>
<td></td>
</tr>
<tr>
<td>8:45 a.m.</td>
<td>Schaefer E. I., McEwen A. S., Mattson S., Ojha L.</td>
<td>Quantifying the Behavior of Recurring Slope Lineae (RSL) [2930]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>We are quantifying the life cycles of RSL in unprecedented detail to determine with what mechanism or mechanisms they are most consistent.</td>
<td></td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>Chojnacki M., McEwen A. S., Dundas C. M., Ojha L.</td>
<td>Widespread Recurring Slope Lineae of Valles Marineris [2537]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Here, we describe the widespread and densely populated recurring slope lineae detected within Valles Marineris and provide initial volumetric water estimates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experiments were conducted in an attempt to mimic RSL formation at varying slopes.</td>
<td></td>
</tr>
</tbody>
</table>
*Seasonal Water Budget Suggests that a Valles Marineris Recurring Slope Lineae (RSL) Site Must be Recharged by an Aquifer [#2669]*
Valles Marineris RSL are briny, have a large water budget, sourced via a pressurized aquifer, and are a significant regional source of atmospheric water vapor.

9:45 a.m. Edwards C. S. * Piqueux S.
The Water Content of Recurring Slope Linea on Mars [#2286]
We constrain the maximum amount of water (<3 wt%) in martian recurring slope linea using a near surface thermal model and measurements from THEMIS.

10:00 a.m. Eddings E. A. * Sylvest M. E. Dixon J. C. Chevrier V. F.*
Experimental Simulations of Recurring Slope Lineae [#1263]
Experimental simulations of reoccurring slope linea were conducted under varying topographic and hydrologic conditions.

Slope Streaks on Mars: Analysis of Geometric Parameters [#1115]
Slope streaks start at slopes steeper than 20°. They can propagate hundreds of meters on ~10° steep slopes. This is difficult to reconcile with dry granular flow.

10:30 a.m. Pilorget C. Forget F. *
CO₂-Driven Formation of Gullies on Mars [#2471]
Gullies form when CO₂ ice defrost: Large gas fluxes run through the soil pores below the ice. They destabilize the soil and create gas-lubricated debris flows.

10:45 a.m. Sylvest M. E. * Conway S. J. Patel M. R. Dixon J. C. Barnes A.
Laboratory Observations of Mass Wasting Triggered by Sublimation of Condensed CO₂ Frost Under Martian Conditions [#2667]
Laboratory experiments examining the potential role of CO₂ sublimation in martian gully evolution.

11:00 a.m. Dickson J. L. * Kerber L. Fassett C. I. Head J. W. Forget F. et al.
Formation of Gullies on Mars by Water at High Obliquity: Quantitative Integration of Global Climate Models and Gully Distribution [#1035]
GCM simulations show that melting is unlikely at almost all gully locations in the southern hemisphere today, while permitted at all locations at 35° obliquity.

11:15 a.m. Conway S. J. * Balme M. R. Soare R. J.
Using Gullies to Estimate the Thickness of the Latitude Dependent Mantle on Mars [#2964]
We use the incision depth of gullies on Mars to estimate the thickness of the latitude dependent ice-dust mantle across the Terra Cimmeria and Argyre regions.

11:30 a.m. Dickson J. L. * Head J. W. Levy J. S. Morgan G. A.
Concentrating Ice in Polar Deserts: Lessons for Mars from Punctuated Gully Incision in the McMurdo Dry Valleys [#1033]
Gullies in the Dry Valleys form through the concentration and melting of ice in a hyper-arid polar desert. Similar processes may have initiated gullies on Mars.
Wednesday, March 18, 2015
SPECIAL SESSION: EARLY RESULTS FROM THE MAVEN MISSION I
8:30 a.m.  Waterway Ballroom 5

Chairs: Janet Luhmann
         Bruce Jakosky

8:30 a.m.  Jakosky B. M. *  Lin R. P.  Grebowsky J. M.  Luhmann J. G.  MAVEN Science Team
           Early MAVEN Results on the Mars Upper Atmosphere and Atmospheric Loss to Space [#1370]
           Preliminary results will be presented from observations made during the spacecraft commissioning
           phase and from the first three months of science observations.

9:00 a.m.  Eparvier F. G. *  Thiemann E. M. B.  Chamberlin P. C.  Woods T. N.
           Solar EUV Irradiance at Mars:  Why We’re Measuring It and Why You Should Care [#3001]
           Solar EUV irradiance is highly variable and must be known to understand the variability of an
           atmosphere, in particular for the MAVEN mission to Mars.

           The Solar Energetic Particle Experiment on MAVEN:  First Results [#2890]
           We present first results from the MAVEN Solar Energetic Particle (SEP) Experiment and its relevance
           to understanding the loss of the martian atmosphere.

           MAVEN Observations of the Martian Magnetosphere and Its Response to Solar Wind Drivers [#1379]
           We present the first observations of the structure and dynamics of the martian magnetosphere
           from MAVEN.

           MAVEN Observations of the Martian Ionosphere and Magnetosheath [#3015]
           MAVEN SWEA observations of the martian ionosphere and magnetosphere.

10:00 a.m. Mahaffy P. R. *  Benna M.  Elrod M.  Bougher S. W.  Yelle R.  et al.
           Early Composition, Structure, and Isotope Measurements in the Upper Atmosphere of Mars from
           MAVEN’s Neutral Gas and Ion Mass Spectrometer [#1981]
           First in situ measurements of upper atmospheric structure and composition from MAVEN’s Neutral
           Gas and Ion Mass Spectrometer are reported.

10:15 a.m. Schneider N. M.  McClintock W. E.  Stewart A. I. F.  Deighan J. *  Clarke J. T.  et al.
           First Results from MAVEN’s Imaging UV Spectrograph [#2647]
           Early results from MAVEN’s Imaging UV Spectrograph reveal a wealth of information about the
           atmosphere’s structure, variability, and processes leading to escape.

           Characterization of the Martian Thermosphere Using MAVEN Accelerometer and Reaction Wheel
           Datasets:  Early Mission Results [#2039]
           Thermospheric density profiles are currently being derived using MAVEN reaction wheel and
           accelerometer data, including the first “deep dip” campaign.

10:45 a.m. Connerney J. E. P. *  Espley J.  Oliversen R.  Sheppard D.  Dibraccio G.
           First Results from the MAVEN Magnetic Field Investigation [#1080]
           Discussion of results of the MAVEN Magnetic Field Investigation (about Mars) acquired during the
           first few months in orbit, including Comet Siding Spring observations.
Highlights from the LPW instrument: electron temperature profiles; nightside ionosphere structures; wave-particle interactions; and the dust.

Structure of the Martian Ionosphere and Atmospheric Loss: MAVEN STATIC First Results [#2899]
MAVEN STATIC provides the first detailed look at the martian ionosphere and the solar wind ionospheric interface where energization and loss mechanisms act.

11:30 a.m. Brain D. A. * Dong Y. Fortier K. Fang X. McFadden J. et al.  
MAVEN Measurements of the Ion Escape Rate from Mars [#2663]
We provide an initial estimate of the loss rate of ions from the martian atmosphere based on the first several months of MAVEN data, and place them in context.

---

Wednesday, March 18, 2015 [W304]
PRESOLAR, INTERPLANETARY, AND COMETARY DUST
8:30 a.m. Waterway Ballroom 6

Chairs:  Andrew Westphal  
Philipp Heck

8:30 a.m. Croat T. K. * Gyngard F.  
Isotopically-Extreme Inclusions and Isotopic Heterogeneity in Supernova Graphitic Spherules [#2489]
NanoSIMS of presolar graphite cross-sections reveals internal TiCs with extreme $^{15}$N and $^{18}$O enrichments and shows dilution of anomalies from graphite.

8:45 a.m. Stroud R. M. * Zinner E. K. Gyngard F.  
Structural and Chemical Heterogeneity in the Bonzana Supernova SiC Grain [#2576]
STEM of a supernova SiC grain reveals complex intergrowth of SiC crystallites with abundant subgrains, including TiN, (Al,Mg)N, and Fe,Ni-rich phases.

9:00 a.m. Heck P. R. * Gyngard F. Maden C. Busemann H. Wieler R. et al.  
New Interstellar Helium and Neon Exposure Ages of Presolar Jumbo SiC Grains from Murchison [#1748]
We present new presolar He and Ne cosmic-ray exposure ages of large presolar SiC grains for which presolar Li exposure ages have been determined earlier.

9:15 a.m. Liu N. * Steele A. Nittler L. R. Alexander C. M. O’D.  
Correlation Between Raman Peak Shifts and Isotopic Compositions of Sub-Micron Presolar SiC Grains [#2173]
We report a positive correlation between the SiC Raman peak positions and the $^{12}$C/$^{13}$C ratios for 11 submicrometer to micrometer-sized mainstream presolar 3C-SiC grains.

Assemblage of Presolar Materials and Early Solar System Condensates in Chondritic Porous Interplanetary Dust Particles [#2868]
Coordinated TEM and NanoSIMS analyses of CP IDPs reveal a unique assemblage of presolar grains, primitive organic matter, and early solar system condensates.
34 46th LPSC Program

9:45 a.m. Joswiak D. J. * Brownlee D. E.
Variable Titanium Oxidation States in Fassaites in Refractory Nodules from an IDP of Probable Cometary Origin [#2252]
Variable Ti oxidation states in fassaites in refractory nodules from a probable cometary IDP indicate formation in a nebular environment with changing $f_{O_2}$.

10:00 a.m. Messenger S. * Brownlee D. E. Joswiak D. J. Nguyen A. N.
Presolar Materials in a Giant Cluster IDP of Probable Cometary Origin [#2603]
We present isotopic and mineralogical studies of presolar materials in a very large IDP with mineralogical affinities to Comet Wild 2 Stardust Mission samples.

10:15 a.m. Pepin R. O. Brownlee D. E. * Palma R. L. Joswiak D. Schlutter D. J.
Radiation History of Giant Cluster Particle U2-20GCA, A Probable Cometary IDP [#1705]
Spallation Ne in the giant U2-20GCA cluster IDP suggests exposure to radiation near the early Sun. Mineral chemistry links it to Comet Wild 2 coma grains.

10:30 a.m. Westphal A. J. * Butterworth A. L. Gainsforth Z.
Metal Content of a Giant Cluster Interplanetary Dust Particle [#2202]
We measured metal content of a giant cluster IDP, and show that collection biases do not explain the difference in metal content between CP-IDPs and Wild 2.

10:45 a.m. Humayun M. * Goldstein J. I. Mubarok A. Westphal A. J. Gainsforth Z. et al.
Preliminary Analysis of Simeio: A Low Ni-Ir Kamacite Grain of Unusual Origin from Comet Wild2 [#2298]
Elemental composition of a metal grain from Track 41 reveals an unusual particle that bears similarities to rare grains in chondrites or to ureilite metal.

11:00 a.m. Gainsforth Z. * Butterworth A. L. Westphal A. J.
Unequilibrated Spinels in Stardust Track C2062,2,162 (Cecil) [#2974]
Information from nano-spinels from Comet Wild 2 can be used to characterize formation conditions in the early solar system, but require careful analysis.

11:15 a.m. De Gregorio B. T. * Stroud R. M. Nittler L. R. Kilcoyne A. L. D.
Evidence for Reduced Carbon-Rich Regions in the Solar Nebula from an Unusual Cometary Dust Particle [#2625]
A cometary particle records a sequence of Fe-rich carbide/metal $>$ poorly graphitized carbon $>$ Cr-rich magnetite, implying condensation in a C-rich nebular region.

11:30 a.m. Engrand C. * Benzerara K. Leroux H. Duprat J. Dartois E. et al.
Carbonaceous Phases and Mineralogy of Ultracarbonaceous Antarctic Micrometeorites Identified by C- and N-XANES/STXM and TEM [#1902]
The microstructure and composition of carbonaceous matter and minerals in two UCAMMs were studied by C-, N-XANES, and TEM. Two different C phases were identified.
Wednesday, March 18, 2015
THE LUNAR CRUST: NEW CONSTRAINTS FROM NEAR AND FAR
1:30 p.m. Waterway Ballroom 1

Chairs: Noah Petro
        Ryan Clegg

1:30 p.m. Peplowski P. N. * Lawrence D. J.  Bazell D.
Composition of the Lunar Highlands as Revealed by Lunar Prospector Thermal
Neutron Measurements [#2545]
We explore mixtures of ferroan anorthosite, norite, and mare basalts to explain the observed variability
in thermal neutron measurements of the lunar highlands.

1:45 p.m. Hagerty J. J. * Skinner J. A. Jr.  Gaddis L. R.  Fortezzo C. M.
Compositional and Morphologic Mapping of the Copernicus Quadrangle, the Moon: New Constraints
on Regional Lithologic Complexity [#2329]
Two investigative strategies are used to determine the distribution of specific lithologies in the
Copernicus quadrangle: geologic and compositional mapping.

2:00 p.m. Lucey P. G. * Norman J. A.  Crites S. T.  Taylor G. J.  Lemelin M. T.  et al.
A Large Spectral Survey of Small Lunar Craters [#1655]
Spectra of over 2700 small highland craters reveal an extremely uniform and noritic sample that can be
explained by excavation of an orthopyroxenite mantle.

2:15 p.m. Petro N. E. * Klima R. L.  Ostrach L. R.
Constraining the Origin of Apollo 17’s Station 8 Boulder: Implications for the Origin of the
Sculptured Hills and the Mg-Suite [#2687]
Apollo 17’s station 8 boulder is an excellent example of the Mg-suite; its source remains enigmatic. The
source crater is considered and may be distant from the landing site.

2:30 p.m. Moriarty D. P. III * Pieters C. M.
The Composition of Mafic Mound: An Unusual Feature Within the South Pole-Aitken Basin [#2105]
Mafic mound pyroxenes are very rich in Fe and Ca, similar to mare basalts, but other properties (weak
1.2 µm band) distinguish these unusual non-mare materials.

2:45 p.m. Neal C. R. * Wu Y. Z.  Cui X. Z.  Peng W. X.  Ping J. S.
Regolith at the Chang’e-3 Landing Site: A New Type of Mare Basalt Composition [#1641]
The X-ray Spectrometer data from Chang’e-3 define a new type of mare basalt that requires an
adjustment to lunar basalt classification.

3:00 p.m. Sato H. * Robinson M. S.  Hapke B.  Lawrence S.
New LROC WAC TiO2 Abundance Map of the Moon [#1111]
We present a new TiO2 abundance map based on LROC WAC near-global mosaic and the
comparisons with TiO2 maps based on Clementine and Lunar Prospector data sets.

3:15 p.m. Lawrence S. J. * Stopar J. D.  Jolliff B. L.  Robinson M. S.  Sato H.  et al.
Characterizing Mare Deposits in the Australe Region [#2739]
We discuss new remote sensing and geological observations of the Australe region derived from
LRO results.

3:30 p.m. Antonenko I. *
The Complexity of Cryptomaria: A Case Study in the Humorum Region of the Moon [#2808]
A variety of basalt-exposing craters provide different information about the Humorum area of the
Moon, indicating that cryptomaria in the region are complex.
The Subsurface Structure of the Compton-Belkovich Thorium Anomaly as Revealed by GRAIL [#2185]  
Compton-Belkovich is associated with high Bouguer gravity and low topography. Inversions predict higher density crust as could result from loss of pore space.

4:00 p.m. Clegg R. N. * Jolliff B. L.  Coman E.  
Analysis of Compositional Variations at Non-Mare Volcanic Regions Using LROC NAC Photometry and Spectra of Glassy and Silicic Mineral Mixtures [#1467]  
Silicic regions/A rare feature on the Moon/Pyroclastic volcanics?

4:15 p.m. Cronberger K. * Neal C. R.  
14160,214: A KREEPy Endogenous, Basalt. Evidence for Magma Chamber Processes [#1295]  
14160,214, an endogenous KREEP basalt, shows evidence for complex magma chamber processes. Petrographic, major element, and trace element analysis is presented.

4:30 p.m. Gross J. * Gillis-Davis J.  Isaacson P. J.  Le L.  
We have initiated space weathering experiments to evaluate its influence on the absorption strength of spinel and to constrain how spinel-rich lunar PSA is.

4:45 p.m. Treiman A. H. * Gross J.  Glazner A. F.  
Lunar spinel-rich rocks, seen in VNIR reflectance, likely form from impact melts, solidified quickly. Anorthosite assimilation by picrite magma is unlikely.

Wednesday, March 18, 2015  
MARS LOW-TEMPERATURE GEOCHEMISTRY AND MINERALOGY  
1:30 p.m. Waterway Ballroom 4

Chairs: Elizabeth Rampe  
Briony Horgan

1:30 p.m. Yen A. S. * Ming D. W.  Gellert R.  Clark B. C.  Mittlefehldt D. W.  et al.  
Silica Retention and Enrichment in Open-System Chemical Weathering on Mars [#2380]  
Samples analyzed at Meridiani Planum, Gusev Crater, and Gale Crater show similar signatures of open-system chemical weathering.

1:45 p.m. McLennan S. M. * Dehouck E.  Grotzinger J. P.  Hurowitz J. A.  Mangold N.  et al.  
Geochemical Record of Open-System Chemical Weathering at Gale Crater and Implications for Paleoclimates on Mars [#2533]  
Sedimentary rocks examined by Curiosity at Pahrump Hills exhibit evidence for chemical weathering, consistent with relatively element climatic conditions.

2:00 p.m. Ming D. W. * Mittlefehldt D. W.  Gellert R.  Peretyazhko T.  Clark B. C.  et al.  
Iron-Manganese Redox Reactions in Endeavour Crater Rim Apron Rocks [#2676]  
Redox reactions have played an important role in mobilization and transportation of redox sensitive elements in Endeavour crater rim deposits.

2:15 p.m. Szynkiewicz A. * Goff F.  Faiia A. M.  Vaniman D. T.  Subia T.  et al.  
Aqueous Sulfur Budget and Oxidation of Fumarolic H2S in the Volcanic Complex of Valles Caldera, New Mexico — Geochemical Implications for Mars [#1303]  
We have been studying the terrestrial hydrological sulfur cycle related to volcanic sulfur emission and aqueous chemical weathering as Mars geochemical analogs.

2:45 p.m. Fox A. * Peretyazhko T. Sutter B. Niles P. Ming D. W. et al. Effect of Sulfur Concentration and pH Conditions on Akaganeite Formation: Understanding Akaganeite Formation Conditions in Yellowknife Bay, Gale Crater, Mars [#1199] The formation of akaganeite in variable pH conditions and sulfur concentrations was studied to better understand how akaganeite formed at Yellowknife Bay, Mars.


3:15 p.m. Siebach K. L. * Groetzinger J. P. McLennan S. M. Hurowitz J. A. Ming D. W. et al. Constraining the Texture and Composition of Pore-Filling Cements at Gale Crater, Mars [#2234] Pore waters in Gale/Made sandstone from sediment/What cements Mars rocks?

3:30 p.m. Horgan B. * Rutledge A. Rampe E. B. Clay Mineralogy and Crystallinity as a Climatic Indicator: Evidence for Both Cold and Temperate Conditions on Early Mars [#2923] Warm and arid climates tend to produce more crystalline clays than cold climates. Clay minerals on Mars suggest both cold and seasonally temperate climates.

3:45 p.m. Gainey S. R. * Hausrath E. M. Hurowitz J. A. Weathering Profiles at Mawrth Vallis Yield Insight into the Aqueous History and Potential Habitability of Mars [#2248] Reactive transport modeling of potential weathering profiles at Mawrth Vallis may yield insight into the aqueous history and potential habitability of Mars.


4:15 p.m. Friedlander L. R. Glotch T. D. * Nontronite Detections in Nili Fossae Based on an Impact-Altered Natural Nontronite Sample Resemble Regional-Scale Spectral Variability Previsouly Associated with Phyllosilicate Diagenesis [#2852] Results from CRISM image processing show that some spectral shifts previously interpreted as diagenesis may also be related to impact processes.

4:30 p.m. Osterloo M. M. * Hynek B. M. Martian Chloride Deposits: The Last Gasps of Widespread Surface Water [#1054] We present results of geologic characterizations of the largest chloride sites to better understand their geologic setting, age, and formation mechanisms.
Wednesday, March 18, 2015
SPECIAL SESSION: EARLY RESULTS FROM THE MAVEN MISSION II
1:30 p.m. Waterway Ballroom 5

Chairs: Richard Zurek
        Shannon Curry

1:30 p.m. Chaffin M. S. * Chaufray J. Y. Deigan J. M. Schneider N. M. McClintock W. E. et al. 
* Escape at the Present Epoch [#2190]
The first MAVEN observations of the extended H corona of Mars will be presented and discussed.

1:45 p.m. Clarke J. T. * Matta M. McClintock W. Schneider N. Deighan J. et al. 
* Early Results from the MAVEN IUVS Echelle Channel [#2313]
The MAVEN IUVS echelle channel is measuring the D/H ratio and O line strengths from the upper atmosphere of Mars. First results will be presented.

2:00 p.m. Lillis R. J. * Deighan J. L. Fox J. L. Bouger S. W. Lee Y. et al. 
Photochemical Escape of Oxygen from the Martian Atmosphere: First Results from MAVEN [#1568]
Photochemical escape of oxygen is expected to be a significant channel for atmospheric escape. MAVEN’s first measurements of escape fluxes are presented.

2:15 p.m. Leblanc F. * Lillis R. Curry S. Luhmann J. Modolo R. et al. 
* MAVEN: Atmospheric Loss Induced by Sputtering [#1363]
Based on MAVEN observations, we will describe our understanding of the sputtering of Mars’ atmosphere and how it might contribute to its atmospheric loss.

2:30 p.m. Bouger S. W. * Tolson R. H. Mahaffy P. R. Johnston T. E. Olsen K. et al. 
Trends in Mars Thermospheric Density and Temperature Structure Obtained from MAVEN ACC/RW and NGIMS Datasets: Interpretation Using Global Models [#2062]
MAVEN first results include in situ sampling of the Mars thermospheric structure at northern mid-to-high latitudes from both NGIMS and ACC/RW measurements.

2:45 p.m. Halekas J. S. * McFadden J. P. Luhmann J. G. Lillis R. J. 
* Solar Wind or Houdini? Penetrating Protons Observed at Low Altitude by the MAVEN Solar Wind Ion Analyzer [#1381]
We present MAVEN observations of a newly discovered population of solar wind protons that penetrate to low altitude by interacting with Mars’ atmosphere.

3:00 p.m. Ma Y. J. Russell C. T. * Nagy A. F. Toth G. Halekas J. S. et al. 
* MHD Model Results of Solar Wind Plasma Interaction with Mars and Comparison with MAVEN Observations [#1202]
This study investigates in detail how plasma properties in Mars ionosphere are influenced locally by the crustal field and its rotation.

3:15 p.m. Curry S. M. * Luhmann J. G. Dong C. F. Leblanc F. Modolo R. et al. 
* MAVEN Data-Model Comparisons of Planetary Ions [#2389]
We present comparisons of planetary pickup ions at Mars with MAVEN data to both validate the models and better constrain global atmospheric loss rates at Mars.

3:30 p.m. Crismani M. * Schneider N. Deigan J. Stewart I. Combi M. et al. 
* Ultraviolet Observations of the Hydrogen Coma of Comet Siding Spring (C/2013 A1) by MAVEN/IUVS [#2462]
After its arrival at Mars, MAVEN was serendipitously positioned to study the anticipated planet-grazing Comet C/2013 A1 and made useful scientific observations.
3:45 p.m. Schneider N. M. * Stewart A. I. F. McClintock W. E. Mahaffy P. R. Benna M. et al. 
MAVEN IUVS Observations of the Aftermath of Comet Siding Spring’s Meteor Shower [2804]
The MAVEN spacecraft observed intense emission from vaporized dust in Mars’ atmosphere following an intense meteor storm caused by Comet Siding Spring.

Atmospheric Effects of Energetic Particle Events Measured by MAVEN [2657]
We calculate effects on the martian upper atmosphere of solar energetic particle precipitation measured by the MAVEN SEP instrument.

MAVEN Observations of Magnetic Reconnection on the Dayside Martian Magnetosphere [2125]
Using MAVEN data, we investigate dayside reconnection by examining the interaction of the IMF with the induced ionospheric magnetic fields and crustal fields.

4:30 p.m. Lisse C. M. * CIOC Team
Results from the CIOC Comet Siding Spring at Mars Observing Campaign [2377]
We present the CIOC-driven observing results, initiatives tried, and lessons learned for C/2013 A1 (Siding Spring) during its 2014 close flyby of Mars.

---

Wednesday, March 18, 2015 [W354]
SMALL BODIES: ACCUMULATION TO DISAGGREGATION WITH SOME NIFTY TRICKS IN BETWEEN
1:30 p.m. Waterway Ballroom 6

Chairs: Thomas Prettyman
Rhiannon Mayne

1:30 p.m. Fu R. R. * Young E. D. Greenwood R. C. Elkins-Tanton L. T. 
Fluid Migration in Early-Accreting Planetesimals [1591]
Most internally-heated chondrite parent bodies permitted global fluid flow. Fractures due to vaporization enhance permeability.

1:45 p.m. Cody G. D. * Kebukawa Y. Wang Y. Alexander C. M. O. 
Water-Organic D-H Isotope Exchange During Planetesimal Alteration: A Simpler Explanation for the Variation in Deuterium Abundance in Extraterrestrial Materials [2458]
Variation of D/H in both organic solids in chondrites and associated water is due to incomplete exchange between D-depleted water and D-rich formaldehyde.

2:00 p.m. Delbo M. Libourel G. Wilkerson J. W. * Murdoch N. Michel P. et al. 
Thermally-Driven Regolith Evolution on Small Asteroids [2449]
Regolith origins and evolution on small asteroids may be dominated by thermally driven fragmentation rather than fragmentation by classical impact processes.

2:15 p.m. Hazeli K. * Wilkerson J. El Mir C. Delbo M. Ramesh K. T. 
Regolith Formation on Airless Bodies [1618]
The objective of this study is to identify and quantify the role of thermally-induced cracking by diurnal temperature variation in regolith formation on small bodies.

2:30 p.m. Yamad T. M. * Ando K. Morota T. Katsuragi H. 
Timescale of the Asteroid Resurface by Regolith Convection [1215]
Because the regolith convection could play an important role of the asteroidal resurfacing process, we model it and estimate the resurfacing timescale.
2:45 p.m. Wood S. E. *  
Geothermal Pore Ice on Airless Bodies [#1226]  
Subsurface ice clouds/Driven by the geotherm/Steady vapor flux.

3:00 p.m. Sarid G. * Stewart S. T.  
Black Sheep and White Elephants: Compositions of Survivors from Collisions of Differentiated Ice-Rock Bodies [#2834]  
Things (ice-rock differentiated bodies) that go bump (giant impacts) in the night (outer solar system) hold many secrets (mixed composition and volatiles).

3:15 p.m. Maindl T. I. Haghhighipour N. * Schaefer C. Speith R. Dvorak R.  
Triggering the Activity of Main Belt Comets [#1032]  
We present impact simulation results of meter-sized projectiles eroding the target’s surface and discuss their implications for the origin of main belt comets.

3:30 p.m. Richardson J. E. Jr. * Taylor P. A.  
The Fate of Impact Ejecta in the 1999 KW4 Binary Asteroid System: A Detailed Modeling Investigation [#1895]  
We model the flight of impact ejecta in an asteroid binary system, determining the final disposition of the excavated mass, either redeposited or lost to space.

3:45 p.m. Wang X. * Li J. Gong S.  
Bifurcation of Equilibrium Points in the Potential Field of Asteroid 101955 Bennu [#1878]  
The stability and topological structure of equilibrium points in the potential field of asteroid 101955 Bennu have been studied with varied physical properties.

4:00 p.m. Hirabayashi M. * Scheeres D. J. Rozitis B.  
Formation of an Equatorial Ridge on an Oblate Rubble Pile Asteroid [#1967]  
We discuss a possible formation scenario for an equatorial ridge on an oblate rubble pile asteroid with a relatively rapid spin period.

4:15 p.m. Sánchez D. P. * Scheeres D. J.  
Scaling Rule Between Cohesive Forces and the Size of a Self-Gravitating Aggregate [#2556]  
We study the scaling relationship between cohesive forces and the size of self-gravitating aggregates as a means to understand the latter’s dynamical evolution.

4:30 p.m. Scheeres D. J. *  
End of Life Scenarios for Small Rubble Pile Asteroids [#2520]  
Small cohesive rubble pile asteroids affected by YORP can have runaway rotational fission: A 500-m body can disaggregate into its components in less than 1 m.y.
Thursday, March 19, 2015
AEOLIAN PROCESSES
8:30 a.m. Waterway Ballroom 1

Chairs: Jani Radebaugh
Kirby Runyon

Experimentally-Derived Saltation Threshold Wind Speeds for Titan: Underprediction by Terrestrial Models [#1027]
Aeolian threshold models underpredict wind speeds on Titan required to move sand. The finding provides input into mechanisms for dune elongation by westerlies.

8:45 a.m. Méndez Harper J. S. * McDonald G. D. Dufek J. Hayes A. G. Malaska M. J. et al.
Triboelectric Charging of Titan Dune Grains: Effect on Sediment Transport [#1637]
We quantify the triboelectric charging behavior of Titan dune grain analogues, and discuss implications for sediment transport.

9:00 a.m. Esposito F. * Molinaro R. Popa C. I. Molfese C. Cozzolino F. et al.
The Strong Relationship Between Dust Lifting and Atmospheric Electric Properties During Aeolian Processes [#2553]
Results of field campaigns performed in the Sahara desert during the dust storm season. Focus on the observed enhancement of atm. E-field during dust events.

Material Flux on Titan: The Fate of Dune Materials [#3024]
Titan surface streaks Indicate all they are is/Just dust in the wind.

9:30 a.m. Cisneros J. * McDonald G. D. Hayes A. G. Smyth T. Ewing R. C.
Morphologic and Computational Fluid Dynamic Analysis of Sand Dune-Topographic Obstacle Interactions on Earth and Titan [#2683]
The aim of our analyses is to determine how the dunes interact with obstacles and how this can be used to determine wind direction.

9:45 a.m. Radebaugh J. * Lorenz R. D. Paillou P. Farr T. G.
Possible Yardangs of Titan and Western China Reveal Winds and Surface Erosion [#2746]
Titan, China winds/Carve elongate forms in clays/Landscape deflating.

10:00 a.m. Silvestro S. * Vaz D. A. Di Achille G. Popa C. Esposito F.
Relict Aeolian Bedforms and a New Type of Wind Streak in the ESA ExoMars 2016 Landing Ellipse in Meridiani Planum, Mars [#1155]
We report the presence of a complex pattern formed by relict aeolian bedforms and a new type of wind streak in the 2016 ExoMars landing site in Meridiani Planum.

10:15 a.m. Quintana S. N. * Schultz P. H. Horowitz S. S.
Experimental Results Supporting an Impact-Related Blast Wind Formation Mechanism for Some Wind Streaks on Mars [#2469]
Laboratory experiments resolve the different contributions to impact-generated winds, which may be the cause of blast wind streaks around some craters on Mars.

10:30 a.m. Daubar I. J. * McEwen A. S. Golombek M. P.
Albedo Changes at Martian Landing Sites [#2225]
Spacecraft create low-albedo areas when landing. We measure the amount of darkening and rate of subsequent brightening, and predict when they will disappear.
10:45 a.m.  Day M. D.  * Anderson W.  Kocurek G. A.  
_Aeolian Sediment Transport in Martian Craters [#1250]_
Wind blown sand changes/Mars crater morphology/New model agrees.

11:00 a.m.  Lapotre M. G. A.  * Ehmann B. L.  Ayoub F.  Minson S. E.  Bridges N. T.  et al.  
_The Bagnold Dunes at Gale Crater — A Key to Reading the Geologic Record of Mount Sharp [#1634]_
We report on spatial mineral sorting at the active Bagnold dunes of Gale Crater from orbital data to shed light on sandstone formation and future rover science.

11:15 a.m.  Runyon K. D.  * Bridges N. T.  Ayoub F.  
_Internal Boundary Layer Effects on Morphologic and Sediment Flux Transitions in Mars’ Dunefields [#1999]_
Winds blow and sands move/Atmo boundary layer?/Marching dunes of Mars.

11:30 a.m.  Bridges N. T.  * Spagnuolo M. G.  de Silva S. L.  Zimbelman J. R.  Neely E. M.  
_Formation and Stabilization of Coarse Grain-Mantled Megaripples on Earth and Mars: Insights from the Argentinean Puna and Wind Tunnel Experiments [#1948]_
The origin of gravel megaripples in the Puna is constrained using wind measurements and wind tunnel runs. Results are applied to understanding martian TARs.

---

**Thursday, March 19, 2015**  
THE EVOLUTION OF MARS: FROM THE INTERIOR TO THE ATMOSPHERE  
8:30 a.m.  Waterway Ballroom 4

**Chairs:**  
Frank Richter  
Nina Lanza

8:30 a.m.  Cousin A.  * Sautter V.  Mangold N.  Fabre C.  Forni O.  et al.  
_Igneous Rock Classification at Gale (Sols 13-800) [#2452]_
This study presents a classification of the 53 igneous rocks analyzed by ChemCam up to sol 800.

8:45 a.m.  Sautter V.  * Toplis M. J.  Wiens R. C.  Cousin A.  Fabre C.  et al.  
_Granodiorite and an Alkaline Suite Analysed by ChemCam at Gale Crater [#1943]_
This abstract focuses on leucocratic effusive and intrusive igneous rocks analyzed at Gale Crater by the ChemCam instrument onboard Curiosity up to sol 700.

9:00 a.m.  Richter F. M.  * Chaussidon M.  Mendybaev R. A.  
_Thermal History and Geologic Setting of Nakhlites Revisited [#1450]_
Evidence of two stages of distinctly different cooling rate of nakhlites NWA 817 and MIL 03346 is reported along with implications for their geological setting.

_Petrologic and Radiogenic Isotopic Assessment of Olivine-Phyric, Diabasic and Microgabbroic Shergottites from Northwest Africa [#2290]_
Recently recovered martian meteorites from Morocco and nearby locations exhibit a wide variety of igneous textures and chemical characteristics.

9:30 a.m.  Jones J. H.  * Franz H. B.  
_Correlations Between Surficial Sulfur and a REE Crustal Assimilation Signature in Martian Shergottites [#2859]_
$\Delta$S-33 anomalies in shergottites sometimes correlate with REE enrichment, strongly suggesting that the enriched shergottites formed by crustal assimilation.
9:45 a.m.  Kiefer W. S. *  Jones J. H.
Formation and Preservation of the Depleted and Enriched Shergottite Isotopic Reservoirs in a Convecting Martian Mantle [#1197]
Enriched shergottites form by interaction between mantle melt and the enriched crust. The extent of enrichment is controlled by the rate of magma production.

10:00 a.m.  Filiberto J. *  Dasgupta R.
Constraints on the Depth and Temperature of Melting in the Martian Mantle [#1518]
Here we investigate how the mantle potential temperature of Mars may have changed through time.

10:15 a.m.  Ding S. D. *  Dasgupta R. D.
Solidus of Martian Mantle Constrained by New High Pressure-Temperature Experiments at Nominally Anhydrous Conditions [#2079]
We constrain the solidus temperature of K-bearing model martian mantle from 2 to 5 GPa and discuss possible compositional effects on mantle solidus temperature.

10:30 a.m.  Chen Y. *  Liu Y.  Guan Y.  Eiler J. M.  Ma C.  et al.
Surface and Magmatic Water Signatures in EETA 79001 Impact Melts [#2291]
We report hydrogen isotopes in the impact melts in EETA 79001 within the range of recent martian atmosphere, contrary to previous low-deuterium data.

10:45 a.m.  Nickerson R. D. *  Chemtob S. M.  Catalano J. G.
Partitioning of Iron and Trace Metals During Isochemical Hydrothermal Basalt Alteration: Implications for Interpreting Clay Occurrence on Mars [#2903]
Laboratory study investigating iron and trace metal repartitioning during isochemical hydrothermal alteration of mafic and ultramafic rocks.

11:00 a.m.  Borlina C. S. *  Ehlmann B. L.
Modelling Diagenesis of Gale Crater Sedimentary Rocks: Scenarios Testable by the Curiosity Rover [#1208]
Modeling heat flow and depths of burial to predict the temperature history and diagenetic mineralogy of sedimentary rocks across MSL Curiosity’s traverse.

11:15 a.m.  Bridges J. C. *  Schwenzer S. P.  Leveille R.  Wiens R. C.  McAdam A.  et al.
Hematite Formation in Gale Crater [#1769]
Hematite Ridge in Gale Crater formed in a high W/R open system, probably at a weathering horizon.

11:30 a.m.  Lanza N. L. *  Wiens R. C.  Arvidson R. E.  Clark B. C.  Fischer W. W.  et al.
Oxidation of Manganese at Kimberley, Gale Crater: More Free Oxygen in Mars’ Past? [#2893]
More free oxygen/In Mars’ past? Manganese/Amount says maybe.

Thursday, March 19, 2015
PLANETARY VOLCANISM: IF YOU CAN’T STAND THE HEAT, GET OUT OF THE MANTLE
8:30 a.m.  Waterway Ballroom 5

Chairs:  Lori Glaze
Ernst Hauber

8:30 a.m.  Parcheta C. *  Parness A.  Nash J.  Wiltsie N.  Carpenter K.  et al.
Comparing Vent Surface Geometry with Its Subsurface Structure [#1649]
Magma conduit/Shape is vital yet unknown/How does it erupt?
8:45 a.m. Hamilton C. W. * Scheidt S. P. Bleacher J. E. Irwin R. P. III Garry W. B.  
“Fill and Spill” Lava Emplacement Associated with the December 1974 Flow on Kilauea Volcano, Hawaii, USA [1072]  
During the December 1974 eruption, catastrophic drainage of perched lava ponds produced distinctive lava facies that are analogous to those observed on Mars.

9:00 a.m. Glaze L. S. * Baloga S. M.  
The Role of Cooling in Pahoehoe Emplacement on Planetary Surfaces [1174]  
Models are presented for slowly-emplaced pahoehoe lava on low slopes. Pressure-driven flows produce elongated lobes consistent with field observations.

No Erosion Needed: Development of Streamlined Islands During Lava Channel Construction [2182]  
We discuss the formation of streamlined islands and branching channel networks through lava construction without requiring erosion by lava or water.

9:30 a.m. Thomas R. J.* Rothery D. A. Conway S. J. Anand M.  
Explosive Volcanism on Mercury and the Moon: Insights into the Nature of Sub-Surface Magma Storage [1347]  
Lunar craters crack/With magma’s rising fury/But Mercury’s, no.

9:45 a.m. Bennett K. A. * Horgan B. H. N. Bell J. F. III Meyer H. M. Robinson M. S.  
Moon Mineralogy Mapper Investigation of the Ina Irregular Mare Patch [2646]  
We use M3 data to investigate the maturity and mineralogy of Ina and place constraints on its origin.

Evidence for Explosive Silicic Volcanism on the Moon from the Extended Distribution of Thorium Near the Compton-Belkovich Volcanic Complex [2081]  
We use LP-GRS data to show that the thorium around the Compton-Belkovich Volcanic Complex was likely created by the explosive eruption of silicic magma.

10:15 a.m. Rutherford M. J. * Head J. W. III Saal A. E. Wilson L. Hauri E.  
A Revised Model for the Ascent and Eruption of Gas-Saturated Lunar Picritic Magma Based on Experiments and Lunar Sample Data [1446]  
This paper integrates new data on C-O-H-S solubility in lunar picritic magmas into a model of dike emplacement and explosive eruption.

The Thickness of Late Stage Basalts in Mare Imbrium [1806]  
This study produced the high-resolution map of the thickness of young high-Ti basalts in Mare Imbrium using M3 combined LOLA DEM data.

Evolving Magmas, Explosive Eruptions and Hydrothermal Deposits at Nili Patea Caldera, Syrtis Major, Mars [1783]  
Nili Patera: ignimbrites, caldera collapse, intrusive and extrusive magmatism, and implications for habitability.

11:00 a.m. Hauber E. * Brož P. Rossi A. P. Michael G.  
A Field of Small Pitted Cones on the Floor of Coprates Chasma, Mars: Volcanism Inside Valles Marineris? [1476]  
Clusters of small pitted cones in Coprates Chasma, Mars, are interpreted as scoria and tuff cones. They were formed after the subsidence of Valles Marineris.
11:15 a.m. Le Corvec N. *  McGovern P. J.
*Volcanic Spreading on Mars: Role of a Basal Decollement on Faulting and Magma Propagation [#2891]*
The vertical extent of surface faulting on martian volcanos is constraining the influence of lithospheric flexure and gravitational spreading.

11:30 a.m. Davies A. G. * Veeder G. J.  Matson D. L.  Johnson T. V.
*A New Map of Io’s Volcanic Heat Flow [#1551]*
Io’s volcanic heat flow map shows discrepancies with end-member interior heating models, and identifies areas of greatest heat flow that are not yet explained.

11:45 a.m. Kite E. S. * Rubin A. M.
*Sustained Eruptions on Enceladus Explained by Turbulent Dissipation in Tiger Stripes [#1247]*
Turbulent dissipation within tiger stripes may plausibly explain the persistence of the plumes, the eruption phase curve, and the moon’s power output.

---

**Thursday, March 19, 2015**

**CHONDRITE COMPONENTS II: ALL THINGS REFRACTORY**

<table>
<thead>
<tr>
<th>Time</th>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Kööp L. * Davis A. M.  Heck P. R.  Kita N. T.  Krot A. N.  et al.</td>
<td><em>Multiple Generations of Fractionated Hibonite-Rich CAIs Sampled the Solar Nebula at Different Degrees of Isotopic Heterogeneity [#2750]</em>&lt;br&gt;We report O, Al-Mg, Ca, and Ti isotopic data for seven hibonite-rich CAIs with F(UN) characteristics. The CAIs record different stages in the evolution of the nebula.</td>
</tr>
<tr>
<td>8:45 a.m.</td>
<td>Han J. * Keller L. P.  Needham A. W.  Messenger S.  Simon J. I.</td>
<td><em>Microstructures and Origins of Two Corundum-Hibonite Inclusions from ALH A77307 (CO3.0) [#2702]</em>&lt;br&gt;A TEM study of two corundum-hibonite inclusions in ALH A77307 (CO3.0) provides the context for the isotopic data and constraints on their formation histories.</td>
</tr>
<tr>
<td>9:15 a.m.</td>
<td>Aléon J. *</td>
<td><em>Crystallization Control on O Isotopes in Pyroxene from a Type B1 Ca-Al-Rich Inclusion [#2684]</em>&lt;br&gt;O isotopes in pyroxene from CAI 3529-Z correlate with TiO$_2$ content and location and evolve from $^{16}$O-poor to $^{16}$O-rich.</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>Nagashima K. * Krot A. N.  Park C.</td>
<td><em>An Amoeboid Olivine Aggregate Surrounded by an Igneous Ferroan Olivine-Rich Rim from CO3.0 Chondrite DOM 08006 [#2477]</em>&lt;br&gt;We report an AOA surrounded by a ferroan igneous rim from DOM 08006 CO3.0 chondrite, indicating the AOA was recycled in type II chondrule-forming region.</td>
</tr>
</tbody>
</table>
9:45 a.m.  Krot A. N. * Nagashima K. van Kooten E. M. M. E. Bizzarro M.
Refactory Inclusions Recycled During Formation of Porphyritic Chondrules from CH Carbonaceous Chondrites [#1596]
We report on mineralogy, petrology, O- and Al- Mg isotope systematics of CH CAIs melted to various degrees during formation of CH porphyritic chondrules.

10:00 a.m.  Luu T. H. Young E. D. Gounelle M. Chaussidon M. *
A Short Time Interval for the Formation of Chondrules’ Precursors [#2110]
Analyses of radiogenic $^{26}$Mg excesses in bulk chondrules show that there is presumably no chondrule having precursors formed later than 1.5 m.y. after CAIs.

10:15 a.m.  Jacquet E. * Thompson C.
Nebular Shocks: Chondrule Formation or Destruction? [#1099]
Enhancements of the solid/gas ratio above solar, as suggested by chondrule properties, may lead to problematically frequent destructive collisions in shocks.

10:30 a.m.  Chaumard N. * Humayun M. Zanda B. Hewins R. H.
Cooling Rates of Type I Chondrules from the Renazzo CR2 Chondrite: Implications for Chondrule Formation [#1907]
Our results are consistent with the predictions of shock wave models and suggest a common heating mechanism for the formation of type I chondrules in CCs.

Oxygen Isotope Systematics of Chondrules in R3 Clasts: A Genetic Link to Ordinary Chondrites [#2053]
Oxygen isotope analyses of chondrules in type 3 clasts in R chondrite breccias suggest similar isotope reservoirs for chondrules in O and R chondrites.

11:00 a.m.  Oulton J. * Humayun M. Fedkin A. Grossman L.
Chemical Evidence from Gujba for Differentiation and Evaporation/Re-Condensation Processes During the CB-Impact Event [#1590]
We report cerium anomalies in silicate clasts from Gujba that correlate with indices of differentiation and discuss mechanisms of their formation.

11:15 a.m.  Fedkin A. V. * Grossman L. Humayun M. Simon S. B. Campbell A. J.
A Kinetic Model for Chemical and Fe Isotopic Zoning of Metal Grains in CBb Chondrites by Condensation from a Plume Made by Impact Vaporization of Differentiated CR Chondrite Bodies [#1038]
Ir, Ni, Co, and Cr elemental and Fe isotopic profiles in CB-zoned metal grains are well fit by incomplete condensation in an impact plume with falling P and T.

11:30 a.m.  Schrader D. L. * McCoy T. J. Davidson J.
Widespread Evidence for High-Temperature Formation of Pentlandite in Chondrites [#1604]
We present compositional and textural evidence suggesting high-temperature formation of pentlandite is widespread in chondrites.
LUNAR SURFACE PROPERTIES AND PROCESSES FROM A DISTANCE
1:30 p.m. Waterway Ballroom 1

Thursday, March 19, 2015 [R451]

Chairs: Nathan Schwadron
        Lillian Ostrach

1:30 p.m. Schwadron N. A. * Spence H. E. Wilson J. K. Jordan A. P. Winslow R. et al.
*LRO/CRATER Discoveries of the Lunar Radiation Environment and Lunar Regolith Alteration by Radiation [#2395]
LRO/CRATER’s direct measurements are transforming our understanding of the lunar radiation environment and its effects on the Moon’s surface.

1:45 p.m. Jordan A. P. * Stubbs T. J. Wilson J. K. Schwadron N. A.
*Dielectric Breakdown Weathering Rate of the Moon’s Polar Regolith [#1523]
Solar energetic particles can cause dielectric breakdown in the Moon’s polar regolith — a weathering process that may be comparable to meteoritic weathering.

2:00 p.m. Stickle A. M. * Patterson G. W. Bussey D. B. J. Cahill J. T. S. Mini-RF Team
*Subsurface Layering in Mare Regions Revealed in Mini-RF Profiles of Crater Ejecta [#2149]
Mini-RF finds/Buried mare flows using/Ejecta blankets.

Far-Ultraviolet Characteristics of Lunar Swirls [#2648]
We study LRO LAMP data of lunar swirl regions. We compare results with those obtained in other spectral regimes to try to understand these mysterious areas.

2:30 p.m. Kumamoto A. * Ishiyama K. Oshigami S. Haruyama J. Goto Y.
High Permittivity Regions in Oceanus Procelluram and Mare Imbrium Found by SELENE (Kaguya) [#1316]
We have estimated the effective permittivity of the lunar surface material based on SELENE datasets, and found high permittivity areas in the PKT region.

2:45 p.m. Molaro J. L. * Byrne S. Langer S. A.
Thermoelastic Stresses on Airless Bodies: Comparing Macro- to Microscopic Breakdown Processes [#1574]
We will present modeling results of thermoelastic stresses produced in near-surface airless microstructures, and discuss implications for material breakdown.

3:00 p.m. Ostrach L. R. * Petro N. E.
Going with the (Debris) Flow: Young Mass Wasting on the Moon [#1180]
Mass wasting landforms observed in young lunar craters, debris flows in particular, must be young – but how young?

We used a 3.7-m telescope on Maui to observe the Moon’s thermal behavior during a total lunar eclipse, constraining properties of impact features and “swirls.”

Using Lunar Eclipses to Investigate the Regolith Boundary Layer [#2949]
Multispectral thermal infrared data of a lunar eclipse, validated with laboratory experiments, are used to investigate the regolith boundary layer.
3:45 p.m. Ghent R. R. * Carter L. M. Bandfield J. L.
Lunar Crater Ejecta: Physical Properties Revealed by Radar and Thermal Infrared Observations [#1979]
We present new observations of the physical properties of lunar impact ejecta and their time evolution, using complementary radar and thermal IR data.

4:00 p.m. Eke V. R. * Bower K. E. Diserens S. Ryder M. Yeomans P. E. L. et al.
The Impact of Craters on Neutron Fluxes [#1905]
We measure the variation of remotely sensed neutron count rates near lunar craters and discuss the implications for hydrogen deposits in polar cold traps.

4:15 p.m. Bandfield J. L. * Cahill J. T. S. Carter L. M. Neish C. D. Patterson G. W. et al.
Lunar Impact Ejecta Strewn Fields — Distal Regions of Oriented Rocky Deposits [#1563]
Anomalous melt flows and rocky surfaces are present on oriented slopes in two regions. These appear to be distant and extensive expressions of recent impacts.

4:30 p.m. Dhingra D. * Head J. W. Pieters C. M.
Impact Melt Wavefronts at Lunar Complex Craters: Morphological Characteristics and Insights into Impact Melt Emplacement Dynamics [#1645]
Wave-like continuous sheets of impact melt occur at impact craters. They provide clues about the cratering process, specifically about impact melt emplacement.

Thursday, March 19, 2015
SPECIAL SESSION: TRACING THE EVOLUTION OF THE ANCIENT MARTIAN ATMOSPHERE AND CLIMATE
1:30 p.m. Waterway Ballroom 4

Chairs: Paul Niles
R. Aileen Yingst

1:30 p.m. Hurowitz J. A. * Fischer W. W. Milliken R. E. Tosca N. J.
Water Loss and the Net Oxidation of the Atmosphere Recorded in the Ancient Sedimentary Record of Mars? [#2796]
The ancient sedimentary rock record of Mars may record atmospheric loss processes that continue in the modern era.

1:34 p.m. Franz H. B. *
Sulfur Isotopes and Martian Climate History [#2970]
Mass-independent sulfur isotopic signatures constrain the history of the martian atmosphere.

Hydrogen Isotopes Record the History of the Martian Hydrosphere and Atmosphere [#1593]
This study presents insights from hydrogen isotopes for the origin and evolution of martian water reservoirs.

The Evolution of the Water Reservoirs on Mars Revealed via D/H Isotopic Mapping [#2073]
We report maps of atmospheric water and its deuterated form across the martian globe, revealing the evolution and interaction of the water reservoirs on Mars.

1:46 p.m. DISCUSSION
*Low Radar Reflectivity in Planum Australe Points to Past Episodes of Martian Atmospheric Collapse [#2586]*
South polar low radar-reflectivity zones are remnants of atmospheric collapse and sequester over half of Mars’ carbon dioxide within the icy layered deposits.

2:04 p.m. Filiberto J. * Baratoux D. Beaty D. Breuer D. Farcy B. J. et al.
*Constrains, Questions, and Future Directions on Volatiles in the Martian Interior: A Summary of the Workshop [#2064]*
This abstract will summarize the key findings of The Workshop on Volatiles in the Martian Interior and the primary open questions.

2:08 p.m. McCubbin F. M. *
*Evidence for a Heterogeneous Distribution of H2O in the Martain Interior [#1715]*
Based on estimates of the H2O abundances of various geochemical sources from the martian interior, Mars has a heterogeneous distribution of H2O.

2:12 p.m. Luhmann J. G. * Ma Y. J. Curry S. Dong C. Alvarez K. et al.
*Are There Magnetic Storms at Mars? [#1823]*
We use models of the solar wind interaction with Mars to anticipate the sensitivity of related ionospheric effects to the interplanetary field orientation.

2:16 p.m. DISCUSSION

2:30 p.m. Fassett C. I. * Goudge T. A. Head J. W. Mustard J. F.
*Open-Basin Lakes and the Climate and Surface Environment of Early Mars [#1880]*
Open-basin lakes/Are evidence for wet Mars/Was it warm or cold?

2:34 p.m. Hynek B. M. *
*Valley Networks and the Nature of the Late Noachian Mars Climate [#2166]*
Valley networks remain the best evidence for long-lived precipitation and surface runoff operating under a clement climate. But the devil is in the details.

2:38 p.m. Mustard J. F. *
*Mineralogic Constraints on Late Noachian Climate [#2362]*
Coupling between the atmosphere and hydrosphere effect aqueous fluids and thus aqueous mineralogy. Consequences for Late Noachian climates is explored here.

2:42 p.m. Ehlmann B. L. * Dundar M.
*Are Noachian/Hesperian Acidic Waters Key to Generating Mars’ Regional-Scale Aluminum Phyllosilicates? The Importance of Jarosite Co-Occurrences with Al-Phyllosilicate Units [#1635]*
Jarosite, discovered associated with regional-scale Al phyllosilicates, may indicate a more acid Mars rather than a more clement Mars during the late Noachian.

2:46 p.m. DISCUSSION

3:00 p.m. Poulet F. * Carter J. Arvidson R. E. Bibring J.-P.
*Constraints on the Past Climate of Mars from Merging of In Situ and Orbital Analyses of Martian Hydrated Minerals [#2509]*
From a coordinated analysis of aqueous-related mineral phases revealed by both orbital and in situ instruments, we discuss the past climatic environments.
3:04 p.m. Ming D. W. * Morris R. V. Clark B. C.  
*Mineralogical Indicators for Climate Change on Mars: Evidence from Landed Missions [#2582]*  
We summarize the detection of secondary minerals at Mars landing sites to place constraints on the 
evolution of the martian climate.

*Sedimentary Early Mars Revealed at the Microscale: The Gale Crater Example [#1378]*  
Microscale textures demonstrate that mechanical aqueous processes dominated the sedimentary record 
at Gale Crater, and were thus active in early Mars.

3:12 p.m. Stack K. M. * Grotzinger J. P.  
*Constraining the Relative Timing and Duration of an Ancient Fluvio-Lacustrine System in Gale Crater 
Using MSL Curiosity Rover Observations [#2012]*  
Summary of ancient sedimentary environments observed by Curiosity and constraints on relative 
timing of depositional and erosional events in Gale Crater.

3:16 p.m. DISCUSSION

3:30 p.m. Quantin-Nataf C. * Craddock R. A. Dubuffet F. Lozac’h L. Martinot M.  
*Estimates of the Erosion Rates on Mars Over Time and Their Implications for the Evolution of the Atmosphere [#1990]*  
We decipher from the geological record how quantitatively the erosion (or deposition) rate have 
changed over time on Mars and waned gradually over time.

3:34 p.m. Haberle R. M. *  
*Early Mars Climate Modeling and the Faint Young Sun Paradox [#2111]*  
The faint young Sun paradox for Mars is not yet solved. We still do not know what environmental 
conditions prevailed during its early history.

3:38 p.m. Kite E. S. * Armstrong J. C. Wordsworth R. Forget F.  
*Late Bursts of Habitability on Mars-Like Planets [#2674]*  
We ran >100 simulations to quantify the effect of obliquity on intermittent surface liquid water on 
Mars <3.5 G.y. as the Sun brightened and the atmosphere was lost.

3:42 p.m. Forget F. *  
*On the Challenge of Understanding the Early Mars Environment with Climate Models [#2982]*  
I will review the current status of the early Mars climate models and the major challenges and enigmas 
that remain.

3:46 p.m. DISCUSSION

4:00 p.m. Niles P. B. * Michalski J. R.  
*Exploring the Cold Icy Early Mars Hypothesis Through Geochemistry and Mineralogy [#2860]*  
We outline a series of arguments supporting a cold early Mars hypothesis with emphasis on the 
mineralogical and geochemical data collected thus far.

4:04 p.m. Head J. W. * Wordsworth R. Forget F. Madeleine J.-B. Halevy I.  
*Tracing the Evolution of the Ancient Martian Atmosphere and Climate: A Synthesis of Outstanding 
Geomorphological and Mineralogical Questions [#2176]*  
We outline a series of fundamental questions designed to encourage interdisciplinary discussion about 
the evolution of the Late Noachian atmosphere and climate.
4:08 p.m. Kerber L. *  
*Geology and Atmospheric Science for Early Mars: Synthesis and Synergies [#2946]*  
The best synergy between atmospheric modelers and geologists takes place when important model parameters and model limitations can be clearly communicated.

4:12 p.m. Milliken R. E. *  
*The Nature of Hydrated Minerals on Mars: Linking Orbital and Rover Observations to Constrain the Climatic Evolution of Mars [#2736]*  
Integrating rover and orbital data is critical to understand the nature of hydrous minerals on Mars and whether they reflect local or global conditions.

4:16 p.m. DISCUSSION
3:00 p.m. Hahn T. M. * McSween H. Y. Taylor L. A.
*Vesta’s Missing Mantle: Evidence from New Harzburgite Components in Howardites [1964]*
We have identified magnesian harzburgite components in howardites from the vestan mantle. Our findings have implications for the differentiation of Vesta.

3:15 p.m. Mittlefehldt D. W. * Peng Z. X. Ross D. K.
*Petroleum of Anomalous Eucrites [1933]*
Some eucrites are odd/Studied here are three of these/One is not so odd.We discuss the petrology of several anomalous eucrite-like achondrites.

3:30 p.m. Shukla A. D. * Ray D. Bhandari N.
*Basaltic Eucrites Similar to Terrestrial MORBs: A Geochemical Approach [1356]*
Piplia Kalan trace element, similar to E-MORB, could therefore be a potential analog for main group eucrites.

3:45 p.m. Warren P. H. * Isa J.
*Secondary-Volatiles Linked Metallic Iron in Eucrites: The Complex Case of Camel Donga [2983]*
The secondary alteration of Camel Donga was more complex than previously realized. Ni-rich metals show some of its Fe component was derived as impact debris.

*Wet Angrites? A D/H and Pb-Pb Study of Silicates and Phosphates [1542]*
Angrites, which formed very early in solar system history and are highly depleted in some volatile metals, were found to be water-rich.

4:15 p.m. Mikouchi T. * Hasegawa H. Takenouchi A. Kagi H.
*Olivine Xenocrysts in Asuka-881371 Angrite Revisited [2065]*
Olivine xenocrysts in Asuka-881371 angrite might be deformed in the parent body mantle, which could be residue of partial melting of C chondrite at low ñO2.

4:30 p.m. Agee C. B. * Miley H. M. Ziegler K. Spilde M. N.
*Northwest Africa 8535: Unique Dunitic Angrite [2681]*
We report here the discovery of a new lithology from the angrite parent body, NWA 8535, a dunite with ~90–95% zoned olivine.
2:00 p.m. Alexander C. M. O’D. * Nilges M. J. Cody G. D. Herd C. D. K.
Are Radicals the Carriers of D in IOM? [2721]
We do not observe the expected correlations between D/H and radical concentration, determined by EPR, if exchange with H$_3^+$ caused the D-enrichments in IOM.

Organic Matter in the Unique Carbonaceous Chondrite Miller Range 07687: A Coordinated In Situ NanoSIMS, FIB-TEM, and XANES Study [1609]
Coordinated in situ analyses of organic matter (OM) in MIL 07687 indicate it lacks nanoglobules, unlike OM previously observed in other chondrite groups.

2:30 p.m. Le Guillou C. * Changela H. G. Brearley A. J.
Ubiquitous Oxidized and Hydrated Amorphous Silicates in Carbonaceous and Ordinary Chondrites: Implications for Alteration Conditions and H$_2$ Degassing of Asteroids [2599]
We investigated the Fe valency of amorphous silicates in chondrite matrices by STXM. The elevated oxidation degree (70% Fe$^{3+}$) may result from H$_2$ degassing.

2:45 p.m. Chan Q. H. S. * Zolensky M. E. Martinez J.
Scaffold of Asymmetric Organic Compounds — Magnetite Plaquettes [1150]
Understanding the apparent spiral configurations of magnetite plaquettes and their correlation to molecular asymmetry using SEM imaging and EBSD analysis.

3:00 p.m. Gasda P. J. * Nagashima K. Thomen A. Taylor G. J.
The Origin and the Alteration of Macromolecular Carbon in CR Carbonaceous Chondrites [1515]
As indicated by in situ SIMS analysis, macromolecular organics in CRs may have derived from an isotopic reservoir that formed in the presolar molecular cloud.

3:15 p.m. Greenwood R. C. * Zolensky M. E. Buchanan P. C. Franchi I. A.
The Oxygen Isotope Composition of Dark Inclusions in HEDs, Ordinary and Carbonaceous Chondrites [2975]
Oxygen isotope variation in dark inclusions (DIs) in carbonaceous chondrites, ordinary chondrites, and HEDs is examined.

3:30 p.m. Sanborn M. E. * Yin Q.-Z. Irving A. J. Bunch T. E.
Differentiated Planetesimals with Chondritic Crusts: New $\Delta^{17}$O-$\varepsilon^{54}$Cr Evidence in Unique, Ungrouped Achondrites for Partial Melting of the CV/CK and CO Parent Bodies [2259]
High-precision Cr isotope measurements for a set of unique achondrites provide new evidence for partial melting of some carbonaceous chondrite parent bodies.

3:45 p.m. Benedix G. K. Russell S. S. * Forman L. V. Bevan A. W. R. Bland P. A.
A New Unequilibrated Chondrite Lithology Discovered in the Murchison CM2Meteorite [1143]
A unique chondrite composition found in Murchison unveils interesting new questions.

4:00 p.m. Hiroi T. * Imae N. Yamaguchi A. Kaiden H. Sasaki S. et al.
Discovery of Unusual 3 Micron Absorption Bands of Some CM Chondrite Chips of NIPR and Possible Link to Asteroidal Surface Minerals [1119]
Unusual 3-$\mu$m-absorption bands were discovered on CM chondrite chips, which are likely due to phosphates and show similarity to Vesta and Gaspra surface spectra.
4:15 p.m.  Miller K. E. *  Lauretta D. S.  Nagashima K.  Domanik K.
*The Nature of Primitive R Chondrite Material: Characterization of an R3.2 Clast in Mount Prestrud 95404 [#2402]*
An R3.2 clast has sulfide chondrules that formed at sulfur fugacity high enough to stabilize melt. Silicate chondrule O-isotopes are similar to the OCs.

4:30 p.m.  Dunn T. L. *  Gross J.
*Magnetite in CK and CV Chondrites: Evidence for Two Parent Bodies? [#1105]*
Are they related?/CV and CK chondrites/Oxides say no way.
Friday, March 20, 2015

EARLY LUNAR EVOLUTION: ACCRETION TO CRUSTAL FORMATION AND MORE
8:30 a.m. Waterway Ballroom 1

Chairs: Peter Schultz
Yann Sonzogni

8:30 a.m. Jacobsen S. B. * Sedaghatpour F. Petaev M. I. Yu G.
Hf-W and the Isotopic Crisis for the Giant Impact Origin of the Moon [#2827]
The observed W isotope compositions of the silicate Earth and the Moon are a problem for the giant impact model.

8:45 a.m. Dauphas N. * Chen J. H. Papanastassiou D. A.
Testing Earth-Moon Isotopic Homogenization with Calcium-48 [#2436]
The calcium-48 isotopic compositions of lunar and terrestrial rocks are identical, suggesting that Theia had the same isotopic composition as the proto-Earth.

9:00 a.m. Wang K. * Jacobsen S. B. Sedaghatpour F. Chen H. Korotev R. L.
Lunar Dunite Reveals the Same Iron Isotopic Composition of the Bulk Silicate Earth and Moon [#1980]
Fe isotopic composition of the Moon is likely identical to that of the bulk silicate Earth, by balancing light Fe in the deep Moon with heavy Fe in the shallow.

Protolunar Disk Evolution and the Depletion of Volatile Elements in the Moon [#2304]
We explore how the evolution of the protolunar disk could lead to a depletion in K, Na, and Zn in the Moon relative to Earth even in the absence of escape.

9:30 a.m. Petaev M. I. * Jacobsen S. B. Huang S.
Testing Models of the Moon’s Origin, II: Phase Relations in a Proto-Lunar Disk of the BSE Composition [#2254]
We present a phase diagram of the protolunar disk of BSE composition and discuss different modes of the Moon’s accretion from the disk.

9:45 a.m. Steenstra E. S. * Rai N. van Westrenen W.
New Geochemical Models of Core Formation in the Moon from Metal-Silicate Partitioning of 14 Siderophile and Chalcophile Elements [#1490]
The observed lunar mantle depletions of 14 siderophile and chalcophile elements can be explained by S-rich core formation in a hot, fully molten Moon.

10:00 a.m. Charlier B. * Grove T. L. Namur O. Holtz F.
Crystallization of the Lunar Magma Ocean and the Primordial Differentiation of the Moon [#1168]
Crystallization experiments on a range of LMO compositions constrain the initial stratigraphy of the lunar interior and the mantle-crust differentiation.

10:15 a.m. Dygert N. * Hirth G. Liang Y.
Rheology of Ilmenite and Ilmenite-Olivine Aggregates: Implications for Lunar Cumulate Mantle Overturn [#2058]
We used deformation experiments to parameterize a flow law for ilmenite in dislocation creep. Ilmenite greatly weakens aggregates composed mostly of olivine.
10:30 a.m. Nekvasil H. * DiFrancesco N. J. Coraor A. E. Lindsley D. H.  
*A New Mechanism for Generating the Calcium Enrichment of Lunar Ferroan Anorthosite [#1617]*
New data suggest calcium-enrichment of plagioclase during cooling of the LMO, which has major implications for the formation of FAN and other old lunar rocks.

10:45 a.m. Yamamoto S. * Nakamura R. Matsunaga T. Ogawa Y. Ishihara Y. et al.  
*Global Distribution of Areas with Featureless Spectra on the Moon: Eroded Lunar Primordial Crust? [#1285]*
We report the global distribution of areas with featureless spectra on lunar highlands, which may be observational evidence of an eroded lunar primordial crust.

11:00 a.m. Sun Y. S. * Li L. L.  
*Characterization of Lunar Crust Mineralogy with M³ Data [#2941]*
A systematic screening of lunar crater central peaks with M³ was conducted to investigate the lunar crustal mineralogy and proposed a new three-layer model.

11:15 a.m. Kendall J. D. * Johnson B. C. Bowling T. J. Melosh H. J.  
*Ejecta from the South Pole-Aitken Basin-Forming Impact: Dominant Source of Farside Lunar Highlands [#2765]*
Using 3-D impact simulations, we suggest the massive impact that formed the South Pole-Aitken basin on the Moon also created the lunar farside highlands.

11:30 a.m. Schultz P. H. * Crawford D. A.  
*SPA-Impact Origin for the Nearside Dike System on the Moon [#2416]*
The recent discovery of deep feeder dikes on the Moon can be explained as the aftermath of the giant South-Pole-Aitken impact.

---

**Friday, March 20, 2015**

**VOLATILE ELEMENTS ON MARS**

8:30 a.m.  Waterway Ballroom 4

**Chairs:** Megan Elwood Madden  
Brian Hynek

*Study of Soluble Organic Compounds from Martian Regolith Breccia NWA 7533 by Orbitrap Mass Spectrometry [#2564]*
We measured the mass distribution of soluble organic compounds found in NWA 7533. We discuss their chondritic origin and their evolution on the surface of Mars.

8:45 a.m. Thomas-Keprta K. L. * Clemett S. J. McKay D. S. Gibson E. K. Wentworth S. J.  
*Indigenous Carbonaceous Matter and Boron Associated with Halite Crystals in Nakhla [#2770]*
We report here the observation of indigenous organic matter spatially associated with halite crystals located in alteration veins in the Nakhla Mars meteorite.

9:00 a.m. Fries M. D. * Steele A. Hynek B. M.  
*Halite as a Methane Sequestration Host: A Possible Explanation for Periodic Methane Release on Mars, and a Surface-Accessible Source of Ancient Martian Carbon [#3017]*
We present the hypothesis that methane sequestered in halite may play a role in observation of methane on Mars.
Martian Chlorobenzene Identified by Curiosity in Yellowknife Bay: Evidence for the Preservation of Organics in a Mudstone on Mars [#1178]
Martian chlorobenzene was identified by Curiosity in an ancient Yellowknife Bay mudstone indicating that organics can be preserved in the martian near-surface.

Martian Perchlorate Chemistry: Perchlorate Formation and Effects on Organics [#2997]
Perchlorate formation under current Mars ambient conditions and possible effects on organic molecules.

Late Stage Formation of Martian Chloride Salts Through Ponding and Evaporation [#1045]
We provide the first definitive formation mechanism and age of martian chloride deposits near Meridiani. Spoiler alert: formed in a “young” not-too-salty lake.

Water in Martian Meteorites: Oxygen Isotope Compositions [#2268]
We present the results of $\delta^{17}$O oxygen isotope analysis of water extracted from the shergottite Tissint by stepwise heating between temperatures of 20° and 1000°C.

Improved Resolution Maps of Hydrogen at Tharsis [#2036]
We find regions with enhanced hydrogen that are coincident with proposed tropical mountain glaciers, using improved spatial resolution MONS maps.

Hydration of the Martian Surface: What We Can Learn from Orbit [#1373]
The martian regolith is hydrated. We perform a global study of the first $\mu$m hydration using orbital NIR spectrometer and review the implications.

Apatite and Merrillite Petrogenesis in the New Enriched Lherzolitic Shergottite NWA 7755 [#1425]
Variable volatile concentrations are measured in apatites, which are spatially related to shock melts, as observed in Cl-X maps of apatite grains.

Investigations of Shock Effects on Phosphate Minerals in Extraterrestrial Materials [#2288]
Synthesis, shock, and synchrotron studies of natural and synthetic extraterrestrially-relevant phosphate-bearing minerals.

Low Temperature Anhydrite Precipitation in Flowing Brines: Implications for Calcium Sulfate Phases Observed on Mars [#1505]
Anhydrite precipitated from low-temperature flowing brines in jarosite dissolution experiments. Fluid flow rate had little impact on jarosite dissolution rates.

Sulfate Mineral Formation from Acid-Weathered Phyllosilicates: Implications for the Aqueous History of Mars [#2857]
Acid sulfate-weathered phyllosilicates may explain observations of sulfates and phyllosilicates in close proximity to each other on Mars.
Friday, March 20, 2015  
OUTER PLANETARY BODIES: EXPERIMENTS AND INVESTIGATIONS INTO THE DEPTHS
8:30 a.m. Waterway Ballroom 5

Chairs:  
James Roberts  
Christopher Glein

8:30 a.m. Brophy B. H. * Singh S. Chevrier V. F.  
Effect of Sediment Concentration on Titan Fluid Dynamics [#1734]  
This study is to determine a model for the dependence of viscosity on the concentration of sediments, and predict the flow of liquids on the surface of Titan.

Benzene-Based Co-Crystals on the Surface of Titan [#2078]  
The benzene:ethane co-crystal may be the dominant form of benzene on Titan, and is a new class of materials for the surface, analogous to hydrated minerals.

9:00 a.m. Bu C. * Baragiola R.  
Cracking and Its Effect on the Electrical Charging/Discharging in Amorphous Solid Water Due to the Desorption of Underlying Xenon Gases [#2956]  
We study the cracking in water ice due to desorption of volatile gases and how cracks affect the surface electric field, with applications in icy bodies.

9:15 a.m. Singh S. * McMahon Z. Chevrier V. F. Combe J. P.  
Solubility of Ethylene and Acetylene in Liquid Methane and Ethane [#1626]  
We calculated the solubility of acetylene and ethylene in liquid methane and ethane under Titan simulated conditions.

9:30 a.m. Choukroun M. * Vu T. Gloesener E. Ibourichene A. Smythe W. et al.  
Partial Dissociation of Clathrate Hydrates in Presence of Ammonia Under Cryogenic Conditions [#2463]  
Experiments bring forth evidence for partial dissociation of clathrate hydrates in presence of ammonia, allowing gas release at lower temperature than expected.

9:45 a.m. Sakai S. * Cravens T. E. Omid N. Perry M. E.  
Test Particle Models of Ions in the Plume of Enceladus — Interpretation of INMS Data [#1200]  
We compare calculated velocity and energy distributions with the CAPS and INMS data and will discuss the physical mechanism in the plume.

10:00 a.m. McKinnon W. B. *  
Effect of Enceladus’ Rapid Spin on Interpretation of Cassini Gravity [#2615]  
Enceladus’ rapid spin affects its J2 and C22 so that Cassini gravity actually implies its ice shell is globally frozen almost but not quite to the ocean bottom.

Rhea’s Internal Structure Inferred from Cassini Gravity and Topography [#1069]  
Updated Cassini radio tracking data and limb profile analyses help to constrain the gravity field, shape, and internal structure of Saturn’s large moon Rhea.

10:30 a.m. Kamata S. * Nimmo F.  
Relaxation of Long-Wavelength Topography and the Thermal Evolution of Rhea [#1092]  
Long-wavelength topography and gravity observed on Rhea suggest that tidal heating played an important role in its thermal evolution.
10:45 a.m. Roberts J. H. * Stickle A. M. 
*Impact Heating and the South Polar Thermal Anomaly on Enceladus [#1468]*
South polar terrain/Last refuge of the scoundrel/An impact did it?

11:00 a.m. Johnston S. A. * Montési L. G. 
*The Impact of a Regional Sea on Stresses on Enceladus [#2029]*
Important stresses/Above a regional sea/Yield exciting results..

*The Chemistry of Enceladus’ Ocean from a Convergence of Cassini Data and Theoretical Geochemistry [#1685]*
Enceladus cold/Ocean of alkali salts/Can be predicted.

11:30 a.m. Elsenousy A. * Vance S. Bills B. G. Goodman J. 
*Modeling Heat and Salt Transfer at Europa’s Ice-Ocean Interface [#1676]*
This work focuses on dynamics of refreezing after a melt event for Europa’s ice-ocean interface and its implications for Europa’s tidal response.

---

**Friday, March 20, 2015**

**VENUS: NEW FLASHERS OF INSIGHT**

8:30 a.m. Waterway Ballroom 6

**Chairs:** Jennifer Whitten
Jorn Helbert

8:30 a.m. Hart R. A. * Russell C. T. Zhang T. L. 
*An Overview of Lightning Induced Whistler-Mode Waves Observed by Venus Express [#2341]*
Venus Express comes to an end after 8.5 years in orbit. Its magnetometer detected lightning-generated whistler waves in the ionosphere throughout the mission.

8:45 a.m. Whitten J. W. * Campbell B. A. 
*Distribution of Venusian Impact Crater Ejecta Within Tessera [#1458]*
Magellan SAR data are used to map the distribution of fine-grained impact crater ejecta within Alpha Regio and Tellus Tessera.

9:00 a.m. Harrington E. * Treiman A. H. 
*High Radar Reflectivity on Venus’ Highlands: Different Signatures on Ovda Regio and Maxwell Montes [#2713]*
The hills grow brighter/As you climb, but the summits/Remain in darkness.

9:15 a.m. Kohler E. * Port S. Chevrier V. Johnson N. Lacy C. 
*Radar-Reflective Minerals Investigated Under Venus Near-Surface Conditions [#2563]*
Results from experiments constraining the origins of the radar anomalies in the venusian highlands are presented.

*Volcanic Events on Venus: Observations, Modelling, and Detection [#1818]*
Numerical models and radar observations are used to explore volcanic processes on Venus. Deposit identification and implications for detection are discussed.

9:45 a.m. Chi P. J. * Russell C. T. Villarreal M. N. Zhang T. L. Luhmann J. G. 
*A Numerical Estimation of Magnetic Induction by the Venusian Core [#1922]*
A finite-element model is developed to estimate the magnetic induction by the metallic core in Venus.

10:00 a.m. BREAK
SMALL BODY SPACE WEATHERING: SUNNY WITH A CHANCE OF AMORPHIZATION
10:15 a.m. Waterway Ballroom 6

Chairs: Lindsay Keller  
Faith Vilas

10:15 a.m. Ogliore R. C. * Dobrica E.  
Space-Weathering Features on Two Hayabusa Particles [#1631]  
We describe impact residues and solar-wind irradiation features on two grains returned from asteroid Itokawa.

10:30 a.m. Berger E. L. * Keller L. P.  
Space Weathering of Itokawa Particles: Implications for Regolith Evolution [#2351]  
Itokawa grains: On the asteroid surface/Were you motionless?

10:45 a.m. Kohout T. * Penttilä A. Gritsevich M. Britt D. Reddy V. et al.  
Can We Distinguish Between Shock-Darkened and Space-Weathered Asteroids? [#2072]  
Both space weathering and shock darkening are capable of asteroid spectra darkening. Can we distinguish between these processes and reflectance spectra?

11:00 a.m. Vilas F. * Hendrix A. R. Jensen E. A.  
Searching for the Onset of Space Weathering in S-Complex Asteroids in the UV [#2935]  
We search for evidence of the onset of space weathering in S-complex asteroids first evident in the UV/blue spectra regime.

11:15 a.m. Keller L. P. * Christoffersen R. Dukes C. A. Baragiola R. Rahman Z.  
Ion Irradiation Experiments on the Murchison CM2 Carbonaceous Chondrite: Simulating Space Weathering of Primitive Asteroids [#1913]  
Irradiation of a hydrated carbonaceous chondrite resulted in microstructural and spectral alteration of matrix materials, including amorphization and OH loss.

11:30 a.m. Gillis-Davis J. J. * Gasda P. J. Bradley J. P. Ishii H. A. Bussey D. B. J.  
Laser Space Weathering of Allende (CV2) and Murchison (CM2) Carbonaceous Chondrites [#1607]  
Laser simulated space weathering of Murchison, Allende, and graphite reveal how spectra of C-complex asteroids may evolve differently due to parent composition.

11:45 a.m. Kaluna H. M. * Gillis-Davis J. J.  
Space Weathering of Fe and Mg End-Member Phyllosilicates [#2408]  
Laser irradiated phyllosilicates suggest C-type space weathering trends may depend on the degree of aqueous alteration experienced by asteroid parent bodies.
46th LPSC Program 61

Friday, March 20, 2015
LATER LUNAR EVOLUTION: HOW OLD IS OLD?
1:30 p.m.  Waterway Ballroom 1

Chairs:  Herbert Frey
         Nicolle Zellner

1:30 p.m.  Jolliff B. L. *  Lawrence S. J.  Petro N. E.  Clegg R. N.  Stadermann A. C.  et al.
Science Priorities for Lunar Exploration Missions and Value of Continued LRO Operations for Future Lunar Geoscience [#2616]
We present science priorities for three examples of lunar exploration missions: SPA sample return, dating young basalts, and exploring Compton-Belkovich volcanics.

Crater Bouguer Anomalies Probe South Pole-Aitken (SPA) Basin Structure [#2897]
We use the Bouguer gravity signals of lunar complex craters to probe the subsurface structure of the South Pole-Aitken Basin.

2:00 p.m.  James P. B. *  Smith D. E.  Kendall J. D.  Zuber M. T.  Solomon S. C.
The Heterogeneous Mantle Under South Pole-Aitken Basin as Constrained by GRAIL and LOLA Observations [#1953]
We isolate the mantle gravity signature under SP-A through an analysis of topography and geoid power spectra.

2:15 p.m.  Newman L. C. *  Ravat D.
Characteristics of Magnetic Sources in the Region of the Lunar South Pole-Aitken Basin [#2942]
New magnetic source geometry determination techniques suggest there is a regional magnetic layer near the lunar surface and also dike- and sill-like sources.

2:30 p.m.  Norman M. D. *  Taylor L. A.
Crystal Accumulation in a 4.2 Ga Lunar Impact Melt from a Pre-Imbrium Basin in the PKT: Petrology and Mineral Chemistry of 67955 [#1755]
67955 formed by crystal accumulation in a KREEP-rich impact melt at 4.2 Ga and was excavated by Imbrium at 3.9 Ga. Its age has nothing to do with Nectaris.

2:45 p.m.  Park J. *  Nyquist L. E.  Herzog G. F.  Turrin B. D.  Lindsay F. N.  et al.
Newly Determined Ar/Ar Ages of Lunar Troctolite 76535 [#2018]
Ar age spectra of lunar 76535 may indicate the possibility that the lunar troctolite formed relatively early in a plutonic environment in the lunar crust.

3:00 p.m.  Spudis P. D. *  Murl J. N.
Impact Melt from Lunar Multi-Ring Basins: Orientale and Imbrium [#1853]
Deposits of ejected impact melt from the lunar Orientale and Imbrium multi-ring basins have been identified and compositionally characterized.

3:15 p.m.  Morse Z. R. *  Osinski G. R.  Tornabene L. L.
New Map of Orientale Basin Ejecta and Comparison of Ejected Lowland and Highland Material [#2608]
Basin ejecta/Multiple facies observed/See our new map.

3:30 p.m.  Cahill J. T. S. *  Lawrence D. J.  Delen O.  Stickle A.  Raney R. K.
The Maturely, Immature Orientale Impact Basin [#2981]
A look at Orientale impact basin surface and subsurface regolith maturity with neutron, radar, near-, and thermal-infrared datasets.
3:45 p.m.  Boehnke P. *  Heizler M. T.  Harrison T. M.  Lovera O. M.  Warren P. H.
Lunar 40Ar/39Ar Data Does Not Indicate a ca. 3.9 Ga Impact Episode [#2745]
New analyses of Apollo 16 samples and published literature 40Ar/39Ar analyses do not support a ca.
3.9 Ga impact episode.

4:00 p.m.  Frey H. V. *
Geophysical Evidence Supporting an Early as Well as Late Heavy Bombardment on the Moon [#1125]
Candidate impact basin Bouguer gravity and rim-interior topographic contrasts add to the evidence for
an Early, as well as a Late, Heavy Bombardment on the Moon.

Comparing U-Pb SIMS Ages of Ca-Phosphates in Apollo 12, 14, and 17 Breccias [#1171]
In this study, we compare in situ U-Pb ages from Ca-phosphate grains obtained from breccias collected
during the Apollo 12, 14, and 17 missions.

4:30 p.m.  Fagan A. L. *  Joy K. H.  Kring D. A.
Unravelling the Bombardment History of the Earth-Moon System ~2 Billion Years Ago [#1405]
We identify four types of projectile relics in lunar regolith breccias with closure ages ~2 Ga that
provide evidence of the projectile population.

4:45 p.m.  Zellner N. E. B. *  Delano J. W.
Lunar Impact Glass Ages and the Bombardment of the Moon: Composition, Size, and
Shape Matter [#2028]
Lunar impact glass/A tricky little sample!/What can you tell us?

Friday, March 20, 2015
MINERALOGY MEASURED BY MISSIONS TO MARS
1:30 p.m.  Waterway Ballroom 4

Chairs:  Paul Archer Jr
Christina Viviano-Beck

1:30 p.m.  Sun V. Z. *  Milliken R. E.
Understanding Ancient and Recent Clay Formation on Mars from a Global Survey of
Crater Central Peaks [#1652]
We determine the depth and age of crustal clays and report very early Noachian (>3.93 Ga) clay
formation as well as more recent (<2.5 Ga) impact-formed clays.

1:45 p.m.  McCollom T. M. *
Geochemical Trends in the Layered Sulfate Deposits at Meridiani Planum and Implications for
Their Origin [#1164]
Data indicate that nearly all elements were immobile during addition of SO4 to the deposits and favor
atmospheric/volcanic sulfur sources over evaporite input.

2:00 p.m.  Viviano-Beck C. E. *
Early Hydrothermal Environments on Mars: Tyrrhena Terra [#2756]
The hydrothermal carbonation of serpentine in the greater Isidis region was likely an important factor
for sequestration of CO2 on early Mars.

2:15 p.m.  Michalski J. R. *  Noe Dobea E. Z.  Weitz C. M.
Mg-Rich Clays and Silica-Bearing Deposits in Eridania Basin: Possible Evidence for Ancient Sea
Deposits on Mars [#2754]
We detected silica and Mg-rich clays in deposits in Eridania Basin that, based on geologic context,
likely formed in an ancient sea on Mars.

62  46th LPSC Program
2:30 p.m. Bishop J. L. * Gross C. Wray J. J. Horgan B. Viviano-Beck C. E. et al.
Acid-Alteration at Mawrth Vallis Between the Older Fe/Mg-Rich Clays and the Younger Al/Si-Rich Clays [#1455]
Spectral doublet at 2.21–2.23 and 2.26–2.28 µm attributed to acidic alteration of Fe/Mg-smectite at Mawrth Vallis.

Regional Context of Soil and Rock Chemistry at Gale and Gusev Craters, Mars [#2284]
In situ geochemical data for rocks and soils from Gale Crater and Gusev Crater are compared with data from the Gamma Ray Spectrometer on Mars Odyssey.

3:00 p.m. Arvidson R. E. Squery S. W. Gellert R. Athena Science Team
Recent Results from the Opportunity Rover’s Exploration of Endeavour Crater, Mars [#1118]
Results of Opportunity’s exploration of Endeavour’s rim are reported, including evidence for aqueous alteration of rocks on Murray Ridge and Cape Tribulation.

Opportunity In Situ Geologic Context of Aqueous Alteration Along Offsets in the Rim of Endeavour Crater [#2209]
In situ mapping identifies outcrops with enhanced aqueous and low-grade thermal alteration at structural boundaries between Endeavour crater rim segments.

3:30 p.m. Ruff S. W. *
New Observations Reveal a Former Hot Spring Environment with High Habitability and Preservation Potential in Gusev Crater, Mars [#1613]
Hot spring discharge channels at El Tatio, Chile, host microbial mats with sinter deposits that are remarkably similar to silica deposits next to Home Plate.

3:45 p.m. Berger J. A. Schmidt M. E. Gellert R. Campbell J. L. Boyd N. I. et al.
Germanium Enrichments in Sedimentary Rocks in Gale Crater, Mars: Constraining the Timing of Alteration and Character of the Protolith [#1564]
Germanium enrichment in Gale Crater sedimentary rocks may serve as a promising tracer for protolith compositions and alteration history.

4:00 p.m. Johnson J. R. * Wiens R. C. Maurice S. Blaney D. Gasnault O. et al.
Chemcam Passive Reflectance Spectroscopy of Ferric Sulfates and Ferric Oxides Near the Base of Mt. Sharp [#1433]
ChemCam relative reflectance spectra (400–840 nm) of fresh surfaces and drill tailings near the base of Mt. Sharp suggest the presence of Fe sulfates and Fe oxides.

4:15 p.m. Treiman A. H. * Bish D. Ming D. W. Grotzinger J. Vaniman D. T. et al.
Mineralogy and Genesis of the Windjana Sandstone, Kimberley Area, Gale Crater Mars [#2620]
The Windjana Sandstone is rich in alkali feldspar and in K2O. It is not clear yet if these represent sediment from K-rich igneous rock, or potassic alteration.

Oxychlorine Species on Mars: The Gale Crater Story [#2971]
A strong linear correlation between O2 detected by SAM and Cl measured by APXS demonstrates the presence of oxychlorine species (perchlorate) in Gale Crater.

4:45 p.m. Stern J. C. * Sutter B. McKay C. P. Navarro-Gonzalez R. Freissinet C. et al.
The Nitrate/Perchlorate Ratio on Mars as an Indicator for Habitability [#2590]
Low nitrate/perchlorate ratios of Gale Crater sediments suggest that nitrate deposition may have been limited to early Mars, prior to major atmospheric loss.
Chairs: Catherine Neish
        Amanda Nahm

1:30 p.m.  Quick L. C. *  Glaze L. S.  Baloga S. M.
**Rheology of Lava on Europa and the Emergence of Cryovolcanic Domes [#1060]**
Several domes on Europa were previously modeled as viscous extrusions of lava. We employ a new model to revisit the possibility of cryovolcanic domes on Europa.

1:45 p.m.  Bland M. T. *  McKinnon W. B.
**Was Ganymede Resurfaced Tectonically or Cryovolcanically? The Effect of Initial Topography on Simulations of Groove Formation [#1540]**
Resurfaced terrains/By flood or by tectonics/Models can reveal.

2:00 p.m.  Nahm A. L. *  Kattenhorn S. A.
**Topographic Analysis of Samaria Fossa on Enceladus: Thermal Gradient, Heat Flux, and Possible Stress Sources Determined from Normal Faulting [#1124]**
Topography of/A fault on Enceladus/Tells the fault’s secrets.

2:15 p.m.  Czechowski L. *
**Mass Loss as a Driving Mechanism of Tectonics of Enceladus [#2030]**
The mass loss from SPT is the main driving force of the following tectonic processes on Enceladus: subsidence of SPT, flow in the mantle, and motion of plates.

2:30 p.m.  Schenk P. *  McKinnon W. B.
**New Crop Circles Found on Europa [But Not Ganymede]! True Polar Wander Conspiracy Confirmed! [#1527]**
Europa is cracked/Polar wander run amok/Whence Ganymede’s bulge?

2:45 p.m.  Dameron A. C. *  Burr D. M.
**Using Europan Double Ridge Morphology to Test Proposed Models of Formation [#2228]**
We derived double ridge slopes from digital elevation models and shadow measurements for comparison with inferred values from formation models.

3:00 p.m.  White O. L. *  Umurhan O. M.  Howard A. D.  Moore J. M.
**Modeling of Sublimation-Driven Erosion and Ice Pinnacle Formation on Callisto [#1589]**
Landform evolution modeling of Callisto’s pinnacle terrain indicates distinct roles for CO$_2$ and H$_2$O ice sublimation in development of regolith and ice pinnacles.

3:15 p.m.  Cartwright R. J. *  Emery J. P.  Alonso-Pinilla N.  Rivkin A. S.  Trilling D. E.
**Hemispherical Asymmetries in H$_2$O Ice Bands on the Large Moons of Uranus: Evidence for System-Wide Alteration Processes [#1647]**
We are investigating surface modification processes operating on the large moons of Uranus by analyzing H$_2$O ice bands on their leading and trailing hemispheres.

3:30 p.m.  Umurhan O. M. *  Howard A. D.  Moore J. M.  Schenk P. M.  White O. L.
**Reconstructing Helene’s Surface History — Plastics and Snow [#2400]**
Helene’s surface geomorphology considered as arising from non-Newtonian mass flow of its icy surface materials. Various historical scenarios are examined.
3:45 p.m. Moore J. M. * Howard A. D. Schenk P. M.  
Landform Evolution Modeling of Specific Fluvially Eroded Physiographic Units on Titan [#2457]  
Eroded pseudo-fractal terrain produces a landscape broadly composed of isolated belts of ridges. We are not finding eroded examples of grooved terrain on Titan.

4:00 p.m. Neish C. D. * Barnes J. W.  
Spectral Properties of Titan’s Impact Craters Imply Chemical Weathering of Its Surface [#1097]  
Fresh Titan craters/Washed clean by methane rainfall/Leave ice rims behind.

Titan’s Magic Island: Transient Features in a Titan Sea [#1538]  
Titan’s Magic Island/Waves, solids, or bubbles/Which can it be?/Come to this talk and see!

4:30 p.m. Michaelides R. J. * Hayes A. G. Mastrogiuseppe M. Zebker H. A. Farr T. G. et al.  
Titan’s Empty Lake Basins: Constraining Surface Physical Properties by Investigating Radar Backscatter Behavior at Multiple Incidence Angles [#1581]  
We present a detailed investigation of the radar scattering behavior of Titan’s north polar empty lake basins at near-nadir and off-axis viewing geometries.

---

Friday, March 20, 2015  
HIGH-PRESSURE MINERAL POLYMORPHS  
1:30 p.m. Waterway Ballroom 6

Chairs: Erin Walton  
Aaron Cavosie

1:30 p.m. Walton E. L. * Sharp T. G. Hu J.  
The High-Pressure Mineral Inventory of Shock Veins from the Steen River Impact Structure [#2512]  
High-pressure minerals such as majoritic garnet associated with shock veins in the central uplift of the Steen River impact structure formed at 15–23 GPa.

1:45 p.m. Cavosie A. J. * Erickson T. M. Timms N. E.  
Nano-Scale Records of Shock Deformation: EBSD Identification of Reidite and Shocked Zircon in Sandstone at the Ordovician Rock Elm Impact Structure [#2651]  
We report EBSD results that document a new occurrence of reidite in brecciated sandstone from the Ordovician Rock Elm impact crater in Wisconsin, USA.

2:00 p.m. Crow C. A. * Jacobsen B. McKeegan K. D. Moser D. E.  
Investigating Zircon Shock Microstructures with NanoSIMS [#2470]  
Preliminary NanoSIMS U-Pb and Pb-Pb age dating of lunar zircons suggests formation of shock microtwins does not locally disturb the U-Pb isotopic age.

2:15 p.m. Takenouchi A. * Mikouchi T. Yamaguchi A. Zolensky M. E.  
Mineralogical Comparison of Olivine in Shergottites and a Shocked L Chondrite: Implications for Shock Histories of Brown Olivine [#1650]  
Mineralogical comparison of olivine in shergottites and shocked L chondrite provides implications for unique P-T shock histories of shergottites.

2:30 p.m. Hu J. * Sharp T. G.  
Collisional Histories of Ordinary Chondrite Parent Bodies: Information from Shock Induced High-Pressure Minerals [#2601]  
We use high-pressure minerals in several shocked chondrites to suggest their origin of kilometer-sized asteroid collision.
2:45 p.m. Rubin A. E. *

*Maskelynite in Basaltic Meteorites: An Indicator of Shock Pressure During Impact Ejection from Parent Bodies [#1047]*

The proportion of maskelynite-rich samples among basaltic meteorites correlates with parent-body escape velocity: eucrites (4 Vesta?), 3%; Moon, 29%; Mars, 93%.

3:00 p.m. BREAK

---

**Friday, March 20, 2015**

**IMPACT CRATERS ON MARS AND THE MOON**

**3:15 p.m. Waterway Ballroom 6**

**Chairs:** Maria Banks

Nadine Barlow

3:15 p.m. Williams J.-P. * Paige D. A.  Jögi P.

*Impact Melt Deposits at the Antipodes of Tycho and Copernicus Craters [#2738]*

Impact melt-like deposits are identified at the antipodes of Tycho and Copernicus craters. Crater counts indicate the deposits have similar ages as the craters.

3:30 p.m. Gregg T. K. P. *

*Large (>1 km) Rayed Craters in Hesperia Planum, Mars: What’s the Ejecta Trying to Say? [#2442]*

A preliminary search for rayed impact craters was conducted within Hesperia Planum, Mars, to help constrain the rate at which crater rays disappear on Mars.

3:45 p.m. Pan L. * Ehlmann B. L.  Carter J.  Ernst C. M.

*Probing Mars’ Northern Plains Stratigraphy with Impact Craters [#2583]*

We detect and map the mineral phases in large craters in the northern plains of Mars and use depth-diameter relationship to establish its geologic history.

4:00 p.m. Viola D. *  McEwen A. S.  Dundas C. M.  Byrne S.

*Inferring the Subsurface Structure of Double Layer Ejecta Craters from Overlying Secondary Craters [#2096]*

The relative abundance of excess ice in each ejecta layer of DLE craters can be determined from the thermokarstic expansion of overlying secondary craters.

4:15 p.m. Noe Dobrea E. Z. *  Stoker C. R.  McKay C. P.  Davila A. F.  Kříček M.

*Crater Morphology in the Phoenix Landing Ellipse: Insights into Net Erosion and Ice Table Depth [#2511]*

We have performed an analysis of the craters and their ejecta within the Phoenix landing ellipse.

4:30 p.m. Sarkar R. *  Singh P.  Porwal A.

*Identification of Aqueous Minerals and Subsurface/Interstitial Ice Signatures from a Crater in Thaumasia, Mars [#1784]*

We report aqueous minerals from an unnamed crater located in Thaumasia region and also find evidence of (active?) subsurface ice within and around the crater.

4:45 p.m. Turner S. M. R. *  Bridges J. C.  Grebby S.  Ehlmann B. L.

*Hydrothermal Minerals Within Impact Craters in Amazonian-Aged Terrains on Mars [#2061]*

CRISM characterization of Mars Amazonian-aged impact-induced hydrothermal systems to determine the type of crater where nakhlite alterations minerals were formed.
POSTER SESSION I
Tuesday, 6:00 p.m.  Town Center Exhibit Area

GENESIS: STILL BUSY AFTER ALL THESE YEARS  [T601]

Huss G. R.  Ogliore R. C.  Jurewicz A. J. G.  Burnett D. S.  Nagashima K.  POSTER LOCATION #1
Estimate of Solar Wind Hydrogen Fluence from the Genesis Collectors  [#2577]
We present H-fluence data for Genesis DOS collectors for four solar wind regimes, compare them with results from the Genesis flux monitor, and give implications.

Meshik A. P.  Pravdivtseva O. V.  Hohenberg C. M.  Burnett D. S.  POSTER LOCATION #2
Refined Composition of Solar Wind Xenon Delivered by Genesis: Implication for Primitive Terrestrial Xenon  [#2640]
Recent analyses of solar wind xenon delivered by Genesis suggest that primordial terrestrial Xe had solar composition and no special primordial Xe is required.

In-Situ Depth Profile of Solar Wind Helium from Genesis Diamond-Like Carbon  [#1766]
We report the first results for a depth profile of solar-wind He from a Genesis collector by sputtered neutral mass spectrometry using strong-field ionization.

Schmeling M.  Davidson J.  Eng P. J.  Stubbs J. E.  Jurewicz A. J. G.  et al.  POSTER LOCATION #4
Grazing Incidence X-Ray Fluorescence Measurements of Genesis Sample 30580 for Determination of Manganese and Nickel Fluences  [#2238]
Genesis flight sample 30580 was analyzed by grazing incidence X-ray fluorescence spectrometry for subsequent calculation of Mn and Ni fluences.

Gonzalez C. P.  Allums K. K.  Allton J. H.  POSTER LOCATION #5
Genesis Solar Wind Samples: Update of Availability  [#1950]
An update to the community of available Genesis solar wind array samples and a preview of other collectors that will be included in the catalog.

Waeselmann N.  Humayun M.  Goreva Y. S.  Burnett D. S.  Jurewicz A.  POSTER LOCATION #6
Impact of Acid-Cleaning on the Solar Wind Layer of Genesis Flight Wafers — Partial Dissolution and Recovery of the Lithium-6 Implant  [#1266]
Successful recovery of the Lithium-6 implant after aqua regia cleaning on Si flight wafers.

Genesis Solar Wind Collector Cleaning Assessment: Update on 60336 Sample Case Study  [#2333]
We present results of the effective procedure for the removal of organic contamination from Genesis collectors surfaces.

Allton J. H.  Kuhlman K. R.  Allums K. K.  POSTER LOCATION #8
Genesis Solar Wind Sample 61422: Experiment in Variation of Sequence of Cleaning Solvent for Removing Carbon-Bearing Contamination  [#1896]
Cleaning of Genesis solar wind array samples with ultrapure water was validated when tested against organic solvent for removing particles.

Allums K. K.  Gonzalez C. P.  Kuhlman K. R.  Allton J. H.  POSTER LOCATION #9
Enhanced Cleaning of Genesis Solar Wind Sample 61348 for Film Residue Removal  [#2024]
Genesis mission return flight samples require enhanced cleaning methods to remove contaminates from the surface of the samples.
Knibbe J. S.  van Westrenen W.  
*The Internal Configuration of Planet Mercury [#1345]*
We examine implications of interior configurations for Mercury and attempt to constrain the inner core radius using estimates of Mercury’s global contraction.

Tian Z.  Zuber M. T.  Stanley S.  
*Magnetic Field Modeling for Mercury Using Dynamo Models with Stable Layers and Laterally Variable Heat Flux [#1419]*
Mercury’s magnetic field is characterized by its low intensity, large dipole offset, and small tilt. We perform dynamo simulations to explain these features.

*Mercury’s Rotation Rate from Three Years of Observations by the Mercury Laser Altimeter [#1893]*
The rotation rate of Mercury is measured with the help of three years of orbital observations by the Mercury Laser Altimeter onboard the MESSENGER spacecraft.

*A Topographic Model of Mercury’s Northern Hemisphere from Combined MESSENGER Stereo Photogrammetry and Laser Altimetry [#1955]*
A high-resolution topographic model of Mercury’s northern hemisphere was produced using stereo images and laser altimetry obtained by the MESSENGER spacecraft.

Susorney H. C. M.  Barnouin O. S.  Ernst C. M.  
*The Surface Roughness of Mercury: Investigating the Effects of Impact Cratering, Volcanism, and Tectonics [#2088]*
The surface roughness of Mercury is measured to understand how impact cratering, volcanism, and tectonics contribute to Mercury’s topography.

Stojic A. N.  Pavlov S. G.  Morlok A.  Hiesinger H.  Sohn M.  
*Space Weathering: Surface Gardening Processes on Mercury’s Surface [#1892]*
We investigate changes in the MIR spectral range of analog material simulating Mercury surface modifying processes using LIBS, IR spectroscopy, and TEM.

Fisher E. A.  Izenberg N. R.  Feng W.  
*Temperature Dependent Spectral Variation on the Surface of Mercury [#1849]*
We present a lab-generated thermospectrum for Mg olivine, and a preliminary analysis indicating that Mercury’s surface shows little thermospectral variation.

Domingue D. L.  Denevi B. W.  Murchie S. L.  Hash C. D.  
*Characterization of Mercury’s Regolith with Multiple Photometric Models [#1341]*
Mercury’s regolith properties are characterized using multiple photometric models. The models indicate Mercury’s regolith is different than the lunar regolith.

Buczkowski D. L.  Denevi B. W.  Ernst C. M.  Fasset C. I.  Byrne P. K.  
*A Geologic Map of the Caloris Basin, Mercury [#2287]*
We present an in-progress 1:5M geologic map of the Caloris basin, refining the stratigraphy of Caloris geologic units and including a crater classification scheme.

Cunje A. B.  Ghent R. R.  
*Caloris Basin, Mercury: Tectonic Deformational History from an Analysis of Cross-Cutting Structures [#1678]*
Through analyses of the cross-cutting relations, orientations and strains of Caloris basin’s tectonic structures, we define a new deformational history.
Investigating the Formation and Structure of Mercury’s Caloris Impact Basin

Numerical modeling of the Caloris basin-forming impact is performed to gain insight into its formation and structure.

The Remarkable Hokusai Crater, Mercury

Hokusai crater on Mercury possesses fluidized ejecta that are similar to those of rampart craters on Mars.

Rembrandt Impact Basin on Mercury: Determining the Origin of Low- and High-Albedo Smooth Plains

We explore the origin of smooth plains of variable albedo surrounding and within the Rembrandt impact basin on Mercury.

Geology of the Vincente-Yakovlev Basin Region on Mercury: Implications for Basin Control of Subsequent Tectonism

Geology of the Vincente-Yakovlev basin on Mercury is examined to investigate if the presence of the basin has controlled subsequent tectonism within the region.

We survey lobate scarps associated with basins on Mercury and find preferred orientation changes from N-S at the equator to E-W at the poles.

We survey crater chains on Mercury: they are not evenly distributed across the surface or between geologic units, and have preferential orientation N-S.

Small Thrust Fault Scarps on Mercury Revealed in Low-Altitude MESSENGER Images

High-resolution images of the surface of Mercury obtained by lowering MESSENGER’s periapsis altitude reveal young, small lobate thrust fault scarps.

Testing for the Influence of Insolation on Formation and Growth of Hollows on Mercury

We present measurements targeted at determining whether the morphology and distribution of hollows are consistent with insolation-driven formation and growth.

Distribution and Analysis of Pyroclastic Deposits on Mercury from Messenger Data

In this study, we use the full range of the MASCS spectrometer onboard MESSENGER to characterize the spectral properties of the pyroclastic deposits.

Sulfur Solubility in Silicate Melts Under Highly Reducing Conditions Relevant to Mercury

We experimentally investigate the S contents of silicate liquids at sulfide saturation as a function of pressure, temperature, and decreasing oxygen fugacity.

Experimental Constraints on the Chemical Differentiation of Mercury’s Mantle

Melting experiments were conducted at high pressure to understand the origin of the chemical heterogeneity observed on the surface of Mercury.
Role of Sulfur, Silicon and Carbon on the Crystallization Processes in Mercury’s Core Inferred from In-Situ Melting Experiments Between 4.5 and 15.5 GPa

In order to test the “iron snow” hypothesis, we performed multi-anvil experiments in the Fe-FeS-Fe2Si-Fe3C system on a synchrotron.

Evidence for Metal Anions in Silicate Melts: Implications for Pt Partitioning, Nanonuggets and Core Formation

Experiments suggest Pt is dissolved in silicate melts as Pt- under fO2 relevant for core formation. Nanonuggets are artifacts formed by oversaturation.

Thermal Infrared Spectroscopy of Igneous Rocks at Simulated Mercury’s Surface Environment

We examine the thermal infrared spectral variations of igneous analogues occurring under the higher temperatures of the surface of Mercury.

The Mantle Sources of Surface Lavas on Mercury

We present high-pressure experimental data that we use to identify the source regions and residual mantle mineralogy of Mercury’s surface lavas (NVP + IcP-HCT).

The BepiColombo Laser Altimeter (BELA) performances have been updated thanks to more accurate measurements acquired by the MESSENGER Laser Altimeter.

BepiColombo is a mission to explore Mercury. From dedicated orbits two spacecraft will be studying the planet. BepiColombo will be launched in July 2016.

BepiColombo is a joint ESA/JAXA mission to orbits around Mercury. Airbus Defence and Space is the prime contractor for the European spacecraft elements.

The Potential Effect of Turbulence on the Bouguer Gravity Patterns of Mascons

Recent two-dimensional simulations of impact features show excellent surface results, but do not show turbulent mixing of crust and mantle shown by three-dimensional simulations.

Shallow Magmatic Intrusion in the Lunar Nearside Highlands?

We use a combination of Clementine, M3, and GRAIL data to search for signatures of shallow magmatic intrusions in the lunar nearside highlands.

Topography on the Crust-Mantle Boundary in Lunar Basins Due to Both Genetic and Evolutionary Processes

Basin moho topography is likely the result of both evolutionary and genetic processes.
Gong S.  Wieczorek M. A.  Nimmo F.  Kiefer W. S.  Head J. W.  et al.  
*POSTER LOCATION #42*
*Constraints on the Distribution and Thickness of Mare Basalts and Cryptomare from GRAIL [#2691]*
We use GRAIL gravity data to investigate the mare basalts, search for the buried lava flows, and invert for the thickness of the major mare basalt flows.

Blanchette-Guertin J.-F.  Drilleau M.  Kawamura T.  Lognonne P.  Wieczorek M.  
*POSTER LOCATION #43*
*Lunar Crustal Thickness and Velocity Model Inversion Using Constraints from GRAIL and Apollo Data (and Preparation for the InSight Mission Data Analysis Phase) [#1867]*
Presentation of a Monte Carlo inversion approach to compute a new generation of 1-D lunar seismic velocity models and 3-D crustal thickness models.

Maksim N. R.  Biddle J.  Hurtado J. M.  
*POSTER LOCATION #44*
*Preferential Filtering and Gravity Anomaly Separation Using Gravity Recovery and Interior Laboratory (GRAIL) Data [#3023]*
We performed a preferential filtering on the free-air anomaly map derived from GRAIL. We then constructed a 2-D inversion model to visualize intrusive bodies in the lunar crust.

*POSTER LOCATION #45*
*Evaluation of Degree-1200 GRAIL Gravity Models Using Line-of-Sight Data and Spectral Analysis [#1314]*
We compare GRAIL gravity models against the gravity-from-topography model from LOLA. This allowed us to understand strengths and weaknesses of the gravity models.

*POSTER LOCATION #46*
*Multiple Plateaux Development Prior to Lunar Dichotomy Formation [#1683]*
The discrepancy in spatial patterns of thorium abundance and crustal thickness on the lunar highland can be explained by a two-step process of crustal formation.

*POSTER LOCATION #47*
*Determining the Structural Stability of Lunar Lava Tubes [#2174]*
Vast empty tunnels/Hiding under lunar seas/Bigger than we thought.

Williams J. G.  Konopliv A. S.  Park R. S.  Yuan D.-N.  Asmar S. W.  et al.  
*POSTER LOCATION #48*
*The Deep Lunar Interior from GRAIL [#1380]*
A solution for a very-high-resolution GRAIL gravity field determines lunar Love number and tidal dissipation Q, but does not detect the inner core.

---

**LUNAR GEOPHYSICS [T604]**

Williams J. G.  Boggs D. H.  Ratcliff J. T.  
*POSTER LOCATION #49*
*Lunar Tidal Dissipation [#1877]*
Strong lunar tidal dissipation has a monthly \( Q \approx 38 \) and an annual \( Q \approx 41 \). A deep hot mantle source, possibly a partial melt, is suspected.

Kim K. H.  Baek S. M.  Jin H.  Garrick-Bethell I.  
*POSTER LOCATION #50*
*Analysis of Magnetic Anomalies Inside Mare Crisium: Lunar Prospector Magnetic Field Study [#1290]*
Unlike the northern Crisium anomaly associated with a single dipole source, the southern Crisium anomaly consists of two anomaly sources.

*POSTER LOCATION #51*
*Crustal Magnetic Fields and a Bright Albedo Anomaly at Leibnitz Crater [#1899]*
Leibnitz Crater has magnetic fields and a bright Alberto anomaly. The field structure is vertical and OMAT is shown similar to the trend of observed other swirls.
Dropmann M. Laufer R. Herdrich G. Matthews L. S. Hyde T. W.  
POSTER LOCATION #52  
Dust Transport in Plasmas Interacting with Complex Magnetic Fields Close to a Non-Conductive Surface [#1984]  
An experiment is presented that allows study of the interaction of plasma with a magnetic field close to a surface, as found in lunar magnetic anomalies.

Baek S.-M. Kim K.-H. Jin H.  
POSTER LOCATION #53  
A Study of Paleomagnetic Pole Positions Using Isolated Magnetic Anomalies on the Lunar Near Side [#1319]  
We find that the depth of an anomaly’s source systematically changes with the inferred latitude of the paleomagnetic pole for each isolated anomaly.

Urbancic N. Stanley S. Ghent R. Carroll K. A. Hatch D. et al.  
POSTER LOCATION #54  
Exploring Lunar Sub-Surface Objects Using Surface Gravimetric Surveys [#1616]  
Early results from a feasibility study to determine what questions can be answered by a rover-mounted gravimeter and gravity gradiometer designed by Gedex Inc.

POSTER LOCATION #55  
Exploring Subsurface Lunar Voids Using Surface Gravimetry [#1746]  
Subsurface voids, perhaps including lava tubes, underlying pit craters on the Moon, can be mapped from the Moon’s surface via gravimetric surveying.

POSTER LOCATION #56  
Nectarian Paleomagnetic Pole Inferred from Kaguya Satellite Magnetic Observations of the Central Leibnitz Basin [#1914]  
Central magnetic anomaly features in Leibnitz impact basin were investigated by using Kaguya magnetic observations.

POSTER LOCATION #57  
Boundary Conditions for ARTEMIS Electromagnetic Sounding [#2728]  
This exercise seeks to define boundary conditions acting on induced fields to improve upon nightside time domain vacuum theory EM sounding applied during Apollo.

Chi P. J.  
POSTER LOCATION #58  
On Preparation of Apollo-Era Data for Magnetic Sounding of the Lunar Interior [#2466]  
In the continuing restoration of the Apollo magnetic field records, we initiate new tasks to calibrate and prepare datasets for probing the lunar interior.

Jiang X. H. Furumura T. Wang Y. B.  
POSTER LOCATION #59  
Numerical Simulation of Lunar Seismic Wave Scattering [#1694]  
This study presents numerical simulations to understand the effects of scattering in the crust and the whole mantle on lunar seismic wave coda.

RESULTS FROM THE CHANG’E MISSIONS [T605]

Zhu M. H. Chang J. Xie M. G. Fritz J. Fernandes V. et al.  
POSTER LOCATION #61  
The Uniform K Distribution of the Mare Deposits in the Orientale Basin: Insights from Chang’e-2 Gamma-Ray Spectrometer [#1207]  
The K distribution of Orientale Basin derived from CE-2 GRS implies Mare Orientale units resulted from multiple eruptions of a homogeneous magma source.

Meng Z. G. Ping J. S. Xiao L. Cai Z. C. Chen S. B.  
POSTER LOCATION #62  
Cold Behavior of the Moon Surface Revealed by CELMS Data from Chang’e-2 Lunar Orbiter [#1976]  
The cold abnormalities and the hidden linear and circular structures are thoroughly studied with the CELMS data from the Chang’e-2 lunar orbiter.

In-Situ Lunar Phase Curves Extracted from Imageries Measured by Panorama Cameras Onboard the Yutu Rover of Chang’e 3 Mission [#2909]

We extracted in situ lunar phase curves from images taken by the panorama cameras onboard the Yutu Rover and performed photometric analysis.

Zhang G. L. Li C. L. Zhou Q. Yao M. J. Fu X. H. POSTER LOCATION #64

The Characteristics and Its Implications of In Situ Detection Data from Alpha Particle X-Ray Spectrometer in CE-3 Mission [#1019]

From elements of the lunar soil, the fine material probably was derived from the weathered basalt at the bottom of the Mare Imbrium.

Qiao L. Xiao Z. Y. Zhao J. N. Xiao L. POSTER LOCATION #65

Subsurface Structures at the Chang’e-3 Landing Site: Interpretations from Orbital and In-Situ Imagery Data [#1050]

To assist the interpretation of the CE-3 radar data, we quantify the subsurface structures at the CE-3 landing site using orbital and in-situ imagery data.

Wu Y. Z. Cui X. Z. Peng W. X. Ping J. S. Neal C. R. POSTER LOCATION #66

Exploring Young High-Ti Basalts with Chang’e-3 Rover [#1528]

Results from four payloads onboard Chang’e-3 rover are reported. Compositions show high Fe, mid Ti, and rich in olivine. The first in situ spectra are shown.

Dai S. Xing S. G. Xiao Y. Feng J. Q. Ding C. Y. et al. POSTER LOCATION #67

Preliminary Analysis of Lunar Regolith Characteristic Within the Chang’e-3 Rover’s Route [#1765]

We use LPR second channel data to analysis the lunar regolith characteristic of the Chang’e-3 rover’s route.

Zhang J. Ling Z. C. Li B. POSTER LOCATION #68

Preliminary Photometric Modeling of the Chang’e-3 Landing Site Using the VNIS Observations [#2372]

We constrained the photometric parameter values of the Chang’e-3 landing site, using the Chang’e-3 VNIS spectrometer data.

HOW YOUNG IS YOUNG? [T606]

Fassett C. I. Thomson B. J. POSTER LOCATION #69

A Landscape Evolution Perspective on How Young is Young on the Lunar Surface [#1120]

The lunar surface/Evolves diffusively/Ina must be young.

Stadermann A. Zanetti M. Jolliff B. Hiesinger H. POSTER LOCATION #70

Revisiting the Youngest Mare Basalts on the Moon: Analysis of Primary and Secondary Crater Distributions in the Region South of Aristarchus Crater [#1269]

We report new CSFD analyses for the basalt unit south of Aristarchus crater to test and better define its apparent young age.

Clark J. D. van der Bogert C. H. Hiesinger H. POSTER LOCATION #71

How Young are Lunar Lobate Scarps? [#1730]

Techniques and analyses: We present absolute model ages derived from crater size-frequency distribution measurements on lunar lobate scarps.

Braden S. E. POSTER LOCATION #72

An Open Source Alternative for Crater Counting Using QGIS and the CircleCraters Plugin [#1816]

CircleCraters is a new, open source QGIS plugin for impact crater counting. Collect data for crater size frequency distributions without ArcGIS or Windows.
Thomson B. J.  Fassett C. I.

Issues with Counting Craters on Small Areas: Fool Me Twice [#2665]

Here we use a Monte Carlo model of a cratered surface to demonstrate the dangers of assigning age dates using small areas on Mars (e.g., <1000 km²).

Tornabene L. L.  Piatek J. L.  Barlow N. G.
Boyce J. M.  Mouginis-Mark P. J.  et al.

“Pristine” Martian Craters: Part 1 — Criteria and Characteristics [#2531]

Fresh and young — the goal! But crater age misleads. What does “pristine” mean?

Piatek J. L.  Tornabene L. L.  Barlow N.
Boyce J. M.  Mouginis-Mark P.  et al.

“Pristine” Martian Craters: Part 2 — Initial Visible and Thermophysical Analyses and Results [#2654]

Ejecta is formed/Thermally distinctive/Changed in time by Mars.


Measurement of the Current Martian Cratering Size Frequency Distribution, Predictions for and Expected Improvements from InSight [#2468]

The current CSFD has been measured at Mars using new impacts. We can use this to predict what InSight will detect, and InSight will improve on this measurement.

Kneissl T.  Michael G. G.  Platz T.  Walter S. H. G.

The Age of the Sirenum and Fortuna Fossae on Mars: Results from Buffered Crater Counting [#1041]

We test buffered cratering counting at Sirenum and Fortuna Fossae and compare the results with age constraints from superpositional relationships.

Golombek M. P.  Warner N. H.  Ganti V.  Lamb M. P.

Degradation of Small Craters on Meridiani Planum and Erosion Rates on Mars [#1610]

The degradation of small craters imaged by the Opportunity rover coupled with long-term erosion rates through time better constrain the link with Mars’ climate.

McCubbin F. M.  Elardo S. M.  Vander Kaaden K. E.
Boyce J. W.  Shearer C. K.

Abundances and Distributions of Lithophile Magmatic Volatiles (F, Cl, and H) in the Bulk Silicate Moon: A Comparison Between Estimates from Samples and Inferences from LMO Modeling [#1717]

Abundances of F, Cl, and H₂O in the bulk silicate Moon were estimated using lunar magma ocean modeling, indicating volatile abundances have been overestimated.


Determining the Source(s) of Water in the Lunar Interior [#2159]

We estimate the proportions of asteroidal and cometary material delivered to the Moon that is consistent with the D/H ratio of water in the lunar interior.

Lowe P. T.  Neal C. R.  Simonetti A.

Accounting for the Volatile Elements: A Method for Quantifying Trace Volatile Elements Using Solution Mode ICP-MS [#1904]

A solution-based ICP-MS method to account for ultra-low-abundance volatile elements in lunar samples.

Potts N. J.  van Westrenen W.  Tartese R.  Franchi I. A.  Anand M.

Apatite-Melt Volatile Partitioning Under Lunar Conditions [#1372]

Experiments on apatite-melt volatile partitioning performed to provide understanding on the measurements on volatiles in lunar apatites.
Potts N. J.  Tartese R.  Franchi I. A.  Anand M.  POSTER LOCATION #83
Understanding the Chlorine Isotopic Compositions of Apatites in Lunar Basalts [#2077]
Chlorine isotope data from a lunar melt rock are compared to literature data to explore potential possibilities for the heavy $^{37}$Cl signature on the Moon.

Singer J. A.  Greenwood J. P.  Itoh S.  Sakamoto N.  Yurimoto H.  POSTER LOCATION #84
High Fluorine and Chlorine in a Chromite-Hosted Melt Inclusion from Apollo 12 Olivine Basalt 12035 [#2040]
We measured high F in chromite-hosted melt inclusion from sample 12035,76a. Dry melt inclusions in samples 12018, 12035, and 12040 suggest H loss during cooling.

Li S.  Milliken R. E.  POSTER LOCATION #85
Water in Lunar Pyroclastic Deposits: Linking Orbital Observations to Interior Processes [#1224]
Water in lunar pyroclastic deposits is investigated with orbital observations and lab measurements/experiments/simulations.

Bhattacharya S.  Chauhan M.  Chauhan P.  POSTER LOCATION #86
Remote Detection of Magmatic Water in Association with Olivine of Possible Mantle Origin on the Moon [#1396]
We report the detection of magmatic water associated with olivine of possible mantle origin from Sinus Iridum, Copernicus, Theophilus, Aristarchus, etc.

Pathak S.  Basantaray A. K.  Chauhan M.  Bhattacharya S.  Chauhan P.  POSTER LOCATION #87
Endogenic Water/Hydroxyl Anomaly Associated with Lunar Silicic Domes Detected by Chandrayaan-1 Moon Mineralogy Mapper (M3) Instrument and Its Implications [#1400]
We have detected magmatic water associated with lunar silicic domes at Hansteen Alpha and Gruithuisen Domes based on Chandrayaan-1 Moon Mineralogy Mapper data.

Kaur J.  Schoonen M. A.  Rickman D.  POSTER LOCATION #88
Reactive Oxygen Species Generation by Lunar Simulants [#1142]
We contribute to the study of several Lunar Simulants for Reactive Oxygen Species (ROS) generation and its possible impact on human lungs.

Pieters C. M.  Garrick-Bethell I.  POSTER LOCATION #89
Hydration Variations at Lunar Swirls [#2120]
Enigmatic bright swirls exhibit OH absorption bands ≤2% lower than dark lanes and surrounding soil; sunlit highlands appear to have ~2% undetected OH absorption.

Siegler M. A.  Miller R. S.  Keane J. T.  Matsuyama I.  Paige D. A.  et al.  POSTER LOCATION #90
Hidden in the Neutrons: Physical Evidence for Lunar True Polar Wander [#2675]
Lunar epithermal neutrons show an off-polar signal inconsistent with present temperatures. This may be due to true polar wander caused by a PKT mass anomaly.

Grava C.  Retherford K. D.  Feldman P. D.  Hurley D. M.  Gladstone G. R.  et al.  POSTER LOCATION #91
LRO-LAMP Observations of the Lunar Exospheric Helium Coordinated with LADEE [#2344]
We report results from LRO/LAMP atmospheric campaign from October 2013 to April 2014 (the science phase of LADEE) on lunar exospheric helium.

LRO-LAMP Observations of Lunar South Pole Permanently Shaded Regions [#2578]
We will present ultraviolet maps of lunar PSRs from the LRO LAMP instrument to show seasonal variability in illumination and volatile content.
Quantification of Water Ice Using MINI-SAR and MINI-RF Datasets Over Lunar Poles [\#1322]
To quantify the presence of water ice on lunar poles using Mini-SAR and Mini-RF.

Mini-RF on LRO and Arecibo Observatory Bistatic Radar Observations of the Moon [\#2888]
Bistatic radar observations of the Moon are providing insight into the character of the opposition response for lunar surface terrains at S-band wavelengths.

The Far-UV Albedo of the Moon as a Probe of the Lunar Cryosphere: LRO Lyman Alpha Mapping Project (LAMP) Latest Results [\#2213]
LRO-LAMP far-UV albedo maps show global spectral evidence for surficial water frost/hydration, and probe PSRs using an innovative nightside observing technique.

The Simple-to-Complex Transition of Lunar Craters: New Precise Depth/Diameter Measurements of Mare and Highland Craters [\#2219]
This study is focused on the simple-to-complex transition diameter of lunar craters and building a new morphometric database for mare and highland craters.

Recent observations of peak-ring basins are summarized and discussed as a framework for resolving uncertainties in numerical models of impact-basin formation.

A relationship between depth and diameter for large lunar basins between 300 and 2200 km is utilized to quantify post-impact modification.

We estimate the Orientale basin impactor size by numerical modeling with ejecta thickness distribution and crustal structure as constraints.

The Depth-Diameter Relationship for Large Lunar Impact Basins and the Implications for Mare Basalt Thickness [\#1677]
A systematic magnetohydrodynamic study of impact-generated fields on the Moon, and their possible contribution in forming crustal remnant magnetization.

New Estimates of the Orientale Basin Impactor Size from Modeling of the Ejecta Thickness Distribution [\#1770]
We estimate the Orientale basin impactor size by numerical modeling with ejecta thickness distribution and crustal structure as constraints.

Impact-Generated Magnetic Fields on the Moon: A Magnetohydrodynamic Numerical Investigation [\#2987]
A demonstration of the presence, distribution, and differentiation of impact melt generated by South Pole-Aitken basin impact event on the Moon.
Identifying the Geologic Context of Apollo 17 Aphanitic, Ophitic, and Poikilitic Impact Melt Breccias

LROC and LOLA data were analyzed to verify that sampled Apollo 17 impact melt breccias originated in massif outcrops not contaminated by younger material.

Morgan J. V.  Gulick S. P.  Urrutia-Fucugauchi J.  
IODP-ICDP Expedition 364:  Drilling the K-Pg Impact Structure

The peak ring of the Chicxulub impact structure will be drilled in 2016 in a joint IODP-ICDP venture. Here we outline the questions that drilling will address.

Gaither T. A.  Hagerty J. J.  Bailen M.  
The USGS Flynn Creek Crater Drill Core Collection:  Progress on a Web-Based Portal and Online Database for the Planetary Science Community

Progress on construction of a web-based portal and online database for the USGS Astrogeology Science Center’s Flynn Creek Crater Drill Core Collection.

Pietrek A.  Kenkmann T.  Jung D.  
Bunte Breccia Revisited:  The Distribution and Source of Water in the Ejecta of Ries Crater; Germany

Based on the detailed study of two fully cored drillcores, the distribution and source horizons of water in the Bunte Breccia of Ries crater were characterized.

Xie Z.  Zuo S.  Wang H.  
Fe-Rich Concretions Bearing Angular Quartz Fragments from Taihu Lake, Southeast of China:  Products of Airburst Eject Plumes ~7–8 K Years Ago

Fe-rich concretions bearing angular quartz fragments of Taihu lake in Southeast China were formed in the eject plumes by airbursts ~7–8 thousand years ago.

The Tsenkher Structure, Gobi-Altai, Mongolia:  A Probable Impact Crater with Well-Preserved Rampart Ejecta

We present our combined field and sample studies of the Tsenkher structure in Gobi-Altai, a probable impact crater with well-preserved rampart ejecta.

Wright S. P.  
Lunar Crater, India:  An Analog for Mars in the Field and in the Laboratory

Not only is fieldwork of Lonar Crater, India, a boon for impact studies, lab/sample data of shocked, altered basalt have implications for SNCs and mission data.

Lambert P.  
Rochechouart as Natural Impact Laboratory:  A Review

Reviewing impact related studies for ground truth data mining at Rochechouart, in the scope of drillings plans and research facility opening on site.

Milam K. A.  Henderson T.  Deane B.  Bensko J.  
Petrography and XRD Analysis of the Howell Structure, Lincoln County, Tennessee

This work involves an assessment of shock metamorphism in samples from drill cores collected from the Howell structure, a proposed impact in Lincoln Co., TN.
Henderson T. Milam K. A.  
**POSTER LOCATION #111**

XRD Analyses of Silurian Dolostones from the Central Uplift of the Kentland Impact Structure, Newton County, Indiana, USA [#2989]

A preliminary study of XRD spectra from shatter-coned dolostone from the central uplift of the Kentland impact structure shows some evidence of peak broadening.

Rae A. S. P. Morgan J. V. Collins G. S. Osinski G. R. Grieve R. A. F.  
**POSTER LOCATION #112**

Observational Constraints on Structural Uplift Formation: The West Clearwater Impact Structure [#1451]

Measure blocks and shocks/With iSALE, we can see why/Target rocks are weak.

Wilks R. P. A. Osinski G. R.  
**POSTER LOCATION #113**

Impact Melt Veins in the Central Uplift of the West Clearwater Lake Impact Structure, Northern Quebec, Canada [#1397]

An analysis of melt veins was conducted using petrography and geochemistry in order to better understand their formation processes.

Walton E. L. Hughes A. H. Herd C. D. K.  
**POSTER LOCATION #114**

Previously Unrecognized Impactites from the Steen River Impact Structure, NW Alberta, Canada: A New Variety of Suevite? [#2592]

Crater fill deposits from the Steen River impact structure contain glass clasts in a matrix of fine-grained pyroxene and feldspar formed by thermal metamorphism.

Morlok A. Hiesinger H. Helbert J.  
**POSTER LOCATION #115**

Mid-Infrared Studies of Impact Rocks (2): Melt from Suevites of Mistastin and Mien Impact Craters [#2196]

Mid-infrared spectra were obtained from impact rock melts and breccias from the Mistastin and Mien craters.

**MAPPING TERRESTRIAL IMPACT CRATERS AND THEIR EJECTA**  

Kring D. A.  
**POSTER LOCATION #116**

Botanical Signature of Tectonic Fractures in the Target Rocks of Barringer Meteorite Crater, Arizona [#1036]

The pre-impact tectonic structure that affected the shape of Meteor Crater is easy to observe in lines of vegetation that grow along joint sets.

**POSTER LOCATION #117**

Distribution of Discontinuous Kaibab Ejecta North of Meteor Crater, Arizona [#1186]

New mapping indicates there is significant discontinuous Kaibab-rich ejecta far beyond the area originally mapped by Shoemaker.

Durda D. D. Kring D. A.  
**POSTER LOCATION #118**

Size-Frequency and Spatial Distribution of Ejecta Blocks at Meteor Crater, AZ Determined from LiDAR and Satellite Imagery [#1487]

We use two independent sets of data to map the locations and dimensions of ejecta blocks at Meteor Crater and compare the size distribution to lunar craters.

Rathbun K. Ukshtins Peate I.  
**POSTER LOCATION #119**

Modeling Ejecta Distribution and Modification at Monturaqui Crater, Chile: A Multi-Source Application of ArcGIS [#2778]

We present a GIS-based, multi-source analysis of the distribution and modification of granitic ejecta and dark impact melt from a small, simple crater.

King D. T. Jr. Petruny L. W.  
**POSTER LOCATION #120**

Correlation of Northern Belize’s Cretaceous-Paleogene (“KT”) Boundary Sections [#1408]

Cretaceous-Paleogene boundary sections are preserved in small grabens across northern Belize. Three of the best sections are described and correlated.
Heider E. King D. T. Jr Omó J. POSTER LOCATION #121
Early Modification Stage Dynamics of Shallow Crater-Filling Units, Wetumpka Impact Structure, Alabama [2566]
A slice of Wetumpka’s interior and explanation of early modification stage dynamics according to shallow crater filling units.

Kukko A. Kaartinen H. Zanetti M. POSTER LOCATION #122
Backpack Personal Laser Scanning System for Grain-Scale Topographic Mapping [2407]
We present a newly developed backpack personal laser scanning system Akhka R2 for acquisition of highly detailed 3-D topographic information for impact analysis.

Botes Z. A. Misra S. Andreoli M. A. G. POSTER LOCATION #123
The ~215 km Morokweng Impact Structure, South Africa — An Integrated Survey from Satellite Imagery [1739]
Interpretation of Landsat imagery of the Morokweng impact crater indicates a multi-ring structure with a diameter of approximately 215 km.

Brown J. J. Spray J. G. POSTER LOCATION #124
Constraining the Dimensions of the Manicouagan Impact Structure: Analysis of the Gravity Anomaly [1482]
Gravity data, combined with field evidence, is analyzed to find that the Manicouagan structure has a collapsed transient crater diameter of between 65 and 75 km.

Shankar B. Osinski G. R. POSTER LOCATION #125
Revisiting the Lineament Study of the Sudbury Impact Structure Using Recent Remote Imagery [3004]
Updating the lineament studies previously done in the 1990s.

Simpson S. L. Lambert P. Lee M. R. POSTER LOCATION #126
Polymict lithic breccia dyke discovered within the basement of the Rochechouart impact structure contains evidence for high temperature hydrothermal alteration.

Gallegos Z. E. Newsom H. E. Crosse L. J. Vaniman D. T. Osinski G. R. et al. POSTER LOCATION #127
Interpreting Impact-Induced Hydrothermal Geochemistry Using Authigenic Mineral Assemblages [2892]
This study examines mineral assemblages produced by impact-induced hydrothermal systems at three giant impacts to gain an understanding of the fluid chemistry.

Kerrigan M. C. Osinski G. R. POSTER LOCATION #128
Overview of Impact-Generated Hydrothermal Activity at the West Clearwater Lake Impact Structure, Canada [1508]
Hydrothermal? Yes!/Hot tub time machines. From space./Come. Let me tell you. (@MazieK @westernuCPSX).

Kerrigan M. C. Osinski G. R. Grieve R. A. F. POSTER LOCATION #129
Hydrothermal Mineralization Within the Impact Melt Sheet of the East Clearwater Lake Impact Structure, Canada [1521]
A double double/Crater trouble, rocks burn and/Minerals bubble. (@MazieK @westernuCPSX).

Hydrothermal Formation and Oxidation of a Calcite-Marcasite Vug at the Haughton Impact Structure: Mapping of Alteration Assemblages with Hyperspectral Imaging [2267]
Spectral mapping of a calcite-marcasite vug and its weathering products shows evolution from hot, reducing to cooler, oxidizing to chemically complex fluids.
Bauer B. P.  Meyer E. E.  Moore J. R.  Sharma M.  
**POSTER LOCATION #131**

Investigating a Burning Question: Search for a Pyrometamorphic Mineral (Esseneite) at the K-Pg Boundary [#2836]

We report initial results from a search of esseneite at the K-Pg boundary.

Kuzmicheva M. Yu.  Losseva T. V.  
**POSTER LOCATION #132**

Transient Magnetic Fields After Crater-Forming Events [#1954]

A possible influence of the transient magnetic fields on magnetization of impact debris is discussed.

<table>
<thead>
<tr>
<th>ISOTOPE AND TRACE ELEMENT GEOCHEMISTRY OF TERRESTRIAL IMPACTITES [T612]</th>
</tr>
</thead>
</table>
| Losiak A. L.  Wild E. M.  Huber M. S.  Wisniowski T.  Paavel K.  et al.  
**POSTER LOCATION #133**

*Dating Kaali Crater (Estonia) Based on Charcoal Emplaced Within Proximal Ejecta Blanket [#1264]*

The Kaali crater was formed shortly after 1650–1400 BC (~3200 14C yr BP).

Magna T.  Farkaš J.  Rodovská Z.  Trubač J.  Georg R. B.  et al.  
**POSTER LOCATION #134**

*Magnesium, Silicon and Calcium Isotopes in Central European Tektites — Implications for High-Temperature Processes and Tracking Their Sources with the Ries Area Sediments [#2207]*

Coupled Ca-Mg-Si isotope data delimit the roles of individual sediment types that formed tektite melts and distinguish between kinetic and equilibrium effects.

**POSTER LOCATION #135**

*The (U-Th)/He Isotope System Applied to the Dating of Distal Ejecta from the Chesapeake Bay Impact Structure [#2722]*

This study provides (U-Th)/He zircon dates obtained from a distal ejecta layer to indirectly date the Chesapeake Bay impact.

Kelley S. P.  Lambert P.  Schwenzer S. P.  
**POSTER LOCATION #136**

*Rochechouart Hydrothermal Overprint: Disentangling the Timing of Events Through Ar-Ar Dating [#1179]*

Argon isotope variations in samples from the Rochechouart crater in France offer outstanding opportunity to investigate an impact hydrothermal system.

Weirich J. R.  Osinski G. R.  Pentek A.  Bailey J.  
**POSTER LOCATION #137**

*Geochemistry of Sudbury Breccia in the North Range of the Sudbury Impact Structure, Canada [#1819]*

Sudbury Breccia near Halfway Lake can be made from three adjacent country rocks, one of which may be sediment from kilometers away, indicating long distance transport.

Ackerman L.  Žák K.  Jonášová Š.  Skála R.  Magna T.  et al.  
**POSTER LOCATION #138**

*Highly Siderophile Element Geochemistry of Impact-Related Glasses and Target Rocks from the Zhamanshin Impact Structure, Kazakhstan [#1963]*

Impact-related glasses and target from the Zhamanshin impact structure was analyzed for highly siderophile element concentrations and 187Os/188Os isotopic ratios.

Ray D.  Misra S.  Newsom H.  Upadhyay D.  
**POSTER LOCATION #139**

*LA-ICP-MS Trace Element Geochemistry of Sub-Millimeter Sized Impact Spherule from Lonar Crater, India [#1071]*

Trace-element chemistry of the Lonar sub-millimeter spherule is similarly shared with target basalts (except Pb and U) and represents high-temperature formation.

<table>
<thead>
<tr>
<th>IMPACTS: EXPERIMENTS [T613]</th>
</tr>
</thead>
</table>
| Černok A.  Marquardt K.  Bykova E.  Liermann H.-P.  Dubrovinsky L.  
**POSTER LOCATION #141**

*Response of α-Cristobalite to High Pressures Under Different Hydrostatic Conditions [#1777]*

The response of α-cristobalite was studied at different levels of hydrostaticity, with the focus on formation, structure, and stability of cristobalite X-I.
*Effects of Shock Metamorphism on the Structure of Kaolinite [2246]*

Shocked kaolinite contains amorphous domains in shocked samples beginning at ~20 GPa. At 40 GPa, most of the material is amorphous, but unshocked domains exist.

*Experimental Impacts into Feldspar Phenocrysts [2164]*

Impacting feldspars/Breccias, fractures, no melt yet/Cute little craters.

Wilk J.  Kenkmann T.  
*The Surface Structure of Shatter Cones in Experimental Impact Craters [2637]*

We analyzed with WLI and SEM shatter-cone-like features, displaying curved and striated surfaces, found in MEMIN cratering experiments.

Ebert M.  Yener A.  Mansfeld U.  Kowitz A.  Schmitt R. T.  et al.  
*Localized Shock-Induced Melting of Sandstone at Low Impact Pressures (<17.5 GPa): An Experimental Study [1851]*

This experimental study demonstrates that hydrous phyllosilicates of shocked sandstone underwent congruent melting during the shock process.

Hamann C.  Hecht L.  Deutsch A.  
*Shock Behavior of Calcite and Basalt in a MEMIN Hypervelocity Impact Experiment and Laser Melting Experiments [2497]*

Here, we present first results of an ongoing experimental impact cratering campaign that investigates the behavior of calcite shocked by a basalt projectile.

Langenhorst F.  Mansfeld U.  Ebert M.  Harries D.  Reimold W. U.  
*First Microscopic Evidence for Stishovite in a Shock Experiment with Sandstone and Constraints on Its Genesis [1810]*

We present first microscopic evidence for stishovite generated in a shock experiment by rapid crystallization from silica melt veins at high pressure.

McDermott K. H.  Cole M. C.  Burchell M. J.  
*Hypervelocity Impacts into Multi-Layer Targets with an Ice Crust Over a Saturated Sand Base [1219]*

This a study of crater morphology produced by impacts into multi-layered target of water ice over saturated sand.

McDermott K. H.  Cole M. C.  Burchell M. J.  
*Hypervelocity Impacts into Multi-Layer Target of Ice Over a Subsurface Ocean [1221]*

Crater morphology variation with ice crust thickness over subsurface ocean.

*Integration of a Dust Accelerator into the IPG6-B Test Facility for Material Impact Tests [2068]*

Our task was to develop, design, and build a one-stage dust particle accelerator that can be connected to the IPG6-B facility at CASPER SSL.

Hogan J. D.  Kimberley J.  Hazeli K.  Plescia J.  Ramesh K. T.  
*On the Role of Defects in the Dynamic Failure of an Ordinary Chondrite [1481]*

The metallic phases serve as fracture sites, resulting in two fragmentation mechanisms: one associated with defect spacing, one associated with structural failure.

Kurosawa K.  Senshu H.  Wada K.  TDSS Team  
*Numerical Simulations of Impacts of a Half Spherical Shell Projectile on Small Asteroids [1868]*

We carried out numerical simulations to investigate impact outcomes after impacts of a half spherical shell on small asteroids using the iSALE.
Shuvalov V. V. Artemieva N. A.
**Craters Made by Severely Fragmented Asteroids [#1442]**
We model impact craters made by projectiles fragmented in Earth’s atmosphere and compare the results with small terrestrial craters and with experiments.

Lucchetti A. Cremonese G. Pajola M. Massironi M. Simioni E.
**New Simulation of Phobos Stickney Crater [#1420]**
In this work we model the Phobos Stickney impact crater using the iSALE hydrocode and considering different scenarios that could form the well-studied crater.

Ivanov B. A.
**Ceres: Possible Records of Giant Impacts [#1077]**
The modeling predicts central mounds at the rocky core surface for large impacts on Ceres. If they exist, under-ice mounds may be found with DAWN’s gravity mapping.

Bowling T. J. Johnson B. C. Melosh H. J.
**Simulating Dwell Times at High Pressure and Temperature Following an Impact: Relating Thin Section to Source Crater [#2289]**
Numerical modeling suggests that the Tissint meteorite may have been ejected by a smaller impact than previously suggested by mineralogical studies.

Wünnemann K. Güldemeister N. Poechau M. H.
**Scaling Meteorite Impact Crater Dimensions in Cohesive Rock by Numerical Modeling and Laboratory Experiments [#1367]**
We present a combined experimental and numerical modeling approach to further refine existing scaling laws relating impact energy with crater size.

Hopkins R. T. Osinski G. R.
**Modelling the Effect of Sediment Thickness on Complex Impact Crater Morphology [#1659]**
We quantify the effect that sediment thickness has on final complex crater morphology for impacts into mixed sedimentary and crystalline targets.

Quintana S. N. Schultz P. H. Crawford D. A.
**Target Strength as an Important Consideration for Low-Speed Impacts [#2727]**
1-D and 2-D impact simulation results suggest that the inclusion of strength may increase melt generation at low speeds compared to the hydrodynamic case.

Korycansky D. G. Catling D. C. Zahnle K. J.
**Planetary Impacts and Atmospheric Escape [#1145]**
We report preliminary results on modeling of impacts into planetary atmosphere and impact-driven escape.

Artemieva N. A. Morgan J. V.
**Formation of the Dual K-Pg Boundary Layer in North America [#1911]**
We model ejecta from Chicxulub and their interaction with Earth’s atmosphere, trying to reproduce ejecta deposits at distances 1000–4000 km from the crater.

Monteux J. Arkani-Hamed J.
**Scaling Law of Impact Induced Shock Pressure in Planetary Mantle [#1891]**
We use hydrocode simulations to derive scaling laws of impact-induced shock pressure in a differentiated Mars-sized body during its accretion from large impacts.

Davies E. J. Stewart S. T. Lillis R. J.
**Impact Basin Formation on Mars: From Borealis to the Late Heavy Bombardment [#2212]**
Impact basin formation scaling laws for varying crustal thickness and thermal gradients. Borealis simulations with crust and strength.
Wolfe C. A.  Lemmon M. T.  
**POSTER LOCATION #165**

*Using Engineering Cameras on Mars Landers and Rovers to Retrieve Atmospheric Dust Loading [#2851]*

Simulation-based assessment of imaging strategies and error budgets, as well as validation based on archival engineering camera data to retrieve optical depth.

Mason E. L.  Lemmon M. T.  
**POSTER LOCATION #166**

*An Analysis of Martian Dust Across the Length of the Phoenix Mission Using Triaxial Ellipsoids [#2876]*

Martian dust is irregular and complex in shape. It cannot be modeled with spheres, but modeled triaxial ellipsoids show a good fit to observations.

Mishra M. K.  Chauhan P.  Singh R. D.  Kiran Kumar A.  S.  
**POSTER LOCATION #167**

*Atmospheric Optical Depth Estimation Over Syrtis Major and Arsia Mons Region of Mars Using Mars Color Camera On-Board Indian Mars Orbiter Mission [#1995]*

AOD estimation on Mars using Indian Mars Orbiter Mission Data from the MCC sensor.

---

**MARS ATMOSPHERE: VOLATILE EXCHANGE WITH THE SURFACE**  
[T616]

Conner M. B.  Farris H. N.  Chevrier V. F.  
**POSTER LOCATION #168**

*Regolith-Atmosphere Water Vapor Transfer on Mars: Comparison Between Phoenix and MSL Data [#1110]*

Phoenix and MSL have returned atmospheric data from the martian surface. The data from both can be fit nicely with a multi-layer BET model.

Pankine A.  
**POSTER LOCATION #169**

*Observations of Martian Water Vapor in MY26–30 by PFS/LW on Mars Express [#1611]*

New retrievals of water vapor column abundances in the martian atmosphere in MY26–30 from spectra collected by PFS/LW onboard Mars Express are presented.

Nuno R. G.  Paige D. A.  Sullivan M.  
**POSTER LOCATION #170**

*Restoration of Viking MAWD Dataset [#2639]*

We are using the non-raster averaged Viking MAWD datasets to recalculate column water vapor abundances using current topographical data.

Bose S.  Vijayan S.  Sinha R. K.  Murty S. V. S.  
**POSTER LOCATION #171**


A first-order estimation of surface thermal inertia, sensible heat flux, and latent heat flux over the landing sites of Curiosity, Phoenix, and Viking Lander 1.

Zent A. P.  
**POSTER LOCATION #172**

*Atmospheric Condensation in the Mars Phoenix TECP and MET Data [#2861]*

Phoenix TECP data, combined with air temperature, enable a very sensitive detection of atmospheric saturation, which begins earlier in the mission than other data suggest.

Farris H. N.  Conner M. B.  Rivera-Valentin E. G.  Chevrier V. F.  
**POSTER LOCATION #173**

*Regolith Control of Atmospheric Water Vapor on Mars: Analysis of Phoenix TECP Data [#2353]*

Regolith control of atmospheric relative humidity can be explained through modeling BET adsorption theory on Phoenix TECP data.

Leung C. W. S.  Rafkin S. C. R.  McEwen A. S.  
**POSTER LOCATION #174**

*Mesoscale Atmospheric Modeling of Water Vapor in Valles Marineris [#2959]*

Puzzling temp profile/Clouds, fog form inside canyon/Local water source?
Lewis S. R. Steele L. J. Holmes J. A. Patel M. R.  
**POSTER LOCATION #175**

*Assimilating Martian Atmospheric Constituents Using a Global Circulation Model [#2390]*

Data assimilation is employed in a novel way for the Mars atmosphere to perform a complete analysis of constituent data over periods of several Mars years.

**POSTER LOCATION #176**

*Measuring Atmospheric Radon with the RAD Instrument Onboard Curiosity [#2842]*

We show how atmospheric radon can be measured by RAD onboard Curiosity at the surface of Mars. Preliminary results will be presented.

Hu R. Gao P. Miller C. E. Yung Y. L.  
**POSTER LOCATION #177**

*Hypotheses for a Near-Surface Reservoir of Methane and Its Release on Mars [#2279]*

We outline three hypotheses in an attempt to explain the apparent variability of the atmospheric methane abundance at Gale Crater.

---

**MARS GEOMORPHOLOGY: GENERAL**

Hanley J. Mellon M. T. Arvidson R. E.  
**POSTER LOCATION #178**

*Experimental Constraints on the Mechanical Strength of the Martian Soil [#2572]*

On Mars: salts, water /Increases soil cohesion/Creates sticky soil.

Watkins J. A. Ehlmann B. L. Yin A.  
**POSTER LOCATION #179**

*Role of Hydrated Silicates in Long-Distance Transport of Landslides in Valles Marineris, Mars [#1030]*

We investigate the decisive contribution of clay minerals in long-runout landslide emplacement on Mars through integrated spectral and satellite-image analyses.

Brugman K. K. Hynek B. M. Robbins S. J.  
**POSTER LOCATION #180**

*Crater-Based Tests Unlock the Mystery of the Origin and Evolution of Arabia Terra, Mars [#2359]*

Arabia Terra, Mars shares characteristics with both the northern and southern hemispheres. We used crater populations to test hypotheses for its geologic history.

Singh R. D. Chauhan M. Sur K. Jain N. Chauhan P.  
**POSTER LOCATION #181**

*Geological Study of Martian Rampart Crater Yuty Using High-Resolution Remote Sensing Data [#1726]*

Discussed here are various morphological surfacial features and thermophysical properties of the crater Yuty as well as its ejecta layers.

Calderon L. P. Robertson K. Tovar D.  
**POSTER LOCATION #182**

*Geomorphologic Evolution of the Zone of Hadriaca Patera in Mars [#2074]*

The photointerpretation of Hadriaca Patera is presented in this work, and it has distinctive landforms as volcanic areas, areas of collapse, and impact craters.

Irwin R. P. III  
**POSTER LOCATION #183**

*Development of Intercrater Plains on Mars [#2906]*

Development of intercrater plains on Mars depended on impact cratering, aqueous weathering, and a combination of slow aeolian and fluvial erosion.

**POSTER LOCATION #184**

*Geomorphological Analyses of the Hellas Basin Floor, Mars: New Implications for Its Geologic History [#1336]*

Based on our photogeological map of the Hellas basin floor (abstract #1335), we conducted an in-depth analysis of the region’s geologic history.

Kerber L. Dickson J. L. Grosfils E. B. Head J. W.  
**POSTER LOCATION #185**

*Global Inventory of Rectilinear and Polygonal Ridge Networks on Mars [#2148]*

Ridge networks on Mars/Formatted in many sundry ways/Found in many spots.
MARS GEOMORPHOLOGY: FLUVIAL/LACTUSTRINE FEATURES

Did Periglacial Lakes Develop Within Martian Outflow Channels? [2306]
Periglacial resurfacing associated with the emplacement of a vast Amazonian lake in Simud Valles produced one of the largest circum-Chryse chaotic terrains.

Formation Timescales of Kasei Valles, Mars: Determination from Observations and an Erosional Model [2854]
Duncan M. S. Weller M. B. Nittrouer J. A.
Kasei Valles, Mars/Water flows with sediment/How long to erode?

Aqueous Deposits Related to Formation of Hale Crater in Southern Margaritifer Terra, Mars [2538]
Grant J. A. Wilson S. A.
The formation of Hale Crater near or after the Amazonian-Hesperian transition created water driven flows reaching two crater diameters north of the impact site.

Geologic History of Margaritifer Basin, Mars: Evidence for a Prolonged Yet Episodic Hydrologic System [1463]
Salvatore M. R. Kraft M. D. Edwards C. S. Christensen P. R.
We describe the geologic history of Margaritifer Basin and provide evidence for prolonged yet episodic fluvial activity in Margaritifer Basin and Morava Vallis.

Geologic Mapping and the Gradational History of Southern Margaritifer Terra on Mars [2492]
Wilson S. A. Grant J. A. Buczkowski D. L. Weitz C. M.
The geologic map of Uzboi Vallis and terrain to the west/northwest of Holden Crater at 1:1M scale highlights a long record of aqueous activity in this region.

A Waterlogged Martian Environment: Channels Patterns and Sedimentary Environments of the Zephyria Alluvial Plain [2527]
Ori G. G. Di Pietro I. Salese F.
The Zephyria alluvial plain is a large continental system dominated by fluvial deposits. Sedimentology suggests that the basin was largely waterlogged.

Potential Alteration by Groundwater flow in NW Noachis Terra: Geomorphic and Mineralogic Evidence in Nirgal and Her Desher Valles [2271]
Buczkowski D. L. Seelos K. D. Beck C. E. Murchie S.
NW Noachis Terra valles geomorphology is consistent with formation by groundwater sapping, suggesting exposed phyllosilicates formed by groundwater interaction.

Analysis and Possible Formation Mechanisms of Noachis Terra Crater Valleys [1039]
Hobbs S. W. Conway S. J. Balme M. R.
Our study of Noachis Terra crater valleys revealed no single mechanism that could account for the range of different morphologies that we observed.

Stratigraphy Evidence of Episodic Fluvial Activity in the South Melas Chasma Basin, Valles Marineris, Mars [1932]
Davis J. Grindrod P. Williams R. Gupta S. Balme M.
We have mapped the stratigraphy and channels east of the Melas basin using HiRISE and CTX DEMs and found further evidence of sustained aqueous activity.

Sedimentology of a River System with a Series of Dam-Breach Paleolakes at Idaeus Fossae, Mars [2296]
Salese F. Di Achille G. Ori G. G.
This work consisting of (1) a nearly 300-km-long valley system located westward of Idaeus Fossae in Tempe Terra and (2) a series of dam-breach paleolakes.
*A Poster Location #196* 
Valleys, Fan-Shaped Deposits and Associated Phyllosilicates of a Paleolake Site at Libya Montes, Mars: Evidence of Complex Hydrologic Activity [1779]

A 60-km-diameter crater paleolake site in the Libya Montes reveals a diverse and complex setting of fluvial and lacustrine landforms.

*A Poster Location #197* 
Flooding in Highly Tectonized Regions of Noctis Labyrinthus, Mars [2349]

We find that groundwater circulation below the ~4000-m elevation level resulted in widespread collapse and recent flooding in central Noctis Labyrinthus.

Cardenas B. T. Mohrig D.  
*A Poster Location #198* 
Incised Valley Formation in Response to Sea or Lake Level Changes at Aeolis Dorsa, Mars [2797]

Valley cut and fill/Indicates sea level change/Strat sequence agrees.

Warner N. H. Wagner N. Gupta S. Sowe M. Dumke A.  
*A Poster Location #199* 
Flood Geomorphology and History of the Eastern Valles Marineris Region of Mars [1130]

We constrain the fluvial history of the eastern Valles Marineris region through a morphologic, chronologic, and paleohydrologic analysis of outflow channels.

Di Achille G. Salese F.  
*A Poster Location #200* 
Lake General Carrera/Buenos Aires (Chile/Argentina) as Natural Laboratory for the Quantitative Understanding of Fan-Deltas: Applications to Mars [2609]

We present the Lake General Carrera/Buenos Aires (Chile/Argentina) as a terrestrial analog site for the quantitative understanding of ancient martian fan-deltas.

Jacobsen R. E. Burr D. M.  
*A Poster Location #201* 
Preliminary Analyses of Martian-Terrestrial Analog Rivers to Examine the Influence of Sediment in Form-Discharge Relationships [1012]

Empirical relationships used to estimate fluvial discharge (Q) on Mars are tested in terrestrial analog rivers. Results suggest relationships overestimate Q.

Grimm R. E. Harrison K. P.  
*A Poster Location #202* 
How Much Groundwater Does Mars Have Today? [2426]

Complete sublimation of tropical ground ice on Mars and subsequent groundwater evaporation can be avoided if porosity does not change strongly with depth.

Mars Geomorphology: Gale Crater and Meridiani Planum [T619]

Allen C. C.  
*A Poster Location #203* 
A Massive Central Peak and a Low Peak Ring in Gale Crater — Important Influences on the Formation of Mt. Sharp [2787]

The central peak and peak ring of Gale Crater would have strongly influenced the deposition and erosion of the sediments forming Mt. Sharp.

Pascuzzo A. Allen C.  
*A Poster Location #204* 
Modeling the Geologic History of Mt. Sharp [1449]

Modeling the geologic history of Mt. Sharp through the geomorphologic comparison of six other craters with sedimentary mounds and four craters with peak rings.

Buz J. Ehlmann B. L.  
*A Poster Location #205* 
Stratigraphy of the Gale Crater Rim and Floor Units [2656]

A significant amount of material on the Gale floor has been transported either from the wall, rim, or beyond.
Potential Sub-Micrometer-Thick Frost Events and Soil Water Content at Gale Crater: Calculations from MSL/REMS Measurements [#2277]

We analyze MSL/REMS measurements to identify surface frost events and to calculate the soil water content at Gale Crater during the first 800 sols.

Recent Mastcam and MAHLI Visible/Near-Infrared Spectrophotometric Observations: Kimberley to Hidden Valley [#1424]

On Curiosity, Mastcam acquired two photometric datasets between sols 611 and 726, and MAHLI was used as a goniometer on sol 707 to image a layered rock (Stirling).

Physical and Material Properties of Gale Crater Sandy Deposits: From Rocknest to Pahrump [#1682]

We use orbital and in situ data to study ripples in Gale Crater, and consider how their physical properties determines Curiosity’s ability to traverse them.

Exploring Curiosity’s Future Path from Orbit: The View of Lower Mt. Sharp from Integrated CRISM, HiRISE, and THEMIS Datasets [#2124]

We combine CRISM, HiRISE, and THEMIS thermal inertia over lower Mt. Sharp to provide detailed, local context for Curiosity in situ analysis.

Mapping the Pahrump Hills Outcrop Using MARDI Sidewalk Mosaics [#2399]

MARDI sidewalk mosaics provide a contiguous record of sedimentary structures and diagenetic textures across the Pahrump Hills outcrop.

Mars Hand Lens Imager (MAHLI) Observations at the Pahrump Hills Field Site, Gale Crater [#2855]

Image observations by the MAHLI instrument on the Mars Science Laboratory rover at the Pahrump Hills field site in Gale Crater.

Unraveling Curiosity Observations of Sedimentary Rocks at Kylie [#2385]

Kylie sedimentary rocks (sandstone and conglomerate facies) are part of a broader depositional sequence of cyclical fluvial-lacustrine environments.

Degradation of Endeavour Crater, Mars [#2017]

Opportunity is traversing rim segments of the 22-km-diameter Endeavour crater in Meridiani Planum and indicates variable but substantial degradation occurred.
MARS GEOMORPHOLOGY: STRUCTURES AND TECTONICS  [T620]

Genova A. Goossens S. Lemoine F. G. Mazarico E. Smith D. E. et al.
POSTER LOCATION #216
The Gravity Field of Mars from MGS, Mars Odyssey, and MRO Radio Science [#1872]
MGS, Mars Odyssey, and MRO have enabled NASA to conduct radio science experiments for 16 consecutive years. We will present an improved gravity model of Mars.

Sarkar R. Singh P. Porwal A.
POSTER LOCATION #217
Ductile and Brittle Deformational Features Within the Light Toned Mounds of Juventae Chasma, Mars [#1788]
Ductile and brittle deformational features are identified from the light-toned mounds of Juventae Chasma using HiRISE images.

Cole H. M. Andrews-Hanna J. C.
POSTER LOCATION #218
The Anatomy of a Wrinkle Ridge Revealed in the Wall of Melas Chasma, Mars [#2575]
We analyze a wrinkle ridge thrust fault exposed in the wall of Melas Chasma, Mars. The derived fault dip of 13°–18° is less than typically assumed.

Duffy A. Schedl A. D.
POSTER LOCATION #219
What Caused Landslides in Valles Marineris, Mars – The Sequel? [#2501]
We examined the role of meteorite impacts in producing landslides in Valles Marineris. Our results suggest marsquakes are a more important cause of landslide.

Okubo C. H.
POSTER LOCATION #220
High-Resolution Structural and Geologic Mapping in Candor Chasma [#1210]
This paper presents a synthesis of results from high-resolution geologic and structural mapping in Candor Chasma.

Kling C. L. Klimczak C.
POSTER LOCATION #221
Thrust Fault Displacement Distributions at the Phlegra Montes Lobate Scarp System, Mars [#1557]
Phlegra Montes, Mars/Impressive thrust tectonics/How you may have grown?

Pozzobon R. Cremonese G. Massironi M. Re C.
POSTER LOCATION #222
A Possible Diapir in Athabasca Region on Mars [#2142]
A circular feature was observed on Mars by the HiRISE camera. From DTM analysis its circular positive relief shape has been interpreted as diapiric phenomenon.

MARS GEOMORPHOLOGY: ICE AND PERIGLACIAL PROCESSES  [T621]

Baker S. R.
POSTER LOCATION #223
Surface Layer Thermal Inertia Reveals Presence and Depth of Subsurface Ice [#1241]
The presence and depth of near-surface ice can be determined from surface thermal inertia of sediment, but deeper ice may not be detectable.

POSTER LOCATION #224
Curvilinear Furrows on Mars: Hints for Iceberg Rafting? [#1349]
Curvilinear furrows identified in the Hellas Basin, indicative of iceberg transport and grounding on very cold oceans on early Mars.

Vijayan S. Sinha R. K. Murty S. V. S.
POSTER LOCATION #225
Glacial Environment Between the Interval of Concentric Crater Fill and Gully Formation on Mars: Insights from Lobate flow Features in Alba Patera Craters [#1774]
Lobate flow feature in Alba Patera craters help reveal glacial environment of the past ~60–10 Ma, i.e., between concentric crater fill and gully formation periods.
Regional Variations in Martian Debris-Covered Glacier Morphology, Flow Characteristics, and Radar Properties [#2253]
Glaciers investigated in Deuteronilus. From models we can show differing histories of flow. HiRISE displays at least rougher surfaces to the east.

Remnant Buried Ice in the Arsia Mons Fan-Shaped Deposit, Mars [#2266]
We review previously undescribed landforms in the Arsia Mons FSD whose morphology indicates that they may still contain remnant tropical mountain glacier ice.

Phlegra Montes, Mars: Chronology and Denudation Rates [#1371]
Our survey of the Phlegra Montes includes chronostratigraphic assessments of surface units (as function of latitude) and estimates on denudation rates.

Mapping the Northern Plains of Mars: Using Impact Crater Morphologies to Resolve Surface Geology When Contacts are Sparse [#1700]
We present a revised impact crater classification scheme that is specific to the martian northern plains in order to complement mapping and landform analyses.

Distribution, Origin and Evolution of Hypothesized Mud Volcanoes and Thumbprint Terrain in Acidalia, Utopia and Arcadia Planitae: Implications for Sedimentary Processes in the Northern Lowlands of Mars [#1862]
This study is part of the activities of an ISSI International Team, which intends to produce new geomorphological studies and maps of the northern lowlands.

Mapping the Northern Plains of Mars: Origins, Evolution and Response to Climate Change — A New Overview of Recent Ice-Related Landforms in Utopia Planitia [#1328]
With innovative mapping, ice-related landforms were mapped in western Utopia Planitia in order to understand the geomorphological evolution of the landscape.

Mapping Mars’ Northern Plains: Origins, Evolution and Response to Climate Change — A New Overview of Recent Ice-Related Landforms in Arcadia Planitia [#1384]
Using a “grid-mapping” approach along a long-latitude swath, the distribution of ice-related landforms and surfaces in Arcadia Planitia, Mars, is presented.

Mapping Mars’ Northern Plains: Origins, Evolution and Response to Climate Change — A New Overview of Recent Ice-Related Landforms in Acidalia Planitia [#1359]
We map the distribution of ice-related landforms in Acidalia Planitia (northern lowlands of Mars). We show cross-correlations between individual landforms.

Heterogeneity of SHARAD Reflectivity in the NPLD: Implications for the Climate Record [#2430]
Spatial and temporal variation is visible in the NPLD for both SHARAD and image data. We investigate the possible processes that could be behind this variation.
Dundas C. M. 

**POSTER LOCATION #235**


This abstract investigates several effects on the morphology of martian sublimation thermokarst features.

Bapst J.  Byrne S. 

**POSTER LOCATION #236**

*Martian Icy Outliers and Climate History*** [#2772]

We examine HiRISE images of the Louth Crater water ice mound for changes in extent. We compare these results with expectations of Mars’ recent climate change.

Sori M. M.  Byrne S.  Hamilton C. W.  Landis M. E. 

**POSTER LOCATION #237**

*Is Viscous Flow Important at the Martian Poles?*** [#1541]

We investigate the importance of viscous flow in shaping icy martian landforms by quantitatively modeling topographic features near the planet’s poles.

Losiak A.*  Czechowski L.  Velbel M. A. 

**POSTER LOCATION #238**

*Ephemeral Liquid Water at the Surface of Martian North Polar Cap*** [#1428]

During the warmest days of summer, water-ice located below a dust particle lying on the equatorial-facing slopes of the martian north polar cap can be melted.

---

**PHOBOS AND DEIMOS: MARS’ LITTLE MESSENGERS OF FEAR AND DREAD** [T623]

Smith H. D.  Lee P.  Hamilton D. 

**POSTER LOCATION #239**

*Low Velocity Impacts on Phobos*** [#2950]

We present evidence for low-velocity impacts on Phobos resulting from material transfer from Deimos to Phobos and/or recapture of Phobos ejecta.

Glotch T. D.  Edwards C. S.  Ebel D. S. 

**POSTER LOCATION #240**

*Spectral Properties of Phobos from the Mars Global Surveyor Thermal Emission Spectrometer: Evidence for Water and Carbonate*** [#2587]

TES at moon Phobos/Hey! Water and carbonates!/Old spectra, new tricks.


**POSTER LOCATION #241**

*Updated Shape Models of Phobos and Deimos from Stereophotoclinometry*** [#2753]

We use stereophotoclinometry methods to create updated shape models of Phobos and Deimos. Data from MOC, HRSC, and HiRISE are incorporated.

Ramsley K. R.  Head J. W. 

**POSTER LOCATION #242**

*The Secondary Impact Spike of Phobos from Stickney Crater Ejecta*** [#1201]

Secondary impacts from Stickney ejecta produced the majority of craters inside Stickney, and when combined with boulder evidence, suggests a ≤0.5 Stickney age.

---

**GEOCHEMISTRY AND PETROLOGY OF MARTIAN METEORITES** [T624]

Corrigan C. M.  Velbel M. A. 

**POSTER LOCATION #244**

*Nakhlite Northwest Africa (NWA) 5790: Discussions on Cooling Rate, Oxidation State and Lack of Alteration*** [#1642]

Outermost nakhlite/How were your minerals formed/?Let’s discuss some clues.

Cohen B. E.  Mark D. F.  Tomkinson T.  Lee M. R.  Smith C. L. 

**POSTER LOCATION #245**

*Martian Igneous Activity and Fluid-Based Alteration: Chronological Constraints from ⁴⁰Ar/³⁹Ar Analyses of the Nakhlites*** [#1886]

High-resolution ⁴⁰Ar/³⁹Ar chronology of six nakhlites is used to examine the igneous age and alteration history of this group of martian meteorites.
Lee M. R.  Lindgren P.  Breton H.  Tomkinson T.  
POSTER LOCATION #246
The Origin of Iddingsite Veins in Olivine from the Nakhlite Meteorites: New Insights from Analogy with CM Carbonaceous Chondrites and Terrestrial Basalts [#1778]
Olivine-hosted veins in the nakhlite Lafayette and the CM2 carbonaceous chondrite Murchison show similar microstructures.

Breton H.  Lee M. R.  Mark D. F.  
POSTER LOCATION #247
Multiple Aqueous Events in the Nakhlite Meteorite North West Africa (NWA) 817 [#1929]
We study the secondary minerals of the nakhlite Northwest Africa 817 to better understand the geochemical environment in Mars subsurface during the Amazonian.

Breton H.  Lee M. R.  Mark D. F.  
POSTER LOCATION #248
Secondary Minerals in the Nakhlite Meteorite Yamato 000593: Distinguishing Martian from Terrestrial Alteration Products [#2010]
We analyze aqueous alteration textures and products to identify the impacts that terrestrial fluids may have had on martian alteration products.

Giesting P. A.  Filiberto J.  
POSTER LOCATION #249
Crystal Chemistry and Formation Mechanisms of the Potassic-Chloro-Hastingsite in MIL 03346 and Paired Stones [#2396]
The nakhlite MIL 03346 and its paired stones contain high-Cl amphiboles. These require not only high Cl, but high Fe, K, and low H2O activity in order to form.

Ling Z. C.  Wang A.  
POSTER LOCATION #250
Abundant Bassanite and γ-CaSO4 in MIL 03346,168 Meteorite [#2598]
We found abundant bassanite CaSO4.1/2H2O in MIL 03346,168, which agrees with the findings by CheMin on Curiosity rover for Sheepbed mudstone samples.

POSTER LOCATION #251
Heterogeneous Olivine-Phyric to Pyroxene-Phyric Textures in the Paired Shergottites LAR 12095 and LAR 12240 [#1360]
Variable textures from olivine-phyric to pyroxene-phyric. Large enstatite megacrysts are observed within a typical basaltic groundmass.

Funk R. C.  Brandon A. D.  Peslier A.  
POSTER LOCATION #252
Petrology and Geochemistry of New Paired Martian Meteorites LAR 12095 and LAR 12240 [#2830]
The paired olivine-phyric shergottites LAR 12095 and 12240 are reduced in terms of oxygen fugacity and may represent a melt with minimal olivine accumulation.

POSTER LOCATION #253
A Coherent Pb Isotopic Model for ALH 84001 and Some Enriched Shergottites [#1761]
Shergottites and an/Orthopyroxenite linked/By Pb isotopes.

Balta J. B.  Sanborn M. E.  Udry A.  Wadhwa M.  McSween H. Y.  
POSTER LOCATION #254
Igneous Petrology and Geochemistry of the Tissint Meteorite [#1267]
We characterize the igneous petrogenesis of olivine-phyric shergottite Tissint, showing it to be a depleted shergottite with several unique characteristics.

POSTER LOCATION #255
Complicated Magmatism of Basaltic Shergottites: Implications from Pyroxene Zoning in Zagami [#1721]
We conducted petrological and mineralogical studies for multiple lithologies from a single martian basalt, Zagami. We discuss complicated magmatism of Zagami.
Moriwaki R. Usui T. Yokoyama T. Simon J. I. Jones J. H.  
**POSTER LOCATION #256**

*Lead Isotope Compositions of Acid Residues from Olivine-Phyric Shergottite Tissint: Implications for Heterogeneous Shergottite Source Reservoirs* [#1921]

Lead isotopic compositions of acid residues from Tissint suggest that its parental magma sampled at least two distinct geochemical source reservoirs.

Leroux H. Jacob D. Marinova M.  
**POSTER LOCATION #257**

*Pyroxene Microstructure in Coarse-Grained Clasts Within NWA 7533 Martian Meteorite* [#1846]

A TEM investigation of four coarse-grained monomineralic pyroxene clasts reveals a microstructure compatible with a slow cooling rate and low shock intensity.

Wirick S. Flynn G. J. Brandes J. Miller L. Smith R.  
**POSTER LOCATION #258**

*FTIR and Fluorescence Spectroscopic Analyses of NWA 7034: Organic Terrestrial Contamination and Its Association with High Nickel Regions* [#2348]

FTIR and X-ray fluorescence spectra were collected on 100-nm-thick sections of NWA 7034. Amide bands were found and were associated with high-nickel hot spots.

Liu Y. Ma C.  
**POSTER LOCATION #259**

*Monazite, Chevkinite-Perrierite and Xenotime in Martian Breccia Meteorite NWA 7034* [#1287]

We report the first findings of rare earth minerals in martian crustal sample NWA 7034 (Black Beauty).

Fassett C. I. Dyar M. D.  
**POSTER LOCATION #260**

*Accumulation of Meteoritic Nickel on Mars* [#1875]

Non-martian nickel/Will accumulate slowly/And mix with Mars soils..

**POSTER LOCATION #261**

*Composition of Fine-Grained Bulk Matrix and Protobreccia Clast Matrix in Northwest Africa 7034: Implications for the Composition of the Martian Crust* [#1723]

The composition of the bulk martian crust was estimated using NWA 7034 and compared to previous estimates for the composition of the martian crust.

**POSTER LOCATION #262**

*Petrologic and Isotopic Characterization of Enriched Mafic Shergottite Northwest Africa 8679* [#2709]

Northwest Africa 8679 is a 285-gram new enriched mafic shergottite found in Morocco in 2014, with compositional and mineralogical similarities to Zagami.

Brandenburg J. E.  
**POSTER LOCATION #263**

*Evidence for Large, Anomalous Nuclear Explosions, on Mars in the Past* [#2660]

It was hypothesized that large natural nuclear reactors ran on Mars but the xenon isotopic spectrum and lack of craters shows the explosions are anomalous.

Brandenburg J. E.  
**POSTER LOCATION #264**

*The NMS (New Mars Synthesis), Recent Data from Gale Crater and NWA 7034: Evidence for a Persistent Biologically Stabilized Greenhouse on Mars* [#2799]

Existence of aqueous, highly oxidized, carbonate-poor sediments in a Hesperian-aged formation constitutes evidence for a persistent bio-greenhouse on Mars.

**POSTER LOCATION #265**

*Mineralogy, Petrology and Geochronology of Intermediate Shergottite NWA 7042* [#2523]

Mineralogical and geochronological study of shergottite NWA 7042 reveals datable mineral assemblages related to igneous crystallization and shock ejection.
Melt Inclusion Analysis of RBT 04262 with Relationship to Shergottites and Mars Surface Compositions
Melt inclusion compositions of RBT 04262 and other shergottites are compared to martian surface compositions to elucidate variety and processes of martian basalts.

Mineralogy and Petrology of the Olivine-Phyric Shergottite Northwest Africa 4880
This abstract describes the mineralogy and petrology of the olivine-phyric shergottite NWA 4880, and found it shows much affinity to NWA 1068.

Shock Effects in NWA 8159: Evidence for a Modest Shock Pressure and a Large Impacting Body
We determined the high-pressure phases associated with the shock veins in NWA 8159 and used them to estimate the shock pressure and the duration.

Gusev-Meridiani-Type Soil Component Dissolved in Some Shock Glasses in Shergottites
Using mass balance modeling, we show that some shock glasses in shergottites contain a Gusev-Meridiani-like soil component.

Liebermannite: A New Potassic Hollandite (KAlSi3O8) from the Zagami Basaltic Shergottite
Liebermannite, a new high-pressure mineral from Mars, likely crystallized during a shock event from high-K mesostasis composition melts in Zagami basalt.

A Geochemical Signature for Martian Near-Surface Alteration in the Tissint Meteorite: Evidence from the Volatile Inventory in Shock Melt Glass
SIMS analyses of volatiles in Tissint glass provide evidence that a geochemical signature for martian alteration products is preserved in shock melt pockets.

Petrographical and Mineralogical Diversity Between Fresh and Impact-Melted Domains of Olivine-Phyric Shergottite Tissint
Tissint represents partially remelted and subsequently recrystallized basaltic material of impact source regions of the shergottites from Mars.

Visualizing the Magnetization and Facture Surfaces in ALH 84001 Using SQUID Microscopy
We use ultra-high-resolution scanning SQUID microscopy to construct a 3-D model of the magnetization and fracture surfaces in ALH 84001.

Crystallinity and Preferred Orientation of Phases in Gabброic Shergottite NWA 6963
Little sample says/Shock makes minerals glassy/Texture is preserved.

Vanadium Valence in Spinel from a Y98 Composition Melt as Determined by X-Ray Absorption Near Edge Structure (XANES)
We examine spinels of Y98 composition using X-ray Absorption Near Edge Structure (XANES) to determine the valence ratio of V^{3+}/V^{4+}. 
Hydrogen Isotope Systematics of Nominally Anhydrous Phases in Martian Meteorites

This study suggests that terrestrial-like hydrogen isotopic compositions of NAPs in martian meteorites could reflect the actual D/H ratio of the martian mantle.

Confirmation of an Isotopically Light Chlorine Solar Nebula and Use of Chlorine Isotopes as a Sensitive Recorder of Martian Crustal Contamination

This study presents new chlorine isotope data for the primitive solar nebula and the confirmation of two martian isotopic chlorine reservoirs (crust and mantle).

Martian Rocks that Reached to Earth were Ejected in 10 Possible Ejection Events

Ejection events of rocks from Mars is studied using cosmic ray exposure ages, based on noble gases. A possible 10 ejection events from Mars are suggested.

Transmission X-Ray Diffraction (XRD) Patterns Relevant to the MSL CheMin Amorphous Component: Sulfates and Silicates

XRD-amorphous sulfates and silicate glasses are possible interpretations of the XRD-amorphous component detected by MSL-CheMin at Gale Crater on Mars.

Amorphous Analogs of Martian Global Soil: Pair Distribution Function Analyses and Implications for Scattering Models of CheMin X-ray Diffraction Data

Pair distribution function analysis of analog amorphous phases in martian soils are examined to better constrain the amorphous material detected by CheMin.

What Salts Actually Form in Martian Soils?: Experimental Results Using Differential Scanning Calorimetry

Experimental results using differential scanning calorimetry indicate a number of novel phase transitions in perchlorate salt solutions relevant to Mars.

The Investigation of Perchlorate/Iron Phase Mixtures as a Possible Source of Oxygen Detected by the Sample Analysis at Mars (SAM) Instrument in Gale Crater, Mars

Iron phases detected in Gale Crater materials when mixed with perchlorate may explain the temperatures in which O₂ were detected by SAM.

Identification and Detection Limits of Perchlorate-Chlorate in Mixtures by Vibrational Spectroscopy

The spectroscopic characteristics of perchlorates-chlorates, in the form of aqueous brines and solid mixtures, were investigated by MIR and Raman spectroscopy.

Quantification of Salt Anions Using Laser-Induced Breakdown Spectroscopy (LIBS)

LIBS analysis was performed on mixtures of salts in basaltic backgrounds to identify the most effective emission lines for measuring salt anions using ChemCam.
Thomas N. H. Ehmann B. L. Anderson D. E.  
**POSTER LOCATION #285**

*Characterization of Hydrogen Abundance in LIBS Data [#2119]*
LIBS is used to understand how hydrogen emission varies with composition in mixtures with known hydrated mineral content for application to ChemCam data.

Yant M. H. Rogers A. D. Nekvasil H.  
**POSTER LOCATION #286**

*Spectral Characterization and Effects of Volatiles on Synthetic Irvine Basalt and Glass [#1230]*
Comparison of the spectral characteristics and secondary mineralogy of geochemically altered synthetic martian material with and without volatiles (Cl and H₂O).

Sun V. Z. Milliken R. E. Ruff S. W. Farmer J. D.  
**POSTER LOCATION #287**

*Hydrated Silica as a Mineralogic Marker for Hesperian Mars: Constraining Environmental Conditions from Orbital and Laboratory Data [#2157]*
We determine spectral aspects of hydrated silica from acidic and alkaline environments and use them to assess the types of martian opaline silica in CRISM data.

Hibbert R. Price M. C. Kinnear T. M. Cole M. J. Burchell M. J.  
**POSTER LOCATION #288**

*The Effects of Temperature on the Raman Spectrum of High Purity Quartz Crystals [#1826]*
Quartz crystals were submitted to temperatures between –100°C and 300°C before changes in their Raman spectra were observed and analysed.

Thorpe M. T. Rogers A. D. Bristow T.  
**POSTER LOCATION #289**

*Thermal Emission Spectral Characterization of Sandstones and Mudstones [#2589]*
Thermal emission spectroscopy of sedimentary rocks are examined to test model accuracy in determining mineral abundances in comparison to traditional techniques.

**POSTER LOCATION #290**

*n, k for Mars Remote Sensing and MSTM Modeling [#2236]*
We model how phase function and albedo change if the main scatterer is a rectangular prism and provide new optical constants for many Mars analog minerals.

Pitman K. M. Jamieson C. S. Noe Dobrea E. Z. Dalton J. B. III Abbey W. J.  
**POSTER LOCATION #291**

*Optical Constants and Reflectance Spectra of Mars Carbonate Analogs II [#2485]*
We provide new optical constants and lab comparison spectra for a range of carbonates to help identify compositions and abundances of known carbonates on Mars.

Ashley J. W. Velbel M. A. Golombek M. P.  
**POSTER LOCATION #292**

*Weathering-Induced Fragmentation as a Possible Contributor to Anomalous Stony Meteorite Scarcity on Mars — Insights from Antarctica and MER [#2881]*
The martian inventory of in situ meteorites is dominated by irons. Petrographic examination of Antarctic chondrites may provide clues to desert fragmentation.

Crandall J. R. Filiberto J.  
**POSTER LOCATION #293**

*Potential Mineral Resources on Mars: Ore Processes and Mechanisms [#1491]*
The application of mineralogical data and terrestrial analogs will allow for the identification of sites where ore mineral concentrations are likely to occur.

Joo Y. J. Funderburg R. L. Soreghan G. S. Elwood Madden M. E.  
**POSTER LOCATION #294**

*Chemical Weathering in Contrasting Climates: Preliminary Results and Implications for Interpreting Paleoclimates on Mars [#2131]*
Chemical weathering compared across four endmember terrestrial climates. Significant dissolution observed in glacial systems, abundant clay in tropical site.
Beckerman L. G.  Hynek B. M.  Alvarado G. E.  
POSTER LOCATION #295
Investigating Acid Sulfate Alteration Processes in Costa Rica as Terrestrial Analogs for Early Mars [#2129]
Alteration mineralogy from Costa Rican volcanos undergoing acid sulfate alteration, analyzed with a variety of techniques, may elucidate martian geochemistry.

POSTER LOCATION #296
Orbital Evidence for Clay and Acidic Sulfate Assemblages on Mars and Mineralogical Analogs from Rio Tinto, Spain [#1958]
A doublet near 2.2 μm is observed in CRISM spectra and mineral analogs from Rio Tinto, Spain; these spectra are consistent with Al-clay and jarosite mixtures.

Singh M.  Garg A.  Rajesh V. J.  Sajinkumar K. S.  Kumar S. N.  
POSTER LOCATION #297
Hyperspectral Characteristics of Jarosite of Warkalli Formation, Varkalai, Southern India: Implications to Mars [#1782]
We present hyperspectral characteristics of jarosite of Warkalli formation, Varkalai, India. It adds the information to the present interplanetary studies.

ENVIRONMENT ANALOGS (INCLUDING TERRESTRIAL OPERATIONAL ANALOGS)  [T626]

Strait M. M.  Jack S. J.  Patmore E. B.  Flynn G. J.  Durda D. D.  
POSTER LOCATION #298
Validation of Detector Placement in Impact Disruption Experiments [#2580]
Use of a 360° ring detector to validate the positioning of passive detectors used in impact disruption experiments.

POSTER LOCATION #299
Aerodynamic and Engineering Design of a 1.5 Seconds High Quality Microgravity Drop Tower Facility [#2833]
Aerodynamic and engineering design of the 1.5 seconds dual capsule drop tower for microgravity experiments currently under development at Baylor University.

Warren T.  Arnold J.  Thomas I.  Lindsay S.  Greenhagen B.  et al.  
POSTER LOCATION #300
Investigating Surface Roughness Effects on the Directional Emissivity of Surfaces Using the Oxford Space Environment Goniometer [#1744]
Early results of measuring the angular dependence of thermal infrared emission/reflection from surfaces with varying roughness.

Kroeker S. E.  Brown A. J.  
POSTER LOCATION #301
Water-Ice Grain Growth in a 3D-Printed Simulation Chamber [#2734]
The construction of a 3-D-printed simulation chamber and observation of water-ice grain growth under Earth conditions inside said chamber.

POSTER LOCATION #302
Laboratory Examination of the Electron Avalanche and Breakdown of the Martian Atmosphere [#1873]
An systematic examination of the electrical conditions of a martian-like atmosphere preceding the (spark) breakdown.

POSTER LOCATION #303
NASA’s International Space Station: A Testbed for Planetary Protection Protocol Development [#2103]
Utilizing NASA’s ISS to develop an integrated forward contamination test and analysis plan to meet planetary protection standards for human exploration.

Cloutis E. A.  
POSTER LOCATION #304
The University of Winnipeg’s Planetary Spectrophotometer Facility (aka HOSERLab): What’s New [#1187]
The University of Winnipeg’s HOSERLab provides samples and analytical facilities to the wider community to support planetary exploration.
**POSTER LOCATION #305**
*Comparison of Simulated CRISM Observations Using Airborn Hyperspectral Images with Ground Truth: Implications for Mars [#1133]*
We present results of simulated CRISM data using HyMap hyperspectral images of a Mars analog environment with comparison to ground truth observations.

**POSTER LOCATION #306**
*The Salar Grande Hyperarid Salts of the Atacama Desert (Chile), an Analog of the Mars Chloride-Bearing Deposits in Terra Sirenum [#1619]*
We are investigating the mineralogy and geochemistry of the Atacama chloride-rich deposits as a terrestrial analog of the ancient deposits bearing halites on Mars.

Goudge T. A.  Mustard J. F.  Russell J. M.  Head J. W.  
**POSTER LOCATION #307**
*Paleolake Deposits on Mars: Perspectives on Source-to-Sink Mineralogy from Lake Towuti, Indonesia [#1191]*
Source-to-sink mineralogy study of a terrestrial lake using VNIR spectroscopy offers insight into remote sensing analyses of martian paleolake deposits.

Shukla A. D.  Ray D.  Bhattacharya S.  Chauhan P.  
**POSTER LOCATION #308**
*Hematite Concentrations from Jhuran Formation (Upper Jurassic) of Kutch, India: Possible Terrestrial Analogue To Martian “Blueberries”? [#1366]*
Geochemical and spectral characterization of hematite concretions from Jurassic-aged sandstone from Kutch, Gujarat, India.

Harris R. S.  Doar W. R. III  Jaret S. J.  Rasbury E. T.  Fleisher C.  
**POSTER LOCATION #309**
*A New Cretaceous-Paleogene Impact Sequence in South Carolina: An Analog for Laminated Spherule Deposits on Mars [#2969]*
A newly discovered C-Pg impact section in South Carolina contains diagenetically altered impact lapilli that may be useful for understanding martian spherules.

Rivera-Hernandez F.  Mackey T. J.  Sumner D. Y.  
**POSTER LOCATION #310**
*Establishing Criteria for Identifying Ancient Perennially Ice Covered Lakes on Earth and Mars from Sedimentary Rocks [#1686]*
Here we discuss sedimentary deposits and processes in modern perennially ice covered lakes (PICL) on Earth as an analog to possible ancient PICLs on Mars.

Englert P.  Bishop J. L.  Patel S.  Gibson E. K.  Koeberl C.  
**POSTER LOCATION #311**
*Don Quixote Pond: A Small Scale Model of Weathering and Salt Accumulation [#2297]*
Variations in gypsum and anhydrite abundance with depth and distance from the center are investigted in Don Quixote Pond, North Fork, Wright Valley, Antarctica.

Patel S. N.  Bishop J. L.  Englert P.  Gibson E. K.  
**POSTER LOCATION #312**
*Coordinating Chemical and Mineralogical Analyses of Antarctic Dry Valley Sediments as Potential Analogs for Mars [#1537]*
Subsurface aqueous activity attributed to chemical alteration in the Antarctic Dry Valleys.

Cavanagh P. D.  Pratt L. M.  Bish D. L.  Bishop J. L.  Peng Y.  et al.  
**POSTER LOCATION #313**
*Microbial Sulfur Isotope Depletion and Mineralogy of Prospect Mesa Formation Soil Pit, Dry Valleys, Antarctica [#2776]*
A soil pit from the Prospect Mesa Formation near Wright Valley, Antarctica, was investigated using sequential sulfur extraction, stable isotope analysis, and XRD.
We performed several multispectral analysis over samples from Faroe islands as a Mars analog site to test for future mission instrumentation.

This study explores the characteristics of pit structures on Earth, the Moon, and Mars in order to determine pit structure origins.

We use a new technique to capture the boundaries of Hawaiian lava flows and demonstrate that they are fractal, but that less-than-ideal cases merit caution.

Testing the usefulness of portable, hand-held thermal infrared imaging instrument for future human missions to planetary bodies on a terrestrial analog.

Analytical/Instruments need field testing/For exploration.

Samples synthesized/Lab and field work smorgasbord/The RIS4E SSERVI team.

This abstract is a continued study in procedures and equipment necessary for human geologic exploration of Mars, and lessons from a two-week mission simulation.

We tested a sample container for astronaut-operated sample return. The collected samples will be used for noble gas, isotope, and microbiology studies.

The Mojave Volatiles Prospector (MVP) project is a science-driven field program to conduct a study of the Mojave desert as a lunar polar rover analog mission.

Serendipitous rover observations of the 10/23/1014 solar eclipse show a decrease in mean short-wave radiance, but cannot be associated solely with the eclipse.
Deans M. C. Lees D. S. Cohen T. E. Lee Y. J. Smith T. et al. POSTER LOCATION #324

Tools for Enabling Real Time Volatile Prospecting with Surface Rovers [#2895]
We tested xGDS in the Mojave Volatiles Prospector (MVP) simulated lunar rover field test. Testing showed real time science operations are enabled by xGDS.

Yingst R. A. Berger J. A. Cohen B. A. Hynek B. M. Schmidt M. E. POSTER LOCATION #325

A Test of Two Field Methods: Determining Best Practices in Reconnoitering Sites for Habitability Potential Using a Semi-Autonomous Rover [#1640]
Our field test shows that the “walkabout-first” approach improves science return where habitability and preservation potential are the mission goals.

---

**MATERIAL ANALOGS (INCLUDING PHYSICAL AND CHEMICAL)** [T627]

Craddock R. A. Rose T. POSTER LOCATION #326

Characteristics of Basaltic Particles Transported by Different Geologic Processes [#1475]
We present preliminary analyses of basaltic lithic fragments found in volcanic tephra, eolian dunes, fluvial deposits, and glacial moraines found in Hawaii.

Whallon E. J. Craddock R. A. Crowe D. Rose T. POSTER LOCATION #327

Analyses of Basaltic Sediments Subjected to Wave Erosion and Their Implications for Past Martian Coastal Processes [#2514]
We analyzed basaltic beach sand to determine physical characteristics of the sediments that may be useful for identifying ancient shorelines on Mars.

Velbel M. A. Wade B. D. Walker I. L. Veach A. E. Vanderroest N. et al. POSTER LOCATION #328

Grain-Surface Textural Indicators of Volatiles in Terrestrial Mars-Regolith Analogs: Implications for Interpreting Sand and Silt Imaged by the Phoenix Optical Microscope at the Phoenix Mars Lander Landing Site [#2264]
Several widely used Mars regolith (soil) simulants exhibit textural indications of volatiles in their environments of formation and alteration.

Ha B. M. Williams A. J. Newsom H. Rapin W. Gasnault O. et al. POSTER LOCATION #329

Grain Size Analysis with Simulation of Digital Images from Mars Science Laboratory Testbed Imagers [#2201]
The limitations of grain resolution with the ChemCam remote micro imager can be understood by using high-resolution images of terrestrial sedimentary rocks.

Eibl M. A. Fedo C. M. Friday M. E. McSween H. Y. POSTER LOCATION #330

The Accuracy of 2D Rover Imagery for Representing 3D Sedimentary Textures of Basaltic Mars Analog Sediment [#2415]
A comparative study of 2- and 3-D textural analyses has found that 2-D representation of 3-D textures depends on image resolution and igneous rock texture.

Levy J. S. Schmidt L. M. Aylward D. S. POSTER LOCATION #331

Sorting of a Different Sort: Experimental Observations of Sublimation-Driven Grain Size Sorting in Mars-Analog Excess Ice Simulants [#1020]
We report experimental results showing the evolution of grain size sorting in response to sublimation-driven ice loss from a Mars-analog sediment substrate.

Calla O. P. N. Mathur S. Gadri K. L. Jangid M. POSTER LOCATION #332

Variation of Dielectric Constant and Brightness Temperature with Respect to Percentage of Water Ice Content [#1323]
Laboratory measurement of TALS is carried out to calculate the dielectric constant.
Stein N. T.  Arvidson R. E.  Wolff M.  
*POSTER LOCATION #333*

*Discrete Dipole Approximation of Scattering from Granular Targets* [#2091]
This abstract explores the effectiveness of discrete dipole approximation in the limit of close-packing between a periodically recurring lattice of spheres.

Veto M. S.  Christensen P. R.  
*POSTER LOCATION #334*

*Mathematical Theory of Thermal Inertia Revisited: Improving our Understanding of Martian Thermophysical Properties Through Analogous Examples of “Periodic Diffusive Inertia”* [#2914]
We provide a set of analogous equations that relate thermal inertia to other scenarios described by a diffusion equation undergoing a periodic boundary condition.

Mellon M. T.  McKay C. P.  Grant J. A.  
*POSTER LOCATION #335*

*The Thermal Conductivity of Soils with Bimodal Grain-Sizes at Mars Pressures* [#2837]
We report new measurements of the thermal conductivity of bimodal size mixtures of natural soils and soil analogs at a range of Mars pressures.

*POSTER LOCATION #336*

*Synthetic Glasses as Analogs for Infrared Studies of Planetary Surfaces* [#2175]
Synthetic glasses with compositions of planetary surfaces are used to produce infrared spectra.

Cloutis E. A.  
*POSTER LOCATION #337*

*Fe-Bearing Glassy Materials: Spectral Reflectance Properties* [#1234]
Reflectance spectra of glassy Fe-bearing materials are sensitive to both ferrous and ferric iron content and can have predictable spectral properties.

Cannon K. M.  Mustard J. F.  
*POSTER LOCATION #338*

*Identifying Basaltic Glass in Complex Samples with Blind Endmember Non-Linear Unmixing* [#1968]
We use laboratory experiments with physical mixtures of rock samples and basaltic glass to explore the feasibility of glass detection with spectral unmixing.

Farrand W. H.  Wright S. P.  Glotch T. D.  
*POSTER LOCATION #339*

Altered and fresh basaltic glass from hydro- and glaciovolcanic eruptions and from Lonar Crater were examined with VNIR, TIR, XRD, and Raman spectroscopy.

Burgess K. D.  Stroud R. M.  De Gregorio B. T.  Dyar M. D.  McCanta M. C.  
*POSTER LOCATION #340*

EELS in the aberration-corrected STEM with quality reference spectra is improving the spatial and energy resolution of analyses of space-weathered materials.

Malespin C. A.  McAdam A. C.  Stern J. C.  Webster C.  Flesch G.  et al.  
*POSTER LOCATION #341*

*Select MSL Sample Analysis at Mars (SAM) Testbed Analog Studies* [#2558]
The SAM testbed instrument is used as a high fidelity replica of the version currently on MSL. Analog samples run on the testbed can be used for FM reference.

*POSTER LOCATION #342*

*Nonlinear Projections of X-Ray Fluorescence Spectra, with Application to PIXL on Mars 2020* [#2406]
We apply statistically-motivated dimensionality reduction to data from the breadboard version of the PIXL instrument, slated for the proposed Mars 2020 rover.
De Angelis S.   De Sanctis M. C.   Manzari P.   Ammannito E.   Di Iorio T. et al.  
**POSTER LOCATION #343**

*Analysis of Rocks Slabs by VNIR Spectroscopy and Linear Mixing with Ma_Miss Instrument Breadboard [#1324]*

Ma_Miss, integrated inside the ExoMars-2018 Rover Drill, is a miniaturized VIS-NIR spectrometer for the investigation of the martian shallow subsurface.

Maturilli A.   Helbert J.   D’amore M.   Ferrari S.  
**POSTER LOCATION #344**

*Experimental Verification of Validity for Kirchhoff’s Law (ɛ=1-R) in Vacuum and Purged Air [#1722]*

R and ɛ @ 200°C to 400°C measured at PEL in vacuum and purging, to study Kirchhoff’s law ɛ = 1–R, for fine and large separates. Found dependence on particle size.

Applin D. M.   Izawa M. R. M.   Cloutis E. A.  
**POSTER LOCATION #345**

*An Ultraviolet Reflectance Survey of Some Materials Relevant to Planetary Exploration [#2358]*

Here we show the UV reflectance of a number of planetary-relevant materials that have, to date, not been spectrally characterized in the UV.

Carli C.   De Angelis S.   Tosi F.   Beck P.   Schmitt B. et al.  
**POSTER LOCATION #346**

*VNIR Spectral Change of Hydrated Sulfate Minerals at Different Low Temperatures [#1800]*

Reflectance VNIR laboratory spectra of hydrated sulfates measured at different low temperatures and variable particle sizes as a tool for planetary mineralogy.

Leask E. K.   Ehlmann B. L.  
**POSTER LOCATION #347**

*Identification and Quantification of Mineral Abundance from VSWIR Reflectance Spectra in Carbonate/Serpentine Systems [#1689]*

Ophiolite mineralogy is mapped and identified at the submillimeter scale in cut rock samples, using VSWIR reflectance spectra from UCIS rover instrument prototype.

**POSTER LOCATION #348**

*Characterization of Synthetic and Natural Manganese Oxides as Martian Analogues [#2132]*

Concentrated manganese oxides discovered in Gale and Endeavour Craters motivate in-depth characterization of this mineral class.

Trang D.   Gillis-Davis J. J.   Hammer J. E.   Cahill J. T. S.  
**POSTER LOCATION #349**

*The Optical Constants of Manganese-Bearing Olivine: The Synthesis [#2643]*

We attempted to synthesize Fo50 olivines through two different methods, a hydrothermal and a 1 atm experiment.

Brand H. E. A.   Scarlett N. V. Y.   Grey I. E.  
**POSTER LOCATION #350**

*Formation of Jarosite Minerals in the Presence of Seed Material [#1825]*

We report the results of in situ SXRD experiments to investigate the formation of jarosite minerals in the presence of mineral seed material.

**POSTER LOCATION #351**

*Raman Spectroscopic Study of the K-Na Jarosite Solid Solutions [#2731]*

We report the method of K content estimation in K-Na jarosite solid solutions by Raman spectroscopy, which is applicable to future Raman payloads for Mars.

Weber I.   Böttger U.   Pavlov S. G.   Hübers H.-W.  
**POSTER LOCATION #352**

*Raman Investigations of Iron Sulfides Under Various Environmental Conditions [#1759]*

We investigate iron sulfides with Raman spectroscopy to determine their behavior in different environmental conditions.
Mössbauer Analysis of Shocked Clays — What Do We Really Know About Mars?  
**Sklute E. C.  Dyar M. D.  Friedlander L.  Glotch T. D.  Sharp T. G.  et al.**  
**POSTER LOCATION #353**

Shock changes phyllosilicate structure, expanding the range of Mössbauer parameters for these phases. Therefore, MER Mössbauer spectra should be reexamined.

MID IR Optical Constants of Triclinic Minerals: A Case Study with Labradorite  
**Rucks M. J.  Arnold J. A.  Glotch T. D.**  
**POSTER LOCATION #354**

We derived optical constants for the triclinic mineral, labradorite.

Mid-IR Optical Constants of Triclinic Minerals  
**Arnold J. A.  Rucks M. J.  Glotch T. D.**  
**POSTER LOCATION #355**

A method outlined/And tested; labradorite/Data to follow.

Nickel Calibration for Use in Laser-Induced Breakdown Spectroscopy on Mars  
**Lepore K. H.  Boucher T. F.  Breves E. A.  Dyar M. D.  Fassett C. I.  et al.**  
**POSTER LOCATION #356**

A calibration for analysis of Ni using laser-induced breakdown spectroscopy is presented.

Calibration Suite for Mars-Analog Laser-Induced Breakdown Spectroscopy  
**Dyar M. D.  Breves E. A.  Lepore K. H.  Boucher T. F.  Bender S.  et al.**  
**POSTER LOCATION #357**

A 3500-sample calibration suite for Mars-analog LIBS spectroscopy has been prepared.

Cr, Ni, Mn, Co, Zn, and S Standards for Use in Laser-Induced Breakdown Spectroscopy on Mars  
**Breves E. A.  Breitenfeld L. B.  Ketley M. N.**  
**POSTER LOCATION #358**

Development of standards for analysis of Cr, Ni, Mn, Co, Zn, and S for use in LIBS applications is described.

Synthesis of “Large” Pigeonite Crystals for Lunar Spectroscopic and Space Weathering Studies  
**Sinclair A.  Lindsley D. H.  Nekvasil H.  Glotch T.**  
**POSTER LOCATION #359**

We have successfully synthesized large (>100 µm) pigeonite crystals as standards for remote sensing measurements, e.g., infrared spectrometry.

Observations and Simulations of Collisional Structures in the Solar Wind  
**Lai H. R.  Russell C. T.  Jia Y. D.**  
**POSTER LOCATION #361**

By combining the results from interplanetary magnetic field observations and MHD simulations, we estimate the mass of the asteroids disrupted in collisions.

Study on Resonant Orbits Around Elongated Celestial Bodies  
**Zeng X. Y.  Fang B. D.  Li J. F.  Zhai K.  Baoyin H. X.  et al.**  
**POSTER LOCATION #362**

Resonant orbits around elongated bodies are studied by using a unified approximate model, providing a basic understanding of the vicinal resonance effect.

Origin of Orbits of Secondaries in Discovered Trans-Neptunian Binaries  
**Ipatov S. I.**  
**POSTER LOCATION #363**

The rarefied condensation that contracted to form a transneptunian binary acquired its angular momentum mainly at a collision of two parent condensations.

Distribution of Captured Planetesimals in Circumplanetary Disks  
**Suetsugu R.  Ohtsuki K.**  
**POSTER LOCATION #364**

We examined capture of planetesimals from their heliocentric orbits and their subsequent orbital evolution in the circumplanetary disk.
Modeling the Evolution of the Sphere-Restricted full Three-Body Problem

The sphere-restricted full three-body problem is investigated in a discrete element method code, focusing on areas of mixed stable configurations.

Exploring the Post-Impact Properties of Collisional Remnants in the Early Solar System

We are combining the iSALE hydrocode and REBOUND particle code to investigate planetesimal collisions in the early solar system.

The Feasibility of Electrostatic Dust Levitation in Small Body Plasma Wakes

The feasibility of electrostatic dust levitation in a plasma wake region near Itokawa’s equator is investigated, using accurate gravity and plasma models.

Survival Times of Meter-Sized Rock Boulders on the Surface of Airless Bodies

We estimate the survival times of meter-sized boulders on the surfaces of the Moon, Phobos, Deimos, Itokawa, Eros, Vesta, Ceres, Trojans, and the planet Mercury.

Cohesion and Electrostatic Lofting of Ellipsoidal Dust Grains

We approximate cohesion between irregular grains as cohesion between ellipsoids. The electric field required to loft particles on the Moon is also calculated.

Preserving Shape and Spin in Asteroid Reaccumulation Simulations

We explore asteroid reaccumulation following catastrophic impacts, where fragments can shape and spin information is preserved for reaccumulated fragments.

Preliminary Broadband Measurements of Dielectric Permittivity of Planetary Regolith Analog Materials Using a Coaxial Transmission Line

Broadband complex dielectric permittivity measurements of powdered planetary analog materials are presented with the goal of systematically varying mineralogy.

Asteroid Cartography: Mapping Very Elongated Objects

Methods for mapping extremely elongated objects are assessed and illustrated with maps of asteroids Eros, Itokawa, Ida, and comet Borrelly.

Percentage of Ordinary Chondrite Mineralogies Among S-Complex and Q-Type Near-Earth Asteroids

Consistent with other studies, there is a high proportion of LL-like mineralogies among S-complex and Q-type NEAs relative to ordinary chondrite falls.

Improved Shape Model of 1627 Ivar

We are presenting an improved shape model for NEA 1627 Ivar made by combining delay-Doppler data and visible-wavelength light curves.

Modeling the Near-Sun Object, 3200 Phaethon

Numerical simulations of Phaethon using a comet model that simulates interior heat and gas diffusion show that it may be a dormant comet nucleus with volatiles.
Hydrogen and Major-Element Concentrations on Asteroid 433 Eros: Evidence for an L- or LL-Chondrite-Like Surface Composition

NEAR GRS data are used to resolve longstanding discrepancies regarding the best chondrite match for the composition of asteroid 433 Eros.

VESTA: IT MUST BE MIDDAY NOW THAT DAWN HAS PASSED

Core Formation in Vesta: Constraints from Metal-Silicate Partitioning of Siderophile Elements
Siderophile-element depletions in Vesta’s mantle show its core formed at low pressure, is S and Ni rich, and did not form under highly reducing conditions.

Gravity Evidence for Post-Magma Ocean Serial Magmatism on Protoplanet Vesta
Vesta’s gravity indicates density variations in its crust consistent with discrete plutonic magmatism.

A Numerical Model of the Physical and Chemical Evolution of Vesta Based on Compaction Equations and the Olivine-Anorthite-Silica Ternary Diagram
A numerical model based on compaction equations is used with the olivine-anorthite-silica phase diagram to model eucrites and diogenites formation in Vesta.

Quantitative Mapping of Minerals on Vesta Using Dawn VIR Data
Minerals on Vesta’s surface are quantified with DAWN VIR data to understand Vesta’s lithologies and interior structures.

Olivine on Vesta: Implications for the Internal Structure of a Terrestrial Protoplanet
While olivine has been detected on Vesta’s surface, its distribution has posed some questions on the mechanisms that have brought it in its present locations.

The Composition of Vesta from all Dawn Data and Analyses
Vesta surface composition is interpreted from analyses of all Dawn Vesta data, the first summary of Dawn findings using the complete, calibrated dataset.

Vesta’s “Ribbon”: Exploring Potential Non-Radially Symmetric Flow Features Near Sossia
Using data from the Dawn mission we attempt to test the fluidized ejecta flow hypothesis on potential flow features near Sossia crater.

Comparison of Spectral Parameters for HED Discrimination with Dawn Data
We investigate the relationship between band-I center and a FC filter based parameter using meteorite spectra and show HEDs on Vesta with Dawn FC and VIR data.
Schenk P. Marchi S. O’Brien D. Russell C. T. Raymond C.  
**POSTER LOCATION #385**
*Morphology and Age of Rheasilvia (Vesta), and Expectations for Large Impact Basins on Ceres [#2309]*
Rheasilvia formed not so long ago/Ceres got hit by more than one blow/Look to Dione but of craters/Only Ceres will know.

Frigieri A. De Sanctis M. C. Ammannito E.  
Yingst R. A. Williams D. A. et al.  
**POSTER LOCATION #386**
*Geospatial Investigation of the Mineralogic and Geologic Maps of Vesta [#1387]*
In this work we present the spatial data analysis of the recently published global geologic and mineralogic maps of Vesta.

Le Corre L. Reddy V. Sanchez J. Dunn T. Cloutis E. A. et al.  
**POSTER LOCATION #387**
*Exploring Exogenic Sources for the Olivine on Asteroid Vesta [#1107]*
We propose that a probable source for the olivine seen in the northern hemisphere of Vesta corresponds to remnants of impactors made of olivine-rich meteorites.

Williams D. A. Blewett D. T. Buczkowski D. L. Garry W. B. Kneissl T. et al.  
**POSTER LOCATION #388**
*Complete Global Geologic Map of Vesta from Dawn and Mapping Plans for Ceres [#1126]*
We present the final 1:250,000 global geologic map of Vesta produced by the Dawn team during the Vesta mission, and we discuss geologic mapping plans for Ceres.

**POSTER LOCATION #389**
*Dawn at Vesta: Composition of the Northern Regions [#2098]*
The northern regions of Vesta observed by Dawn reveal that impact-related processes (excavation, ejecta, and exogenous materials) changed the surface composition.

Villarreal M. N. Russell C. T. Prettyman T. H. Yamashita N.  
**POSTER LOCATION #390**
*Limits on Vesta’s Magnetic Field from the Gain of Dawn’s Gamma Ray Detector [#1698]*
Here we attempt to use the variation of the gain of the photomultiplier tube as Dawn orbits Vesta as a proxy for any crustal fields that may be present.

Kramer G. Y. Schenk P. Dawn Team  
**POSTER LOCATION #391**
*Morphologies of Fresh Craters, Lunar Analogs, and the Simple-Complex Transition Vesta [#2571]*
Simple to complex/What controls the transition?/Speed? Gravity? Gnomes?

Longobardo A. Palomba E. De Sanctis M. C. Capaccioni F. Tosi F. et al.  
**POSTER LOCATION #392**
*VIS-NIR Spectroscopy of Linear Features of Tectonic Origin on Vesta and Other Asteroids [#1469]*
The spectral variations in correspondence of the Vesta linear features are analyzed and compared with the spectral properties of the Lutetia and Eros grooves.

---

**CERES AS IT GROWS TO AN OMINOUS SIZE IN DAWN’S HEADLIGHTS [T630]**

Takir D. Reddy V. Le Corre L. Sanchez J. A.  
**POSTER LOCATION #394**
*Phase Angle Effects on 3-μm Absorption Band on Ceres: Implications for Dawn [#1881]*
We analyzed the phase angle effects on 3-μm absorption band on Ceres.

Daly R. T. Schultz P. H.  
**POSTER LOCATION #395**
*New Constraints on the Delivery of Impactors to Icy Bodies: Implications for Ceres [#1972]*
Experiments at the AVGR reveal that Ceres should host significant impactor contamination and provide clues about how that component may be expressed.
Schmedemann N. Michael G. Ivanov B. A. 
Kneissl T. Neesemann A. et al. POSTER LOCATION #396

A Preliminary Chronology for Ceres [#1418]
We present a preliminary crater production and chronology function for Ceres for initial estimates of surface ages from early Dawn imaging data of Ceres.

De Sanctis M. C. Ammannito E. Fonte S. Magni G. Capaccioni F. et al. POSTER LOCATION #397

Hyperspectral Observations of Ceres by VIR on Dawn: First Data Obtained During the Approach [#1427]
On approach to Ceres, VIR data reveal the first details of Ceres’ surface. Here we report about the first data obtained by VIR during its approach to Ceres.

Li J.-Y. Nathues A. Mottola S. De Sanctis M. C. Mastrodemos N. et al. POSTER LOCATION #398

The Phase Function of Ceres at High Phase Angles [#2565]
Preliminary results about the phase function of Ceres at phase angles up to 160° that can only be obtained by the Dawn spacecraft during approach.

Horiguchi K. Isobe H. POSTER LOCATION #399

Hydrothermal Alteration Experiments with Aqueous Fluid on the Early Ceres [#1703]
Hydrothermal experiments with fluid simulated the early Ceres revealed that mineral species and compositions of carbonate and phyllosilicates are essential.

Le Corre L. Reddy V. Bottke W. F. Dykhuis M. Nathues A. POSTER LOCATION #400

Exploring Sources of Exogenic Material on Ceres [#1431]
We present a hypothesis for the possible presence of L chondrites on the surface of Ceres and how to identify it using Dawn Framing Camera color data.

DeMario B. E. Schmidt B. E. Mutchler M. J. Li J.-Y. McFadden L. A. et al. POSTER LOCATION #401

Results of a Hubble Space Telescope Search for Natural Satellites of Dwarf Planet 1 Ceres [#1622]
A search was conducted using Hubble Space Telescope data to determine whether or not natural satellites exist around the distinguished Dwarf Planet 1 Ceres.

Reddy V. Li J.-Y. Gary B. G. Stephens R. Megna R. et al. POSTER LOCATION #402

Photometric Observations of Ceres from Telescopic Observations Using Dawn Framing Camera Color Filters [#1663]
We observed Ceres with Dawn camera color filters mounted on a telescope and found that its geometric albedo in a 0.44-µm filter is higher than expected.

Tosi F. Capria M. T. De Sanctis M. C. Ammannito E. Capaccioni F. et al. POSTER LOCATION #403

Surface Temperature of Dwarf Planet Ceres: Preliminary Results from Dawn [#1745]
We report on the first spatially-resolved surface temperatures of dwarf planet Ceres retrieved by the Dawn/VIR instrument in the early approach mission phase.

Nathues A. Hoffmann M. Schaefer M. Russell C. T. Schaefer T. et al. POSTER LOCATION #404

Framing Camera Color Filter Imaging on Ceres Approach [#1957]
The Dawn Framing Camera is expected to map 1 Ceres from different orbits in 2015. We intend to present the first color imaging results from the approach phase.

Luspay-Kuti A. Haessig M. Fuselier S. A. Balsiger H. Calmonte U. et al. POSTER LOCATION #405

Subsurface Temperature of Comet 67P/C-G from ROSINA/DFMS? [#2947]
Based on the time variation of coma volatiles, the shallow subsurface nucleus temperature in the winter hemisphere of 67P may be estimated.
Noviello J. L.   Asphaug E.  

**POSTER LOCATION #406**

*Block Mapping and Analysis on Cometary Nuclei: Identifying and Quantifying Surface Change Due to Outgassing [#2873]*

We present a potential method for analyzing images taken by the OSIRIS camera on Rosetta that focus on obtaining information about the seismology of the comet.


**POSTER LOCATION #407**

*Spatial and Temporal Variations of the Near-Surface Thermal Properties of 67P/Churyumov-Gerasimenko Obtained from Continuum Observations with Microwave Instrument on the Rosetta Orbiter (MIRO) [#2798]*

Spatial inhomogeneities of near-surface thermal properties are derived from microwave observations and numerical modeling.

Lee S.   von Allmen P.   Hofstadter M.   Beaudin G.   Biver N.   et al.  

**POSTER LOCATION #408**

*Local and Diurnal Variation of Water Outgassing on Comet 67P/Churyumov-Gerasimenko Nucleus Observed from Rosetta/MIRO [#2716]*

Rosetta/MIRO has observed the coma of Comet 67P, which shows a strong variability of outgassing activity with time of day and with location on nucleus.


**POSTER LOCATION #409**

*Local Sculptures at PHILAE Landing site as Seen by PHILAE/CIVA: Clues to Primordial Accretion Process? [#2450]*

From the analysis of CIVA images, we investigate the different physical processes that may have sculpted the local landforms observed at the landing site.

ElShafie A.   Heggy E.  

**POSTER LOCATION #410**

*How Hard is the Surface of Comet Nucleus? A Case Study for Comet 67P/Churyumov-Gerasimenko [#2444]*

We try to constrain the surface hardness of C67 from the multiple observed bounces of Philae lander during the landing phase.

A'Hearn M. F.   Agarwal J.   Bertaux J.-L.   Bodewits D.   Cremonese G.   et al.  

**POSTER LOCATION #411**

*Imaging the Gas from 67P/Churyumov-Gerasimenko [#2347]*

We will present the first images of the gas around 67P/C-G.

Cravens T. E.   Madanian H.   Rahmati A.   Golledge B.   Robertson I. P.   et al.  

**POSTER LOCATION #412**

*Electrons Near the Nucleus of Comet 67P/C-G at 3 AU: Model Comparisons with Rosetta Data [#2199]*

Electrons in the cometary coma near the nucleus of Comet 67P/Churyumov-Gerasimenko measured by the Rosetta IES (Ion and Electron Sensor) are discussed.

Tosi F.   Capria M. T.   Capaccioni F.   Filacchione G.   Erard S.   et al.  

**POSTER LOCATION #413**

*Thermal Maps and Properties of Comet 67P as Derived from Rosetta/VIRTIS Data [#2156]*

We present temperature maps and properties of Comet 67P as observed by Rosetta/VIRTIS under different illumination conditions and different local solar times.

Ciarniello M.   Capaccioni F.   Filacchione G.   Erard S.   Leyrat C.   et al.  

**POSTER LOCATION #414**

*Comet 67P/C-G as Seen by VIRTIS-M Onboard Rosetta: Photometric Correction [#2114]*

We present a photometric correction for hyperspectral data of Comet 67P/C-G acquired by VIRTIS-M onboard Rosetta.

Quirico E.   Moroz L. V.   Beck P.   Schmitt B.   Arnold G.   et al.  

**POSTER LOCATION #415**

*Composition of Comet 67P/Churyumov-Gerasimenko Refractory Crust as Inferred from VIRTIS-M/Rosetta Spectro-Imager [#2092]*

We address the interpretation of VIRTIS spectra of the refractory surface of Comet 67P/C-G.
A Glimpse into the Underworld: Active Pits on 67P

Circular pits are detected on 67P: produced like sinkholes, they provide a glimpse into the inner nucleus and trace the evolutionary history of the comet.

Detection of Transient Water Ice on Comet 67P/Churyumov-Gerasimenko

VIRTIS observes the cyclic replenishment of water ice, due to the illumination changes, on the comet’s surface.

Surface Fractures on Comet 67P/Churyumov-Gerasimenko

We present a summary of the various fractures that have been observed on the surface of Comet 67P using OSIRIS images and discuss their mode of formation.

Regional Geomorphology of Comet 67P/Churyumov-Gerasimenko Using the OSIRIS Camera Onboard Rosetta

We present an overview of the regional morphology of Comet 67P using OSIRIS images and describe the various terrains and units as well as notable features.

Compositional Maps of 67P/CG Nucleus by Rosetta/VIRTIS-M

Compositional maps of 67P/Churyumov-Gerasimenko comet nucleus are derived from VIRTIS-M VIS-IR hyperspectral data acquired during August–September 2014.

Evidence and Modelling of Dust Transport on the Nucleus of Comet 67P/Churyumov-Gerasimenko

Rosetta/OSIRIS imaging shows evidence of dust transport across the surface of the nucleus. The presentation will show evidence and models of the phenomena.

NavCam Observations of the Hathor Cliff and Hapi Area on the Nucleus of Comet 67p/Churyumov-Gerasimenko

Images of comet 67P nucleus taken by Rosetta NavCam show several types of downslope material movement and the meters to tens of meters inhomogeneity of nucleus material.

Philae: First Landing on a Comet

The paper will give a summary of the actual landing and operations of the Rosetta Lander, Philae, on comet 67P/Churyumov-Gerasimenko.

Rosetta Mission Status Update

Overview of the Rosetta mission, past, present, and future.
Rahmati A. Cravens T. E. Madanian H. Burch J. L. Goldstein R. et al.  
**POSTER LOCATION #426**
*Pickup Cometary Ions at Comet 67P/C-G: Comparison of Test Particle Models with Rosetta IES Data [#2519]*
The flux and density of the heavy pickup cometary ions are calculated with a test particle code and compared with IES data.

Plettemeier D. Statz C. Abraham J. Ciarletti V. Hahnel R. et al.  
**POSTER LOCATION #427**
*Insights Gained from CONSERT Measurements During Philae’s Descent onto 67P/C-G’s Surface [#2388]*
The scientific objective of the CONSERT instrument onboard Rosetta is the dielectric characterization of the nucleus of Comet 67P/Churyumov-Gerasimenko.

Stenzel O. J. Varmuza K. Engrand C. Ferriere L. Brandstätter F. et al.  
**POSTER LOCATION #428**
*Using Meteorite Samples as a Test for Correlation Based Analysis of SIMS Data from Cometary Grains [#2200]*
Correlation analysis is used to examine time of flight SIMS spectra from meteorite samples for comparison with Rosetta COSIMA data.

Merouane S. Hilchenbach M. COSIMA Team  
**POSTER LOCATION #429**
*Exploring Alteration of Grains in Cometary Comae Induced by Electrical Charging [#2106]*
We aim to characterize the alteration of grains in the coma of 67P/CG during their way from the comet nucleus to their collection by the Rosetta-COSIMA instrument.

Brouet Y. Levasseur-Regourd A. C. Encrenaz P. Sabouroux P. Heggy E. et al.  
**POSTER LOCATION #430**
*Broadband Permittivity Measurements on Porous Planetary Soil Simulants, in Relation with the Rosetta Mission [#1809]*
Permittivity measurements have been made between 50 MHz and 190 GHz on porous samples in order to support microwave experiments involved in the Rosetta mission.

Combi M. R. Fougere N. Tenishev V. Bieler A. Altwegg K. et al.  
**POSTER LOCATION #431**
*The Distribution of Gases in the Coma of Comet 67P/Churyumov-Gerasimenko from Rosetta Measurements [#1714]*
We study Rosetta measurements of the highly tenuous gas coma of 67P/Churyumov-Gerasimenko using a 3D fully kinetic DSMC Adaptive Mesh Particle Simulator model.

---

**CHONDRITES AND THEIR COMPONENTS I: PARENT BODY ALTERATION [T632]**

**POSTER LOCATION #432**
*Chemical Heterogeneity of Organic Matter in Minimally-Heated CO Chondrites [#2951]*
Organic matter in the least-heated CO chondrites is chemically heterogeneous on scales not observed in other chondrites, caused by incomplete thermal processing.

Changela H. G. Le Guillou C. Brearley A. J.  
**POSTER LOCATION #433**
*Analytical Constraints on the Formation and Evolution of Organic Material by Processes on Primitive Chondrite Parent Bodies [#2810]*
Using FIB-STXM-TEM, constraints have been made on the formation and evolution of OM on primitive chondrite parent bodies.

Tokunaga M. Isobe H.  
**POSTER LOCATION #434**
*Aqueous Alteration Experiments with Hydrothermal Fluid Based on the Solar Abundance in the Early Solar System [#1704]*
Oxidative fluid based on the solar abundance may constrain carbonate formation temperature in aqueous alteration processes on carbonaceous chondrites.
Na, K-Rich Rim Around a Chondrule in Unequilibrated Ordinary Chondrite LEW 86018 (L3.1) 
Na, K-rich around a chondrule in a low petrographic type UOC LEW 86018 (L3.1) is being studied to understand the metamorphism, metasomatism in UOCs.

Models demonstrate chemically contrast alteration microenvironments in matrices, around Fe-Ni metal grains, and at matrix-metal interfaces.

We report on the possible correlation between localized (μm-scale) aqueous alteration and the spatial variation of presolar grain abundances in CO3.0 chondrites.

We have analyzed the texture and composition of chondrule mesostasis in the mildly altered CM2 EET 96029.

We focus on the formation of secondary alteration products and how different elements may be mobilized and redistributed by aqueous fluids.

Spectral signatures related to variable alteration in CR meteorites are seen in the MIR. Least-altered CRs are similar to CVs while more-altered CRs are like CMs.

We report O-isotope systematics of 11 EOCs that cover all groups (H, L, LL) and metamorphic types (4, 5, 6), including shock stages and brecciated meteorites.

We suggest that both calcic cores and sodic borders of zoned plagioclases observed in the matrices of CK chondrites were formed during parent body metamorphism.

New Ti-XANES measurements on H chondrites are presented and trends in these and previous analyses of ordinary and enstatite chondrites are discussed.

We suggest that macro- and microstructures can be used to identify ordinary chondrites that formed directly below impact craters on already warm parent bodies.
**POSTER LOCATION #445**

*Measurement of Thermal Properties of the Ordinary Chondrites Relevant to Planet-Forming Processes [#2730]*

The thermal properties for two ordinary chondrites are measured at the high temperatures (300–1000 K) relevant to planetesimal formation and radiogenic heating.

---

**PLUTO, KUIPER BELT OBJECTS, AND NEW HORIZONS: CASTING LIGHT ON DARK WORLDS [T633]**

Singer K. N.  Stern S. A.  **POSTER LOCATION #446**

*An Endogenous Source for Pluto’s Nitrogen (N₂) [#1192]*

We explore the provenance of Pluto’s N₂ and determine that comets could not have delivered enough N₂ to support the current atmosphere or escape over time.

---

Parker A. H.  Buie M.  Spencer J.  Fraser W.  Porter S. B.  et al.  **POSTER LOCATION #447**

*Updating the Kuiper Belt Luminosity Function with the HST Search for a New Horizons Post-Pluto Target [#2614]*

Using the 5 low-i Kuiper belt objects discovered in our New Horizons–HST survey, we make a new measurement of the Kuiper belt luminosity function.

---

Thomason C. J.  Nimmo F.  **POSTER LOCATION #448**

*Determination of Pluto’s Radius During the New Horizons Encounter [#1462]*

Presentation of a GUI that can determine the limb of a planet in an image to within a quarter pixel. We discuss applications to the New Horizons encounter.

---

Probst L. W.  Desch S. J.  Thirumalai A.  **POSTER LOCATION #449**

*The Internal Structure of Haumea [#2183]*

We simulate whether Haumea can have a rocky core and ice crust and remain in equilibrium. For a Jacobi ellipsoid, equilibrium favors a low core density.

---

Prentice A. J. R.  **POSTER LOCATION #450**

*Ceres and Charon: Predictions for Chemical Composition, Physical Structure and Origin [#2664]*

This paper makes predictions for the bulk chemical composition and physical structure of Ceres and Charon, ahead of the arrivals of Dawn and New Horizons.

---

Rhoden A. R.  Henning W.  Hurford T. A.  Bills B. G.  Hamilton D. P.  et al.  **POSTER LOCATION #451**

*The Potential for Current Tidal-Tectonic Activity on Charon from Obliquity Tides [#2456]*

Charon, if still warm/Obliquity tides will stress/Fractures reveal all.

---

**STARDUST MISSION AND COSMIC DUST [T634]**

Taylor S.  Lindsay F. N.  Nakashima D.  Herzog G. F.  Kita N. T.  et al.  **POSTER LOCATION #452**

*Searching for Microachondrites [#2227]*

We made elemental and oxygen isotope measurements of selected micrometeorites to match specific textures or relict minerals to achondritic compositions.

---

Defouilloy C.  Kita N. T.  Lord N. E.  Sobol P. E.  Tenner T. J.  et al.  **POSTER LOCATION #453**

*New WiscSIMS IMS 1280 100-nm-Resolution Primary Beam Deflection System, for Accurate Aiming of Returned Samples [#1415]*

Development of an FIB-marking protocol coupled with a modified deflector board to improve aiming of small particules with 100 nm precision.

---

Snead C. J.  McKeegan K. D.  Boehnke P.  Kearsley A. T.  **POSTER LOCATION #454**

*Further Oxygen Isotope Measurements for Two Cometary Impact Crater Residues: Still Like Chondrites [#2621]*

We have measured the oxygen isotope composition of two additional impact crater residues collected by the Stardust spacecraft.
<table>
<thead>
<tr>
<th>POSTER LOCATION #455</th>
<th>Carbonaceous and Magnetite-Bearing Stardust Cometary Grains from Tracks 187, 188, 189, 190 [#2000]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price M. C. Bridges J. C. MacArthur J. L. Hicks L. J.</td>
<td>We present Raman spectroscopy and XANES results from a set of 19 grains found in 4 tracks taken from the cometary side of NASA’s Stardust mission collector.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #456</th>
<th>Neon and Helium in the Surface of Stardust Cell C2028 [#2378]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palma R. L. Pepin R. O. Schlutter D. J. Frank D. R. Bastien R. et al.</td>
<td>Q-gases with high Ne abundance, combined with spallation and solar wind components, were detected in particles trapped in Stardust surface aerogel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #457</th>
<th>Identification of Impact Craters in Aluminum Foil from the Stardust Interstellar Dust Collector: An Update [#1005]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floss C.</td>
<td>Post-ISPE scanning of Al foils from the Stardust interstellar dust collector has led to the identification of eight additional impact features.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flynn G. J. Northrup P. Wirick S.</td>
<td>P-, S- and K-XANES of cluster IDP L2009R2 show P as phosphate while sulfides contain sulfate suggesting a reaction rim formed in the Nebula or the parent body.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #459</th>
<th>Complete TEM-Tomography: 3D Structure of GEMS Cluster [#2177]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matsuno J. Miyake A. Tsuchiyama A. Messenger S. Nakamura-Messenger K.</td>
<td>To evaluate 3D nano structure of GEMS correctly, we performed complete TEM-tomography. Many GEMS grains were observed to be aggregated into clusters.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #460</th>
<th>Size Matters: Assessing Degree of Preservation of Interplanetary Dust and Micrometeorites [#2541]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ishii H. A.</td>
<td>New approaches to assess atmospheric entry alteration, especially below solar flare track erasure temperatures, in CP IDPs and UCMMs for comparison to Wild 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #461</th>
<th>Classification of Cosmic Spherules from Widerøefjellet (Sør Rondane Mountains, East Antarctica) [#1762]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventura Bordenca C. Huber M. S. Goderis S. Debaille V. Claeys Ph.</td>
<td>We report the classification of a large number of well-preserved melted micrometeorites collected at Widerøefjellet Mountain in East Antarctica.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #462</th>
<th>Crystallographic Textures of Olivine in Artificial Cosmic Spherules Produced by Quick Quench Experiments [#1697]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isobe H. Gondo T.</td>
<td>Crystallization of olivine controls external and internal structures of cosmic spherules in rapid growth processes of quench crystals from chondritic materials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #463</th>
<th>Nanodiamond Analysis Methods Compared for Consistency [#1480]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lewis J. B. Isheim D. Floss C. Daulton T. L. Seidman D. N.</td>
<td>We compare two atom-probe analysis procedures used to investigate the origins of meteoritic nanodiamonds. The results are roughly comparable but inconclusive.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POSTER LOCATION #464</th>
<th>Electrophoresis of Allende Nanodiamonds in Colloidal Solution [#2688]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shatoff E. A. Meshik A. P. Pravdivtseva O. V.</td>
<td>Electrophoresis of Allende nanodiamonds reveals two subpopulations with different susceptibilities to gravity.</td>
</tr>
</tbody>
</table>
POSTER LOCATION #465

Abundances of O-Rich Presolar Grains in the Acfer 094 Meteorite Revisited [#1315]

Hoppe P. Leitner J. Kodolanyi J.

An automated search for O isotope anomalies in NanoSIMS images of Acfer 094 suggests adjustments to previously reported abundances of presolar grains.

POSTER LOCATION #466

Identification of Circumstellar Magnetite in the LAP 031117 CO3.0 Chondrite [#2828]

Zega T. J. Haenecour P. Floss C. Stroud R. M.

We have identified presolar circumstellar magnetite in the LAP 031117 CO3.0 chondrite. We discuss its formation and astrophysical implications.

POSTER LOCATION #467

FIB-TEM Studies of a Presolar SiC and the Surrounding Matrix in a Primitive CO3.0 Chondrite [#2135]

Croat T. K. Haenecour P. Floss C.

We present FIB-TEM results from a presolar SiC in CO3.0 meteorite LaPaz 031117 and characterize the surrounding matrix materials from three different FIB sections.

POSTER LOCATION #468

Isotopic and Structural Investigation of Presolar SiC Grains of Supernova Origin [#1733]

Kodolányi J. Hoppe P. Vollmer C. Müller M.

We studied the isotope composition and structure of supernova-derived SiC grains from the Murchison carbonaceous chondrite.

POSTER LOCATION #469

Isochrons and Al Contamination in Presolar Grains [#1559]

Groopman E. Amari S. Gyngard F. Jadhav M. Lin Y. et al.

Aluminium-/Magnesium isochrons/in presolar grains.

POSTER LOCATION #470

Condensation of Carbonaceous Dust in the Helium-Rich Supernova Shell [#2803]

Yu T. Meyer B. S. Clayton D. D.

Network calculations that include breakup of CO by radioactive decay of 56Co produce carbonaceous dust grains roughly 1 μm in size in helium-rich matter.

POSTER LOCATION #471

Continued SIMS Trace Element Study of Presolar Graphite Grains [#2882]

Jadhav M. Nagashima K. Huss G. R.

We present Sc, Rb, Sr, Y, Zr, and Nb trace-element data for low-density graphite grains from Orgueil and discuss correlations between the relative abundances.

POSTER LOCATION #472

Simultaneous Analysis of Strontium, Zirconium, and Barium Isotopes in Presolar Silicon Carbide Grains with CHILI [#2825]

Stephan T. Trappitsch R. Davis A. M. Pellin M. J. Rost D. et al.

After more than five years of designing and building the Chicago Instrument for Laser Ionization (CHILI), we present the first analyses of presolar SiC grains.

EARLY SOLAR SYSTEM CHRONOLOGY [T636]

POSTER LOCATION #473

Hafnium-Tungsten Chronology of the Ureilite Parent Body [#2293]

Budde G. Kruijter T. S. Fischer-Gödde M. Irving A. J. Kleine T.

High-precision W isotope data show that the ureilite parent body differentiated ~2.6 Ma after CAI, and accreted ~1 Ma later than iron meteorite parent bodies.

POSTER LOCATION #474

Cooling of the H Chondrite Parent Body: Examination and Assessment of ⁴⁰Ar/³⁹Ar Age Data [#1876]

Cohen B. E. Mark D. F. Lee M. R. Smith C. L.

We discuss the cooling of the H chondrite parent body, in particular the onion-shell model, via evaluation of ⁴⁰Ar/³⁹Ar chronological results.

POSTER LOCATION #475

⁴⁰Ar/³⁹Ar Ages of an EL6 Chondrite Clast from Almahata Sitta [#2784]

Turrin B. D. Lindsay F. N. Herzog G. F. Park J. Delaney J. S. et al.

We present newly obtained ⁴⁰Ar/³⁹Ar results from an EL6 chondrite (fragment MS-D) from Almahata Sitta.
Koefoed P. Amelin Y. Yin Q.-Z. Sanborn M. E. Huyskens M.

**POSTER LOCATION #476**

*A Re-Examination of the U-Pb Systematics of the Achondrite Asuka 881394 [#1842]*

A re-examination of the U-Pb systematics of the achondrite Asuka 881394.

Kagami S. Yokoyama T. Usui T. Fukai R.

**POSTER LOCATION #477**

$^{147}$Sm-$^{143}$Nd and $^{146}$Sm-$^{142}$Nd Chronology of a Basaltic Eucrite, NWA 7188 [#1668]

We report the $^{147}$Sm-$^{143}$Nd and $^{146}$Sm-$^{142}$Nd ages of NWA 7188 and compare the results with the ages obtained in previous chronological studies on other eucrites.

Crowther S. A. Busemann H. Bischoff A.

**POSTER LOCATION #478**

Constraining the Thermal History of the Rumuruti Chondrite Parent Body: I-Xe Ages of Distinct Lithologies of NWA 753 [#2197]

Preliminary ages for four individual clasts appear to correlate with the lithologies: The most primitive clasts exhibit older ages than the more metamorphosed ones.

Pravdivtseva O. V. Meshik A. P. Hohenberg C. M. Krot A. N.

**POSTER LOCATION #479**

I-Xe System in Chondrules from CR2 Chondrite NWA 721 [#2926]

I-Xe isotope systematics of five chondrules from the CR2 chondrite NWA 721 suggests aqueous alteration processing at about 11 m.y. after CV CAIs.

Telus M. Huss G. R. Nagashima K. Ogliore R. C.

**POSTER LOCATION #480**

The $^{60}$Fe-$^{60}$Ni Systematics of UOC Chondrules, Open-System Redistribution Compromises Its Usefulness [#2550]

We show that UOC chondrules behaved as open systems for Fe and Ni and may not be suitable for dating using the $^{60}$Fe-$^{60}$Ni system.

---

**ISOTOPE COSMOCHEMISTRY: ANALYTICAL METHOD ADVANCEMENTS [T637]**

Tappa M. J. Simon J. I. Jordan M. K. Young E. D.

**POSTER LOCATION #481**

*A Procedure to Simultaneously Determine the Calcium, Chromium, and Titanium Isotopic Compositions of Astromaterials [#2083]*

We detail a procedure for the coordinated isotopic characterization of multiple elements that could provide a powerful tool for understanding solar system processes.

Hu J. Tissot F. L. H. Ireland T. J. Yokochi R. Dauphas N.

**POSTER LOCATION #482**

Developments in PF-HPLC (Pneumatic-Fluoropolymer High Performance Liquid Chromatography) [#2939]

Our Pneumatic Fluoropolymer HPLC system is a robust, durable, all plastic system for automated chromatography for use in isotope geochemistry.

Beard S. B. Swindle T. D. Domanik K. J.

**POSTER LOCATION #483**

Searching for Potassium Host Phases in Preparation for Ar-Ar Analysis of Brachinite and Brachinite-Like Achondrites [#2568]

Ar-Ar and cosmic-ray-exposure (CRE) dating of brachinites is needed to understand more about brachinites. Here we discuss our search for potassium host phases.

Sapah M. S. Amelin Y. Ireland T.

**POSTER LOCATION #484**

Investigating the Effects of Acid Leaching on the U-Th-Pb System in CAIs from the CV Chondrite NWA 4502 [#1859]

Three different acid-leaching procedures applied to mineral fractions of NWA 4502 CAIs to investigate the effect of acid leaching on their U-Pb systems.

Huyskens M. H. Sanborn M. E. Yin Q.-Z.

**POSTER LOCATION #485**

High-Precision U-Pb and Pb-Pb Geochronology at UC Davis — First Results for EarlyTime Standards [#2340]

Analytical protocols for U-Pb geochronology with MC-ICP-MS and TIMS were developed and our first results for the EarlyTime standards are reported.
Ichimura K.   Sugiura N.  
**POSTER LOCATION #486**  
Preparation of Synthetic Dolomite for Determination of Mn/Cr Relative Sensitivity [#1795]  
Dolomite samples were prepared for determination of Mn/Cr relative sensitivities.

Tyra M. A.  
**POSTER LOCATION #487**  
The Forgotten Uncertainties in Using Radiochronometry to Date Minerals that Formed in the Early Solar System — The Example of $^{53}$Mn [#2911]  
The half-life of many radionuclides used to construct chronologies of the ESS have large, often ignored, uncertainties. This presentation focuses on Mn-53.

| ISOTOPE COSMOCHEMISTRY: ORIGINS OF ISOTOPE HETEROGENEITIES | [T638] |
|-------------------------------------------------------------|
| Andreasen R.   Lapen T. J.  
**POSTER LOCATION #489**  
Mass-Dependent Neodymium Isotopic Variations in Planetary Materials — Determined Using a Neodymium Double Spike [#2847]  
Mass dependent variation in neodymium isotopic composition among planetary and terrestrial materials are observed at the epsilon unit level. |
| Krabbe N.   Kruijer T. S.   Budde G.   Kleine T.  
**POSTER LOCATION #490**  
Tungsten Stable Isotope Variations Investigated Using a New Double Spike Method [#2383]  
We present our first W stable isotope data using a newly developed double spike technique. |
| Qin L.   Xia J.   Carlson R. W.   Zhang Q.  
**POSTER LOCATION #491**  
Chromium Stable Isotope Composition of Meteorites [#2015]  
The new $\delta^{53}$Cr values of chondrites are similar to the range observed for mantle-derived rocks, suggesting no Cr isotope fractionation during core formation. |
| Xia J.   Qin L.   Carlson R. W.   Horan M. F.   Mock T. D.   et al.  
**POSTER LOCATION #492**  
Cr Isotope Fractionation in Basalts and Mantle Xenoliths [#2505]  
Stable Cr isotope composition of basalts and mantle xenoliths and Cr isotope fractionation behavior in mantle-derived rocks during high temperature processes. |
| Tissot F. L. H.   Dauphas N.   Grossman L.  
**POSTER LOCATION #493**  
Uranium Isotope Variations in Group II Refractory Inclusions [#2819]  
To determine the cause of U isotope variation in CAIs we identified, characterized, and measured the U isotopic compositions of 12 fine-grained group II CAIs. |
| Nielsen S. G.   Sarafian A. R.   Owens J. D.  
**POSTER LOCATION #494**  
Vanadium Isotope Heterogeneity of the Solar System: New Data for Achondrites [#1597]  
We will present vanadium isotope data for various achondrites. Our new results indicate that the solar system is heterogeneous with respect to vanadium isotopes. |
| Shollenberger Q. R.   Brennecka G. A.   Borg L. E.  
**POSTER LOCATION #495**  
The Strontium, Barium, Neodymium, and Samarium Isotopic Compositions of Non-Allende CAIs [#2593]  
We show the Sr, Ba, Nd, and Sm isotopic compositions of non-Allende CAIs are very similar to Allende CAIs, suggesting an isotopically homogeneous CAI reservoir. |
| Hidaka H.   Sera K.   Yoneda S.  
**POSTER LOCATION #496**  
Isotopic Studies of Strontium, Barium, Cerium, Neodymium, Samarium, and Gadolinium in Eucrites [#1307]  
Systematic isotopic analyses of Sr, Ba, Ce, Nd, Sm, and Gd were performed on eight eucrites for understanding of differentiation on the eucrite parent body. |
Fukai R., Yokoyama T., Kagami S., Takahashi H.

High Precision Neodymium Isotopic Analysis of Chondrites with Complete Sample Digestion [1667]
We discuss the Nd isotopic heterogeneity of chondrites in detail by combining the method of the perfect digestion and high precision Nd isotopic analysis.

Yokoyama Tatsunori, Misawa K., Okano O., Shih C.-Y., Nyquist L. E., et al.

Early Solar System Alkali Fractionation Events Recorded by K-Ca Isotopes in the Yamato-74442 LL-Chondritic Breccia [1695]
We have determined the Ca isotopic composition of D’Orbigny and estimated a source K/Ca for Y-74442 alkali-rich fragments using the D’Orbigny initial 40Ca/44Ca.

Williams C. D., Sanborn M. E., Yin Q.-Z.

Ti-Cr-O Isotope Systematics of the Anomalous Eucrites and Martian Meteorites [1671]
Preliminary Ti-Cr-O isotope systematics for eucrites, diogenites, martian meteorites, and an H7 chondrite elucidate petrogenetic links among planetary materials.

Brennecka G. A., Borg L. E., Romaniello S. J., Souders A. K., Wadhwa M.

The Search for Supernovae Fingerprints in the Early Solar System: No Signs of Live 126Sn in Allende CAIs [1813]
Using a new and much more precise method, we report Te isotope compositions of Allende CAIs in the search for live 126Sn in the early solar system.

Boss A. P., Keiser S. A.

Supernova Shock Triggering and Radioisotope Injection into the Presolar Cloud: Effects of Rotational Axis Orientation [1049]
Three-dimensional models of presolar clouds rotating perpendicular to shock front direction are consistent with the supernova triggering and radioisotope injection hypothesis.

Bojazi M. J., Meyer B. S.

Production of Manganese-53 in a Self-Enriching Molecular Cloud [2872]
Inclusion of a mass cut for stellar yields of the highest-mass stars increases the spread in the 53Mn abundance in a model of a self-enriching molecular cloud.

Wiederhold J. G., Schönbächler M.

Mercury Concentrations and Hg Isotope Compositions of Chondrites and Eucrites [1841]
Novel Hg isotope and concentration data show variations that are not correlated with meteorite class or general degree of volatile element depletion.

Hunt A. C., Ek M., Schönbächler M.

The Effect of Cosmic Ray Irradiation on Platinum and Palladium Isotopes in Iron Meteorites [1835]
Galactic cosmic rays induce shifts in isotopic ratios due to neutron capture. We assess the use of Pt and Pd isotopes as neutron dosimeters.

Matthes M., Fischer-Gödde M., Kruijer T. S., Leya I., Kleine T.

Neutron Dosimetry and Neutron Capture Model for Palladium-Silver Chronometry of Iron Meteorites [2369]
We found large neutron-capture effects on Ag isotopes in iron meteorites and developed a correction method using Pt isotope neutron dosimetry.

Sharma M., Jurewicz A., Burnett D.

The Problem with the Estimated Re/Os Ratio of the Solar Nebula [2361]
There is a bimodal distribution in Re/Os ratios between O-/E- and C-chondrites, indicating a large-scale solar nebula heterogeneity.
A $^{33}$S Anomaly in CM Chondrites [#1869]
The S isotope composition of two CM chondrites, including Murchison, is shown to be mass-independent with respect to the bulk composition as well as the IOM.

Burnett D. S. Liu M.-C. Paque J. M. McKeegan K. D. Beckett J. R. 
Testing Solar Proton Irradiation Models for $^{10}$Be: Correlation with $^{138}$La [#1394]
The CAI Egg 6 has typical $^{10}$Be/$^{9}$Be, but not the predicted excess $^{138}$La. Either $^{10}$Be was not produced by solar protons or there were no 20 MeV protons.

Chakraborty S. Jackson T. L. Rude B. Ahmed M. Thiemens M. H. 
Low Temperature (80K) Vacuum Ultraviolet Photodissociation of Nitrogen: Isotopic Fractionations and Significance for Solar Nebular Chemistry [#1519]
N-isotopic compositions in organic molecules of carbonaceous chondrites will be discussed with the new low-temperature VUV photodissociation data of nitrogen.

Chakraborty S. Rude B. Ahmed M. Thiemens M. H. 
Carbon Isotopic Fractionation During Low Temperature (80K) Vacuum Ultraviolet Photodissociation of Carbon Monoxide: Relevance for the Solar Nebula [#1504]
New data on the C-isotopic composition in the product of VUV photodissociation of CO at 80 K will be presented along with the connection to the solar nebula.

GharibNezhad E. Lyons J. R. Ayres T. R. 
$CO (x=16,17,18)$ Isotopologue Ratios in the Solar Photosphere [#1592]
Using revised f-values of CO isotopologues, preliminary isotope ratios for the solar photosphere were determined, and are found to be similar to Genesis values.

Photolysis of CO at Long Wavelengths: Comparison with Laboratory Experiments and Implications for the Solar Nebula [#2167]
Using accurate measured CO spectra, model simulations of CO photolysis experiments at long wavelengths can reproduce measured slopes only by altering lifetimes.

Kurokawa H. Inutsuka S. 
The Effect of Compositional Inhomogeneity on Radii of Hot Jupiters [#1710]
We evaluate the effect of compositional inhomogeneity on radii of hot Jupiters by a structure calculation with self-consistent treatment of convection regimes.

A Simple One-Dimensional Radiative-Convective Atmosphere Model for Use with Extrasolar Atmospheres [#1573]
A radiative-convective atmospheric model was copied from IDL to Python to make it more accessible. Vapor pressure curves were plotted for extrasolar planets.

Fusco M. S. Singh S. 
Exoplanet Atmosphere Spectral Mixing and Unmixing Models: Toward Measurement of Atmospheric Constituents [#1675]
Spectral mixing and unmixing models developed to model exoplanet atmospheric constituents. Eventual goal of assessing detection limits for various telescopes.

Lorenzo A. Desch S. J. Shim S. H. Nys D. 
Effect of Fe Redox State and Mg/Si Ratio on Exoplanet Mass-Radius Relations [#2908]
We find that even drastic changes in mantle FeO content or bulk Mg/Si ratio have surprisingly little effect on the radius of a planet.
Port S. T. Heydenreich J. A. McMahon Z. M.  
*POSTER LOCATION #517*

**Distribution of Planets in Multi-Planetary Exo-Solar Systems [#1098]**
Using the Titius-Bode relation and the list of confirmed exoplanets, we aimed to discover a relation between planets in multi-planetary systems.

Schmude R. W. Jr.  
*POSTER LOCATION #518*

**Near-Infrared Photometry of Jupiter and Saturn [#1530]**
This study summarizes near-infrared photometric constants of Jupiter and Saturn based on measurements made in 2014.

*POSTER LOCATION #519*

**Interior Structure and Habitability of Super-Europas and Super-Ganymedes [#2717]**
We consider ice-covered oceans in exoplanets using new user-friendly thermodynamics suitable for geochemistry and geophysics.

---

**EXOBIOLGY: PREBIOTIC CHEMISTRY TO EXTREMOPHILE LIFE [T640]**

Czechowski L.  
*POSTER LOCATION #521*

**Enceladus and Origin of the Life in the Solar System [#2699]**
We consider conditions for origin of life in early Enceladus and possible proliferation of the life to inner planets.

Keele C. L. Urquhart M. L. Taylor S. M.  
*POSTER LOCATION #522*

**A Saturnian RNA World? First Steps Toward Evaluating the Stability of Life’s Precursor Molecules in an Enceladus Ocean [#2315]**
We examine the expected lifetime of a subsurface ocean on Enceladus and implications for the stability of precursor molecules critical to life such as RNA.

Sandford S. A. Materese C. K. Nuevo M.  
*POSTER LOCATION #523*

**The Formation of N- and O-Heterocycles from the Irradiation of Benzene and Naphthalene in H2O/NH3-Containing Ices [#2171]**
Irradiation of aromatic hydrocarbons in mixed-molecular ices results in the production of aromatic O- and N-heterocyclic molecules.

Kebukawa Y. Oka S. Tokumitsu A. Tachibana S. Ishikawa Y. et al.  
*POSTER LOCATION #524*

**Possible Prebiotic Organic Molecule Syntheses on Asteroids from Formaldehyde and Ammonia During Aqueous Activities [#1300]**
Hydrothermal reaction with H2CO and NH3 produced amino acids, sugars and possibly nitrogen bearing heterocyclic compounds as well as IOM like solid residues.

Simkus D. N. Goreva Y. S. McCoy T. J. Herd C. D. K.  
*POSTER LOCATION #525*

**ToF-SIMS Analysis of Prebiotic Organic Compounds in the Murchison Meteorite [#2513]**
Amino acids, carboxylic acids and PAHs were detected in the Murchison meteorite via ToF-SIMS analysis. Some organics appear to vary spatially across the sample.

*POSTER LOCATION #526*

**Atypical Amino Acid Structural and Isotopic Compositions in the CR2 Chondrite Miller Range 090001 and the CH3 Chondrite Sayh al Uhaymir 290 [#2242]**
The meteorites listed in the title contain much lower abundances of amino acids than comparable meteorites, with dissimilar [extraterrestrial] stable isotope signatures.

*POSTER LOCATION #527*

**Distribution and Origin of Amino Acids in Lunar Regolith Samples [#1945]**
Amino acids in lunar regolith samples appear to be primarily the result of terrestrial contamination, with some potential contribution from meteoritic infall.
Williams A. J.  Eigenbrode J.  Floyd M.  McAdam A.  Freissinet C.  et al.  

**POSTER LOCATION #528**

Lipid Detection in Fe(III)- Dominated Samples to Prepare for the Tetramethylammonium Hydroxide (TMAH) Wet Chemistry Experiment on the SAM Instrument Suite [#1814]

Modern and ancient chemical biosignature preservation in iron environments and their potential for detection by the SAM instrument onboard the Curiosity rover.

Che C.  Parvez S.  Glotch T. D.  

**POSTER LOCATION #529**


This work aims to build a spectral library of biosignatures stored in terrestrial clay-rich sediments for use in Mars-related spectroscopic studies.

Applin D. M.  Izawa M. R. M.  Cloutis E. A.  

**POSTER LOCATION #530**

Infrared (2.5–25.0 µm) Reflectance of Solid State Polycyclic Aromatic Hydrocarbons (PAHs) [#2588]

Here, we show the 2.5–25-µm reflectance spectra of a diverse suite of PAHs.

Kaplan H. H.  Milliken R. E.  

**POSTER LOCATION #531**

Assessing Organic Content of Sediments with Reflectance Spectroscopy: Analysis of Natural Samples and Laboratory Mixtures [#1220]

Reflectance spectra of natural, clay-rich samples and synthetic organic-clay mixtures are analyzed with the goal of quantifying organic content in sediments.

Fujiwara A.  Kitazato K.  

**POSTER LOCATION #532**

Photometric Measurements of Analog Materials for Asteroid Organics [#2204]

We examined the photometric properties of natural organic samples as analog of asteroid organics.

Yesiltas M.  Sedlmair J.  Hirschmugl C. J.  Peale R. E.  

**POSTER LOCATION #533**

Three Dimensional FTIR Spectro-Microtomography of Carbonaceous Chondrites [#1445]

A highly novel analytical technique, three-dimensional infrared tomography, is applied to meteorites in order to understand their chemical constituents.

Adkin R. C.  Bruce J. I.  Pearson V. K.  

**POSTER LOCATION #534**

Novel Fluorescent Sensors for the Detection of Organic Molecules in Extraterrestrial Samples [#2044]

Previously, meteoritic extraterrestrial organic compounds have been elucidated by destructive analysis; non-destructive fluorescent sensors are being developed.


**POSTER LOCATION #535**

Effect of High Electron Radiation Doses on the Preservation of Antigenic Structures of Biomolecules: Implications for Life Detection on Mars [#1223]

We describe how biological polymers such as proteins and peptides can still be detected by an immunoassay after high electron radiation doses.

Mujib M. Z.  Fu Q.  

**POSTER LOCATION #536**

Carbon Isotopes of Evolved CO$_2$ During Acetic Acid Oxidation by Different Oxidizing Agents [#2954]

Carbon isotope measurement of CO$_2$ evolved from acetic acid oxidation experiments suggest that reaction pathways may be different with different oxidizing agents.

Miyake N.  Ishimaru R.  Komatsu G.  Matsui T.  

**POSTER LOCATION #537**

Analysis of Microbial Community Thriving in the Methane-Seeping Murono Mud Volcano, Niigata, Japan [#1944]

We present a result of microbiological investigation of the methane-seeping Murono mud volcano at central Japan, with astrobiological implications for Mars.
Sinha N. Nepal S. Kral T. A. Kumar P.  

Growth and Survivability of Methanogens at High Pressure and High Temperature: Implications for Subsurface Life on Mars [#2195]  
Growth and survivability of methanogens at high pressure and high temperature: Implications for subsurface life on Mars.

---

**Geodynamics: The Force Awakens**  

Nahm A. L. Kattenhorn S. A. Pendleton M. W.  

Unraveling the Formation Mechanism(s) of the Cerberus Fossae, Mars: Evacuated Dikes, Graben, or Both? [#2367]  
Deep fissures on Mars/Named for a three-headed dog/The magma did it.

Boden E. A. C. Dawers N. H.  

Dike-Related Fault Morphology from Graben Topography, SW Tharsis [#2986]  
Dike-induced graben/MOLA profiles. Growth of faults/By segment linkage.

Kukkonen S. Aittola M. Öhman T.  

An Update on the Structural Control of Venusian Polygonal Impact Craters [#2005]  
Venusian volcanotectonic features do not favor the formation of polygonal impact craters but the orientation of their structures affect the PIC rim orientation.

Beddingfield C. B. Burr D. M. Tran L. T.  

Testing for Non-Visible Fractures on Dione by Identifying Polygonal Impact Craters [#1159]  
We test the hypothesis that fractures exist below available image resolutions by identifying polygonal impact craters in Dione’s Cratered and Smooth Plains.


Global Morphological Mapping of Strike-Slip Structures on Ganymede [#2985]  
Icy Ganymede/Is over time deforming/Faulting and sliding.

Slezak T. J. Davies A. G. Kesztethyi L. P. Okubo C. Williams D. A.  

Slope Stability Analysis of Scarps on Io’s Surface: Implications for Upper Lithospheric Composition [#2528]  
Near-vertical scarps in paterae reveal cross-sections of Io’s upper crust. Numerical modeling is used to quantify material strength and constrain composition.

Weber R. C. Nahm A. L. Schmerr N.  

Mass Wasting in Planetary Environments: Implications for Seismicity [#1485]  
When planets rumble, rocks can tumble.

McGovern P. J. Hero J. L.  

Mechanical Effects of Clay Sediment Layers on Landslides and Fault Systems at Large Volcanoes and Elsewhere on Mars [#2539]  
We find ancient clay/Sediment layers making/Olympus Mons slide.

Jacobson S. A. Rubie D. C. Hernlund J. Morbidelli A.  

A Late Giant Impact is Necessary to Create Earth’s Magnetic Field [#1882]  
Late giant impacts are necessary for the creation of terrestrial core dynamos. Otherwise, stable compositional stratification of the core naturally occurs.

Plattner A. Simons F. J.  

Mars’ Heterogeneous South Polar Magnetic Field Revealed Using Altitude Vector Slepian Functions [#1794]  
We present a high-resolution regional model of the martian south polar magnetic field by taking advantage of locally available high-quality data.

---

120  46th LPSC Program
Essa K.  Kletetschka G.  POSTER LOCATION #549
*Depth Estimates and Its Implications from Second Moving Average Residual Magnetic Anomalies on Mars* [#1977]
Mars total magnetic data obtained by the Mars Global Surveyor mission from 400 km altitude were processed using a SMA method to estimate the depth parameter.

Morschhauser A.  Vervelidou F.  Lesur V.  Grott M.  POSTER LOCATION #550
*The Necessary Magnetization Distribution to Explain the Observed Martian Magnetic Field* [#2478]
We present a map of the magnetization distribution necessary to explain the observed lithospheric field on Mars.

Roberts J. H.  Arkani-Hamed J.  POSTER LOCATION #551
*Thermal Evolution of the Core and Mantle of Mars: Effects of a Sequence of Basin-Forming Impacts* [#2617]
A single impact/Halts dynamo for a while/What about seven?

Duncan M. S.  Weller M. B.  Wicks J. K.  Knezek N. R.  Black B. A.  et al.  POSTER LOCATION #552
*Mars Thermal History: Core, Atmosphere, Mantle, Phobos, and Surface (MaTH CAMPS)* [#2900]
Mars 1-D models/Core-mantle evolution/Thermal history.

Hofmeister A. M.  Criss R. E.  POSTER LOCATION #553
*Relevance of the 2nd Law, Gravitational Potential, Rotation, and Heat Transfer to Core Formation and Differentiation of Planets and Moons* [#1273]
Planetary evolution produces internal order, requiring loss of heat to space. Core size depends on gravity. Earth is much more refractory than envisioned.

Weller M. B.  Duncan M. S.  POSTER LOCATION #554
*Insight into Terrestrial Planetary Evolution via Mantle Potential Temperatures* [#2749]
Planets all around/Interior states veiled/Can we glean a mantle T_p?

Kamata S.  Nimmo F.  Kuramoto K.  POSTER LOCATION #555
*One-Dimensional Thermal Convection Calculation Using a Modified Mixing Length Theory* [#1093]
We develop a one-dimensional scaling based on mixing length theory and compare it with three-dimensional calculation results.

Gomi H.  Hirose K.  Akai H.  Fei Y.  POSTER LOCATION #556
*Electrical Resistivity of Substitutional Disordered hcp Fe-Si and Fe-Ni Alloys at High Pressure: Implications for Core Energy Balance* [#2342]
This study provides systematic data and theoretical predictions that reveal the effect of Ni and Si on the resistivity of Fe based alloys at high pressure.

Menard J. M.  Cooper C. M.  POSTER LOCATION #557
*Parameterized Thermal Evolution of the Earth with Continental Growth* [#1275]
We built a parameterized thermal history model of the Earth taking into account the continental insulation of the mantle heat flow, including continental growth.

Montesi L. G. J.  Gueydan F.  Précigout J.  POSTER LOCATION #558
*Efficiency of Ductile Shear Zone Localization by Grain Size Reduction on Earth, Venus, and Mars* [#2439]
Grain size reduction/Shear zone localization/What planet is this?

Ahern A. A.  Radebaugh J.  Christiansen E. H.  POSTER LOCATION #559
*Lineations on Paterae and Mountains on Io: Implications for Internal Stresses* [#2821]
Lineations on paterae and mountains on Io reveal that they formed under two different stress fields — one of horizontal extension and one of compression.

Hurford T. A.  Spitale J. N.  Rhoden A. R.  Henning W. G.  Hedman M. M.  POSTER LOCATION #560
*Tidal Volcanism on Enceladus* [#1912]
Enceladus sprays/Reservoir depth important/Delays activity.
**POSTER LOCATION #561**
*Constraints on Titan Rotation from Cassini Radar Data [#1636]*
We present a model of the rotation of Titan, as constrained by the Cassini radar data. Titan is a synchronous rotator, but does not have a uniform angular rate.

Curren I. S.   Yin A.  
**POSTER LOCATION #562**
*Likely Suspects for Water-Vapor Plume Eruptions on Icy Satellites [#2952]*
We present an experimental tectonic model that investigates the role of tidal deformation in forming plume-source fractures.

**POSTER LOCATION #563**
*A New Suite of Hydrodynamical Simulations of the Origin of the Obliquity of Uranus [#2916]*
Here, we report on the findings obtained from our initial suite of 35 SPH simulations of the impact origin of the obliquity of Uranus.

Zheng Y.   Nimmo F.   Lay T.  
**POSTER LOCATION #564**
*Probing the Thermal State of Mars Using InSight Seismic Data [#1665]*
A seismic low-velocity zone is predicted to be present in Mars’ lithosphere for stagnant-lid convection, which can be used to probe the thermal state of Mars.

**POSTER LOCATION #565**
*Science Goals of SEIS, the InSight Seismometer Package [#2272]*
We provide a general science overview of the seismometer (SEIS) instrument package that comprises the primary payload of the upcoming InSight mission to Mars.

Bowles N. E.   Pike W. T.   Teanby N.   Roberts G.   Calcutt S. B.   et al.  
**POSTER LOCATION #566**
*Performance and Noise Modelling of the Short Period Seismometer SEIS-SP, Part of the SEIS Instrument for NASA’s 2016 InSight Mission [#2146]*
This presentation describes the work being carried out by the InSight SEIS-SP short-period seismometer team to characterize the instrument’s noise performance.

---

**ADVANCED CURATION [#T642]**

Fries M. D.   Allen C. C.   Calaway M. J.   Evans C. A.   Stansbery E. K.  
**POSTER LOCATION #569**
*JSC Advanced Curation: Research and Development for Current Collections and Future Sample Return Mission Demands [#2805]*
An Advanced Curation R&D effort is necessary to maintain NASA’s scientific collections as contamination control and analysis techniques evolve.

Calaway M. J.  
**POSTER LOCATION #570**
*Lunar Processing Cabinet 2.0: Retrofitting Gloveboxes into the 21st Century [#1492]*
The Apollo 16 Lunar Processing Glovebox (cabinet 38) in the Lunar Curation Laboratory at NASA JSC received an upgrade including new technology interfaces.

**POSTER LOCATION #571**
*Comprehensive Non-Destructive Conservation Documentation of Lunar Samples Using High-Resolution 3D Reconstructions and X-Ray CT Data [#2740]*
Advanced curation documentation method using precision photography, photogrammetry, and X-ray CT scanning to create interactive 3-D models of lunar samples.
Anand M. Crawford I. A. Sims M. R. Smith A. Burgess R. et al.  **POSTER LOCATION #573**

**Lunar Mission One: The First Crowdfunded Mission to the Moon Presenting New Opportunities for Lunar Science [#2611]**

We will present the mission concept and the primary science drivers for Lunar Mission One — the first crowdfunded mission to the Moon.

Lawrence S. J. Stopar J. D. Jolliff B. L. Robinson M. S. Speyerer E. J.  **POSTER LOCATION #574**

**Lunar Surface Traverse and Exploration Planning: Destinations for Automated Sample Return [#2755]**

We present new lunar potential regions of interest for automated sample return optimized to address key lunar and planetary science questions.

Garrick-Bethell I. Pieters C. M. Russell C. T. Weiss B. P. Halekas J. et al.  **POSTER LOCATION #575**

**NanoSWARM: A Cubesat Discovery Mission to Study Space Weathering, Lunar Magnetism, Lunar Water, and Small-Scale Magnetospheres [#3000]**

The NanoSWARM mission concept uses a fleet of cubesats around the Moon to address a number of open problems in planetary science.

Milazzo M. P. Stone T. Heynssens J. Daubar I. Springmann A. et al.  **POSTER LOCATION #576**

**Naaki: A Twin CubeSat Mission to the Moon [#2875]**

Naaki: CubeSat/Lunar voyeur exposing/Light and dark impacts.

Clark P. E. Didion J. Cox R. Ghafoor N.  **POSTER LOCATION #577**

**CubeSat Deployables on the Lunar Surface? [#1109]**

We revisit the small, deployable lunar instrument package design concept, useful for environment monitoring with existing cubesat technology.

Cohen B. A. Hayne P. O. Paine C. G. Paige D. A. Greenhagen B. T.  **POSTER LOCATION #578**

**Lunar Flashlight: Mapping Lunar Surface Volatiles Using a Cubesat [#2020]**

Sunlight glinting off/Our cubesat’s solar sail will/Reveal lunar frost..


**Neutron Spectrometer Prospecting During the Mojave Volatiles Project Analog Field Test [#2885]**

The Mojave Volatiles Project was a robotic lunar analog test aimed at maturing instrument and operational approaches for a future landed mission.


**Classifying Planetary Surfaces with Results from TextureCam Processing with the Mojave Volatiles Prospector (MVP) Rover Mission [#2239]**

TextureCam (automated pixel classification method) was applied to Groundcam images from the Mojave Volatiles Prospector mission to determine the terrain type.

Speyerer E. J. Lawrence S. J. Stopar J. D. Robinson M. S. Jolliff B. L.  **POSTER LOCATION #581**

**Optimized Traverse Planning for Future Lunar Polar Prospectors [#2299]**

A polar prospector that samples multiple PSRs near persistently illuminated regions could answer many questions about the resource potential of lunar volatiles.

Gruener J. E. Suzuki N. H. Carpenter J. D.  **POSTER LOCATION #582**

**International Strategy for the Exploration of Lunar Polar Volatiles [#2618]**

The International Space Exploration Coordination Group (ISECG) has begun an effort to develop a coordinated strategy to investigate lunar polar volatiles.
Hashimoto T. Hoshino T. Tanaka S. Otake H. Morimoto H. et al.  
**Poster Location #583**

*Moon Surface Exploration in Japan [#2011]*

A lunar lander SELENE-2 has been considered. It lands on the Moon’s surface and performs in situ scientific observation, environment investigation.

**Poster Location #584**

*Uncertainty and Phase Angle Dependency of SELENE/SP Lunar Reflectance Model for Lunar Calibration [#1852]*

SP lunar reflectance model accuracy and its photometrical characteristics depending on phase angles and libration are investigated with the ROLO model.

Allen C. C.  
**Poster Location #585**

*Taurus Littrow Pyroclastic Deposit: High-Yield Feedstock for Lunar Oxygen [#1140]*

Optimum landing sites for a lunar resources demonstration mission can be identified, and the oxygen yield can be predicted using orbital data.

Nishiyama M. Otake H. Hoshino T. Hashimoto T. Watanabe T. et al.  
**Poster Location #586**

*Selection of Landing Sites for Future Lunar Missions with Multi-Objective Optimization [#1368]*

Optimal landing sites on the Moon are selected considering sunlight, communication, inclination angle, and ice distribution with multi-objective optimization.

**Poster Location #587**

*Recent Advancement of System Development of WISE-CAPS: A WebGIS-Based Lunar and Planetary Data Collaboration System [#1725]*

WISE-CAPS is Web-GIS based collaboration environment for lunar and planetary exploration. Here we briefly summarize current status of its development.

Ito S. Tan H. Patricia R. C. Bhalla S. Vazhenin A. et al.  
**Poster Location #588**

*Digital Data Refinement for the Area of Crater on the Moon [#2052]*

We provide the new way that refines the area of crater under digital observation data gathered by space explorer opened for the public.

Hendrickson D. B. Huber S. A. Thornton J. P.  
**Poster Location #589**

*Astrobotic Commercial Lunar Delivery Model for Science Missions [#2631]*

Astrobotic’s lunar delivery service opens access to the Moon for new science investigations from around the world.

**Poster Location #590**

*The Icebreaker Drill System: Sample Acquisition and Delivery for the Lunar Resource Prospective Mission [#1614]*

The Mars Icebreaker drill has been modified to capture and deliver samples for the lunar Resource Prospecting Mission (RPM).

Fink W. Baker V. R. Schulze-Makuch D. Hamilton C. W. Tarbell M. A.  
**Poster Location #591**

*Multi-Rover Framework to Autonomously Explore Planetary Lava Tubes [#3011]*

Multi-rover framework and associated operational autonomy, based on stochastic optimization and LIDAR, for the autonomous exploration of planetary lava tubes.

Fink W. Baker V. R. Flammia M. Tarbell M. A.  
**Poster Location #592**

*Avoiding Planetary Rover Damage by Multi-Objective Rover Traverse Optimization [#1353]*

Automated optimal rover traverse planner using multivariate stochastic optimization based on terrain data in the presence of simultaneous mission constraints.
Planetary Mission Concepts: Mars Missions

Smith C. L.  Haltigin T. W.  iMARS Phase II Science Subteam

*POSTER LOCATION #593*
International Mars Architecture for the Return of Samples (iMARS) Phase II Science Sub-Team Report: Sample Science Management Plan [T644]

Assuming that we/Return some samples from Mars/What will we do then?

Siegler M. A.  Smrekar S. E.  Piqueux S.  Muller N.  Grott M.  et al.

*POSTER LOCATION #594*
Three-Dimensional Thermal Modeling for the 2016 InSight Mission [T2696]

In anticipation of the InSight HP3 measurements, we are developing a series of 3-D thermal models to aid in interpretation of this unique dataset.


*POSTER LOCATION #595*
Application of the Fleet of Micro Sized Space-Motherships (MSSM) with Nano, Pico Space Devices and Robots (NPSDR) for Life Signal Search on DDS Sites Using Global Digital Dune Database of Mars [T2788]

Using the Mars Digital Dune Database we propose application of nano/micro devices equipped with biosignal sensors to search on DDS sites of southern polar Mars.

Jain N. S.  Singh R.  Kaur P.  Chauhan P.  Kiran Kumar A. S.

*POSTER LOCATION #596*
Morphometry of Arsia Mons by Mars Orbiter Mission-Mars Color Camera (MOM-MCC) Data [T1830]

Morphometry and geomorphology of Arsia Mons by Mars Orbiter Mission-Mars Color Camera (MOM-MCC) data.

Ramsley K. R.  Head J. W.

*POSTER LOCATION #597*
Exploring Mars with Micro-UAV Squadrons and High Data Rate Communications [T1185]

24 UAVs are inserted to sites on Mars. A laser link satellite, plus radio data relay stations, establish a global 120 megabits/s Mars-to-Earth data-relay system.

Buch A.  Pinnick V.  Szopa C.  Grand N.  Humeau O.  et al.

*POSTER LOCATION #598*
MOMA Gas Chromatograph-Mass Spectrometer Onboard the 2018 ExoMars Mission: Prototype Results and Performances [T2680]

MOMA instrumentation is a GCMS that enables characterization of a broad range of compounds allowing chemical analyses of volatile and non-volatile species.

Hays L. E.  Beaty D. W.  Shotwell R.  Mattingly R.

*POSTER LOCATION #599*
Potential Strategies for Making Organic Measurements in Returned Martian Samples of Relevance to Science and Planetary Protection [T1664]

Mars returned samples/What and how to measure them/And what could it mean?

Beaty D. W.  Hays L. E.  Parrish J.  Whetsel C.

*POSTER LOCATION #600*
Caching Scenarios for the Mars 2020 Rover, and Possible Implications for the Science of Potential Mars Sample Return [T1672]

Implications of alternative caching options on sample quality — both individually and as a collection — and restrictions on rover operations.

Bergman D.  Zacny K.  Davé A.  Paulsen G.  Glass B. J.

*POSTER LOCATION #601*
Icebreaker Drill Cuttings Size Analysis from Mars Analog Icy-Soils [T1228]

This paper studies the filtering necessary for the Icebreaker mission using sieves to characterize Mars analog soils. Tests are performed at Mars conditions.

Murchie S. L.  Chabot N. L.  Castillo-Rogez J. C.

*POSTER LOCATION #602*
The Mars-Moons Exploration, Reconnaissance and Landed Investigation [T2047]

Mars-Moons Exploration, Reconnaissance and Landed Investigation (MERLIN) is a proposal for a Discovery mission to explore Mars’ moons and land on Phobos.
PANDORA — Unlocking the Mysteries of the Moons of Mars [#2792]
A mission to Phobos and Deimos can reveal their origin and constrain Mars’ accretionary environment.

PADME (Phobos and Deimos and Mars Environment): A Proposed NASA Discovery Mission to Investigate the Two Moons of Mars [#2856]
PADME is a proposed NASA Discovery mission to investigate the origin of two remarkable and enigmatic small bodies, Phobos and Deimos, the two moons of Mars.
### Assessing Gale Crater as a Potential Human Mission Landing Site on Mars

A Mars mission is the “horizon goal” for human space flight. We assess Gale Crater in terms of EDL, in situ resources, and science return with positive results.

### MARSdrop Microprobe Architecture: Broadening the Science Return and In Situ Exploration from Mars Missions

MARSdrop, a secondary payload, is a targeted microprobe delivery system that can expand the list of viable landing sites for scientific exploration on Mars.

<table>
<thead>
<tr>
<th>Poster Location</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>#614</td>
<td>MARSdrop Microprobe Architecture: Broadening the Science Return and In Situ Exploration from Mars Missions</td>
<td>Williams R. M. E., Eby M. A., Stahle R. L., Bhartia R.</td>
</tr>
</tbody>
</table>

### PLANETARY MISSION CONCEPTS: SMALL BODY MISSIONS

<table>
<thead>
<tr>
<th>Poster Location</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>#617</td>
<td>Landing MASCOT on Asteroid 1999 JU3: Solutions for Deploying Nanosats to Small-Body Surfaces</td>
<td>Tardivel S., Canalias E., Deleuze M., Klesh A. T., Scheeres D. J.</td>
</tr>
<tr>
<td>#618</td>
<td>Investigating Trojan Asteroids at the L4/L5 Sun-Earth Lagrange Points</td>
<td>John K. K., Graham L. D., Abell P. A.</td>
</tr>
<tr>
<td>#620</td>
<td>Asteroid Material Shielding Potential Against High Energy Particles</td>
<td>Pohl L., Britt D. T.</td>
</tr>
<tr>
<td>#621</td>
<td>Sentinel Mission Performance for Surveying the Near-Earth Object Population</td>
<td>Buie M. W., Reitsema H. J.</td>
</tr>
<tr>
<td>#622</td>
<td>Evaluating Small Body Landing Hazards Due to Blocks</td>
<td>Ernst C. M., Rodgers D. J., Barnoin O. S., Murchie S. L., Chabot N. L.</td>
</tr>
</tbody>
</table>
Venus Atmospheric Maneuverable Platform (VAMP) — Air Vehicle Concept and Entry CONOPS [T647]

The VAMP provides unique in situ exploration capabilities to support Venus exploration objectives. The presentation focuses on platform entry and science ops.

A Geophysical Mission to Venus: Result of the Alpbach Summer School 2014 [T1348]

A geophysical mission to Venus is proposed. The main goals are to study tectonics and associated timescales as well as the structure and composition of Venus.

The Io Volcano Observer for Discovery 2015 [T1627]
Volcano worshipers: IVO is back, this time powered by remote hot fusion.


Here we describe an Io observer mission concept developed by students of the August 2014 NASA/JPL Planetary Science Summer School together with JPL’s Team X.

Science and Reconnaissance from the Europa Clipper Mission Concept: Exploring Europa’s Habitability [T2673]

Europa mission/A dream for so many years.../May be real, real soon.

Enceladus Life Finder: The Search for Life in a Habitable Moon [T1525]

Building on the results of Cassini, Enceladus Life Finder is a Discovery proposal to determine the habitability of Enceladus and search there for signs of life.

Titan Submarine: Vehicle Design and Operations Concept for the Exploration of the Hydrocarbon Seas of Saturn’s Giant Moon [T1259]

Titan robot sub/Reveals Kraken’s hidden past/Runs deep, not silent.

Overview of the System Accommodation and Mission Design for a Fission Powered TSSM [T2322]

Overview of a 1.0 kWe fission power system implemented on the Titan Saturn System Mission Concept (2008) with spacecraft and mission design accommodations.

Altitude-Dependence of Titan’s Methane Transmission Windows: Informing Future Missions [T2307]

We examine near and mid-infrared methane transmission in a model Titan atmosphere, at altitudes anticipated for future aerial and surface missions.
EDUCATION AND PUBLIC OUTREACH:  
EXPANDING OUR REACH THROUGH COLLABORATIVE PROGRAMS AND LESSONS LEARNED  

POSTER LOCATION #633
Hagerty J. J.  Titus T. N.  Barlow N.  Dye D.  
A formalized framework for promoting planetary research and education collaboration in northern Arizona has been established.

POSTER LOCATION #634
Shupla C.  Gladney A.  Shipp S.  Truxillo J.  Dalton H. et al.  
Lessons from a Train-the-Trainer Professional Development Program [№1940]  
This poster will share main findings and evaluation results from a long-term middle school science professional development program being conducted by LPI.

POSTER LOCATION #635
Urquhart M. L.  
The Importance of Partnerships and Data Collection in Long Term Programs for Pre-Service and In-Service Science and Mathematics Teachers [№2085]  
We detail specifics of data collection and necessity for partnerships to measure the effectiveness of UTD STEM teacher preparation and professional development.

POSTER LOCATION #636
Jones A. J. P.  Bleacher L. V.  Buxner S.  Canipe M.  
LRO’s Lunar Workshops for Educators:  A Proven Model of Exceptional Professional Development for Teachers [№1898]  
We’ll summarize five years of evaluation results and highlight the strengths of the workshop model developed for LRO’s award-winning Lunar Workshops for Educators.

POSTER LOCATION #637
Aubele J. C.  Crumpler L. S.  
Mars Rover Missions and Science Education:  Lessons Learned from a Decade of Education and Public Outreach at the New Mexico Museum of Natural History and Science [№2302]  
A decade of EPO using Mars and Mars missions at the New Mexico Museum of Natural History and Science provides lessons on reaching over 2 million participants.

POSTER LOCATION #638
Hutson M. L.  Pugh R. N.  Ruzicka A. M.  
Lessons Learned from Meteorite Public Outreach and Education in the Pacific Northwest [№1690]  
The Cascadia Meteorite Laboratory reflects on lessons learned after more than ten years of informal education and public outreach.

EDUCATION AND PUBLIC OUTREACH:  PUBLIC OUTREACH EVENTS  

POSTER LOCATION #639
Rothery D. A.  
The 9 May 2016 Mercury Transit — A Timely Opportunity for Outreach [№1327]  
Mercury’s next solar transit 11:12–18:42 9 May 2016 will be ideal for drawing attention to MESSENGER and BepiColombo, and to show why Mercury is so fascinating.

POSTER LOCATION #640
Foxworth S. F.  Mosie A. M.  Allen J. A.  Kent J. K.  Green A. G.  
NASA Space Science Day Events — Engaging Students in Science [№2809]  
NASA Space Science Day Events provide an out-of-school experiential learning environment for students to enhance their STEM curriculum and let students see a college campus.

POSTER LOCATION #641
International Observe the Moon Night:  An Effective Model for Public Engagement with NASA Content [№2281]  
Consistent annual hosting of InOMN events indicates the public’s interest in sharing NASA content with others and connecting with like-minded space enthusiasts.
O'Dea E. R.

Keeping Up with Space Science in 2014 and 2015 at the Museum of Science, Boston [#2042]
Summary of space science coverage via live presentations and events at the Museum of Science, Boston, in 2014 and 2015.

Yoshikawa M. Hosoda S. Sawada H. Ogawa N. Tsuda Y. et al.
Public Outreach of Hayabusa2 Mission [#1644]
An asteroid sample return mission Hayabusa 2 was launched on Dec. 3, 2014. We show our public outreach activities for Hayabusa 2 up to now and from now on.

Cobb W. Buxner S. R. Shebby S. M. Shipp S.
Best Practices in the Evaluation of Public Outreach Events [#1923]
This abstract describes a best-practices guide for evaluating E/PO events. It includes event profiles, findings, and recommendations for event organizers.

---

**EDUCATION AND PUBLIC OUTREACH:**

**ENGAGING AUDIENCES THROUGH TECHNIQUES, TOOLS, AND ACTIVITIES** [T650]

Buxner S. Grier J. Gross N. Schultz G. Low R. et al.
NASA Resources Supporting Higher Education in Earth and Space Science [#2256]
We present resources for college faculty developed by members of NASA’s Science Mission Directorate Forums and Missions.

Graff P. V. Rampe E. Stefanov W. L. Vanderbloemen L. Higgins M.
Engaging Students with Subject Matter Experts and Science Content Through Classroom Connection Webinars [#2907]
Webinars connect classrooms with subject matter experts and enable them to “translate” current research bringing science to life in classrooms nationwide.

Runyon C. J. Hall C. Hurd D. Allen J.
Powered by STEAM: Exploring Small Bodies in Our Solar System [#1526]
To prepare students for a highly visual and tactile workforce, it is imperative to engage students through a variety of learning strategies and technologies.

Torres J. A. Saavedra F. Tovar D.
Literary Production in Science Fiction Like a Tool for Teaching Planetary Sciences in Colombia [#2461]
The literary science fiction as a teaching tool for planetary science in Colombia is an alternative that learning the planetary science community is facilitated.

Hargitai H. Gede M. Zimbelman J. Köszeghy Cs. Sirály D. et al.
Planetary Map Series for Children [#2257]
The paper describes wall maps of Venus, the Moon, Mars, Io, Europa, and Titan designed for children.

Foxworth S. F. Luckey M. L. Allen J. A. McInturff B. Mc. Kascak A. K.
Lunar and Meteorite Sample Disk for Educators [#2948]
The Lunar and Meteorite Sample Disk Program provide physical samples for educators with special training to have their students conduct investigations like true scientists.

Klug Boonstra S. Swann J. L. Boonstra D. W. Manfredi L. Zippay J. A.
Bringing Authentic STEM Experiences to K–14 Students: Astrobiobound! The Search for Life in the Solar System [#2853]
Astrobiobound! meets the needs of NGSS and helps students see how science and systems engineering are integrated to achieve a focused scientific goal.
Rodriguez Hidalgo P., Mazrouei S., Strubbe L.

POSTER LOCATION #652

Fun Hands-On Classroom Astronomy Activities Inspired by the Latest Discoveries [#1576]

New inquiry-based activities, inspired by the latest discoveries, designed by professional astronomers and planetary scientists.

Fraile J. C.

POSTER LOCATION #653

Implementation of Fluorescence Spectroscopy as Basic Laboratory Practice to Introduce to the Students of High School and Undergraduate Education to Chemical and Instrumental Analysis Techniques Used in Planetary Science [#2922]

We propose a laboratory practice about the fluorescence spectroscopy in the area of basic chemistry in high school and undergraduate education.

Schreiner B. P., van Gasselt S.

POSTER LOCATION #654

Overview of Techniques Used for the Production of High Quality Public and Educational Outreach Imagery of Mars Express' HRSC Data [#2215]

Techniques for imaging HRSC data are presented: orthorectified high resolution color mosaics, color-coded DTM, anaglyph images, and perspective color views.


POSTER LOCATION #655

Interactive Mapping of Mars (iMARS): A New Online E/PO Activity [#2104]

Here we present and launch iMARS, which is a new online E/PO activity focused on carrying out and designing missions to the surface of Mars.

---

EDUCATION AND PUBLIC OUTREACH: STUDENT INSTRUMENTS, EXPERIMENTS, AND EXPERIENCES [T651]

Szalay J., Piquette M., Horanyi M.

POSTER LOCATION #657

Dust Measurements by the Student Dust Counter Onboard the New Horizons Mission to Pluto [#1701]

The Student Dust Counter continues to make observations across the solar system. We will report on the most recent results, reaching beyond 32 AU from the Sun.

Smith H. D., McKay C. P., Icebreaker Proposal team

POSTER LOCATION #658

Summary of the Student Collaboration for the Icebreaker Discovery 2015 Proposal [#2843]

In this presentation we describe the student activities proposed for the Icebreaker mission and opportunities for involvement should the mission be selected.


POSTER LOCATION #659

Experiment for Lunar Probe System Hunveyor-Husar Planetary Science Education Program: Observation of the Changing Levitating Dust Cloud Above the Lunar Surface After Local Sunset and Before Local Sunrise [#2551]

We constructed experiments for the Hunveyor-Husar space probes to observe how the levitating dust cloud change after local sunset and before sunrise on the Moon.

Sipos A., Vizi P. G.

POSTER LOCATION #660

Simulated Mars Rover Model Competition 2013–2014 [#2602]

Report about the Simulated Mars Rover Competition events of 2013 and 2014; building double wheels and hovers, putting and collecting small probes in a complex surface.

Adcock C. T., Hausrath E. M.

POSTER LOCATION #661

Educational Experiences for K–12 in the Earth and Planetary Sciences [#2330]

Developing a series of engaging and interactive informal activities for the K–12 classroom to promote and retain educational and career paths within STEM.
Rodriguez-Ford L. A.  Zambrano-Marin L. F.  Petty B. M.  
Howell E. S.  Nolan M. C.  POSTER LOCATION #662
Arecibo Observatory Space Academy: Inspiring the next Generation of Scientists from Puerto Rico [#2783]
The Arecibo Observatory Space Academy (AOSA) is a ten-week research program for pre-college students in grades 9–12 in Puerto Rico.

Benfield M. P. J.  Turner M. W.  Mitchell B. K.  
POSTER LOCATION #663
The Innovative System Project for the Increased Recruitment of Emerging STEM Students [#1393]
High school competition to design and develop a scientific payload for a conceptual NASA planetary science mission-of-interest.

---

EDUCATION AND PUBLIC OUTREACH:  
TOOLS AND PRACTICES FOR SCIENTISTS AND ENGINEERS  [T652]

Grier J.  Buxner S.  Vezino B.  Shipp S.  
POSTER LOCATION #664
Space Scientists and Engineers’ Engagement in Education and Public Outreach — Comparison of Survey Results [#2500]
We have conducted two surveys, one of planetary scientists and one of engineers, to determine their attitudes, needs, and involvement in E/PO.

POSTER LOCATION #665
Tools for Scientist Engagement in E/PO: NASA SMD Online Community Workspace [#2965]
NASA’s Science Mission Directorate Education and Public Outreach (E/PO) community workspace provides avenues for scientists to get involved in E/PO (smdepo.org).

Cobb W. H.  Buxner S.  Schwerin T.  Clark A.  Grier J.  et al.  
POSTER LOCATION #666
NASA Wavelength: Education and Public Outreach Resources for Scientists and Engineers [#2706]
We present NASA Wavelength, an online database of activities that are peer-reviewed and aligned with national standards as a resource for scientists/engineers.

Shupla C.  Buxner S.  Grier J.  Shipp S.  Meinke B.  et al.  
POSTER LOCATION #667
Presentations Through the NASA SMD Scientist Speakers Bureau [#1974]
The NASA SMD Scientist Speaker’s Bureau is accepting speaker requests from educational institutions. Scientists and engineers are welcome to join the system.

Curren I. S.  Jewitt D. C.  
POSTER LOCATION #668
Embedding Effective Science Communication Practices into Undergraduate Education [#2924]
A new and innovative undergraduate course in Education and Public Outreach to be implemented at UCLA is presented.
POSTER SESSION II
Thursday, 6:00 p.m.  Town Center Exhibit Area

PROGRAMMATIC UPDATES: MEPAG AND SSERVI [R701]

Pendleton Y. J.  Schmidt G. K.  Daou D.  Bailey B. E.

POSTER LOCATION #1

NASA’s Solar System Exploration Research Virtual Institute: Merging Science and Exploration [#2270]
New scientific opportunities are highlighted as well as recently published work that demonstrates the importance of interdisciplinary, collaborative research.

Hamilton V. E.  Eigenbrode J.  Hoehler T.  Rafkin S.  Withers P.  et al.

POSTER LOCATION #2

2014 Revision of the MEPAG Goals Document [#2543]
Update MEPAG goals/Help with Mars priorities/And mission planning.

INFORMATICS: DATABASES AND COMPUTATIONAL TOOLS [R702]

Acton C. H. Jr.  Bachman N. J.  Semenov B. V.  Wright E. D.

POSTER LOCATION #3

Advances in “SPICE” Supporting Planetary Science [#1037]
Description of new capabilities in NASA’s “SPICE” ancillary information system, used by scientists worldwide to help plan and analyze science observations.

Laura J. R.  Hare T. M.  Gaddis L. R.  Fergason R. L.

POSTER LOCATION #4

Python for Planetary Data Analysis [#2208]
Continuing application of Python within the USGS Astrogeology Center focusing on high performance computing, legacy code bases, and interactive data analysis.

Garcia P. A.  Keszthelyi L.  Becker T.  Becker K.  Sides S.

POSTER LOCATION #5

The Present and Future of Pattern Matching in the Integrated Software for Imagers and Spectrometers (ISIS) [#2782]
Discussion of ISIS software pattern matching options and research to expand them, as well as selection of ISIS parameter values for successful pattern matching.


POSTER LOCATION #6

Light Time and Stellar Aberration Corrections in ISIS, Status and Looking Ahead [#2719]
Light time and stellar aberration correction topics are addressed as related to cartographic processing within USGS ISIS software.

Minin M.  Vargas L.  Fueten F.  Stesky R.  Hauber E.

POSTER LOCATION #7

A New Automated Technique Within ArcGIS to Compute the Attitudes of Planar Topographic Features [#1577]
A new ArcGIS add-on computes surface derivatives using least squares regression, estimates topographic roughness, and displays strike/dip as hue/saturation.

Kilgallon A.  Stephens J.  Sutton S.  Mueting J.

POSTER LOCATION #8

AutoTriangulation: A New Tool for Controlling Stereo Pairs to Laser Altimetry [#2373]
AutoTriangulation is a standalone program that optimizes the fit between stereo images and laser altimetry. It is intended to aid HiRISE and LROC DTM producers.

Becker K. J.  Archinal B. A.  Hare T. H.

POSTER LOCATION #9

Criteria for Automated Identification of Stereo Image Pairs [#2703]
Identifying planetary images for stereogrammetry can be complex. We provide criteria and recommendations for automated identification of stereo pairs.
Lozac’h L.  Quantin-Nataf C.  Allemand P.  Bultel B.  Clenet H.  et al.  
**POSTER LOCATION #10**
*MarsSIpulami: A Distributed Information System for Managing Data of the Surface of Mars* [#2139]
MarsSIpulami is a web-GIS application that allows geologists to automatically download and process orbital data of Mars surface.

Fergason R. L.  Laura J. R.  Hare T. M.  
**POSTER LOCATION #11**
*THEMIS-Derived Thermal Inertia: Improvements to a Fundamental Dataset* [#1807]
We describe the development and implementation of an end-to-end processing pipeline for deriving thermal inertia from any temperature dataset at any resolution.

**POSTER LOCATION #12**
*The Mars Express Limbs Observations Database* [#1844]
We will present a database of limbs acquired by the Mars Express payload. The database is accessible via the ESA’s Planetary Science Archive server.

**POSTER LOCATION #13**
*Access Planetary Data Through the Orbital Data Explorer from the PDS Geosciences Node* [#1560]
An overview of NASA’s PDS Geosciences Node’s ODE, which provides web-based functions to search and access orbital data from multiple missions and instruments.

Estes N. M.  Hanger C. D.  Ramaswamy A.  Johnson A.  Bowman-Cisneros E.  et al.  
**POSTER LOCATION #14**
*Lunaserv WMS Software Enhancements* [#1507]
The Lunaserv WMS software, written by the LROC SOC, has a number of enhancements this year, focusing primarily on vector layers and performance.

Yang H. W.  Zhao W. J.  Wu Z. H.  
**POSTER LOCATION #15**
*Matlab Program to Construct Bouguer Gravity Anomaly Field Using Ultra High Degree Spherical Harmonic Coefficients* [#1262]
Summary of ultra-high-degree spherical harmonic experiments vital to gravity mods. Compared to Fortran, parallel Matlab reduces complexity of the program and Bouguer corrections.

McMichael S.  Moratto Z. M.  Beyer R. A.  
**POSTER LOCATION #16**
*LRO-NAC Mass DTM Pipeline* [#2491]
We produced over 1000 lunar DTMs from LRO-NAC stereo pairs using the Ames Stereo Pipeline, more than triple the number of currently available DTMs.

Williams D. R.  Hills H. K.  Taylor P. T.  Grayzeck E. J.  Guinness E. A.  
**POSTER LOCATION #17**
*Status of the Restoration of Apollo Data by the Lunar Data Project/PDS Lunar Data Node* [#2101]
We report on the progress and future plans for the restoration of Apollo surface and orbital data by the Lunar Data Project/PDS Lunar Data Node.

**POSTER LOCATION #18**
*Restoration of the Apollo Heat Flow Experiments Metadata* [#1243]
We have reconstructed the metadata necessary for fully processing the Apollo Heat Flow Experiments raw data extracted from the original ALSEP archival tapes.

**POSTER LOCATION #19**
*A Semi-Rigorous Sensor Model for Precision Geometric Processing of Mini-RF Bistatic Radar Images of the Moon* [#2507]
We have developed software to control and rectify Mini-RF bistatic images in order to make quantitative assessments of radar scattering by possible lunar ice.
The Effect of Incidence Angle on Stereo DTM Quality: Simulations in Support of Europa Clipper [\#2521]
To determine the illumination conditions useful for topomapping, we simulate images, perform stereoanalysis, and compare the results to the input topographic model.

Bland M. T.  Becker T. L.  Edmundson K. L.
Patterson G. W.  Collins G. C.  et al.

A New Enceladus Base Map and Global Control Network in Support of Geologic Mapping [\#2303]
We are creating an updated global control network and base map for Enceladus that will enable high-fidelity geologic mapping of the satellite.

Edmundson K. L.  Backer J. C.  Barrett J. M.
Becker K. J.  Becker T. L.  et al.

An Integrated Photogrammetric Control Environment for Planetary Cartography [\#1454]
The USGS is developing in ISIS a fully interactive user interface integrating all aspects of the photogrammetric control process within a single environment.

Edmundson K. L.  Anderson J. A.  Archinal B. A.
Becker T. L.  Nefian A. V.  et al.

Photogrammetric Control and Mosaicking of Apollo 15 Panoramic Camera Images [\#1350]
The USGS Astrogeology Science Center is photogrammetrically and geodetically controlling the ~3400 images acquired with the Apollo 15 Panoramic Camera.


Status of Geodetically Controlled High-Resolution LROC Polar Mosaics [\#1571]
We describe progress on high-resolution (1 m/pixel) geodetically controlled LROC illumination mosaics of the lunar poles.

Gaddis L. R.  Boardman J.  Malaret E.  Besse S.  Kirk R.  et al.

Status of Restoring Moon Mineralogy Mapper Data to Full Spatial and Photometric Accuracy [\#2033]
NASA Moon Mineralogy Mapper data are being updated. Results will improve the scientific usability of these data.


Texture Analysis of Lunar Surface Using DEM and Image Dataset [\#1707]
In this paper, we use statistical moments of gray-level histogram of lunar images or DEM data to describe lunar surface morphology.


The Shape and Elevation Analysis of Lunar Crater’s True Margin [\#1709]
In this paper, we used new statistics measurements of crater’s shape and relief to analyze the possible geological processes involved.


A New Global and High Resolution Topographic Map Product of the Moon from Chang’e-2 Image Data [\#1638]
We have finished a new lunar global topographic map product by using Chang’e-2 image data. Its spatial resolution is 7 m, and has a very good quality.

Palmer E. E.  Dominguez D. L.
Enhanced Photometry Using Stereophotoclinometry on the Moon [\#1556]
We used stereophotoclinometry to create a 5-m DEM for Tsiolkovsky crater. We registered images and did photometry using DEM-based emission and incidence angles.
Kreslavsky M. A.  Bystrov A. Yu.  Karachevtseva I. P.  \textit{POSTER LOCATION #30}

\textit{Frequency Distributions of Topographic Slopes on the Moon} \textit{[#2848]}

Slopes at 10s and 100s meter scales on highlands are inherited from kilometer-sized features, while on maria such slopes are shaped by regolith gardening.

Wagner R. V.  Speyerer E. J.  Robinson M. S.  LROC Team  \textit{POSTER LOCATION #31}

\textit{New Mosaicked Data Products from the LROC Team} \textit{[#1473]}

A summary of new global and polar mosaics from LROC, including monthly global mosaics, updated morphology mosaics, and a 2 m/px 681-gigapixel north pole mosaic.

Howington-Kraus E.  Fergason R. L.  Kirk R. L.  \textit{POSTER LOCATION #32}

\textit{High-Resolution Topographic Mapping Supporting Selection of NASA's Next Mars Landing Sites} \textit{[#2435]}

Topographic mapping and contributions of the USGS Astrogeology Science Center to site selection for the upcoming InSight lander and Mars 2020 rover missions.

Gaither T. A.  Hare T.  Fortezzo C. M.  \textit{POSTER LOCATION #33}

\textit{Digital Renovation of the 1978 Mariner 9-Based Global Geologic Map of Mars} \textit{[#2522]}

In support of ongoing scientific analysis and global geologic mapping efforts, we have digitized the 1978 Mariner 9-based global geologic map of Mars.

Hare T. M.  Gaddis L. R.  Baile M. B.  \textit{POSTER LOCATION #34}

\textit{OGC Catalogue Services for Planetary Portals} \textit{[#2476]}

Here we present methods for sharing data and resources using (OGC) Catalogue Services for the Web to support searches across multiple websites or data portals.

Nelson D. M.  Williams D. A.  \textit{POSTER LOCATION #35}

\textit{Geographic Information Systems at the Ronald Greeley Center for Planetary Studies} \textit{[#2413]}

The Ronald Greeley for Planetary Studies, the ASU RPIF, is upgrading to a digital planetary GIS laboratory, and will offer seminars for using GIS in research.

Baile M. B.  Herkenhoff K. E.  Howington-Kraus E. A.  Becker K. J.  \textit{POSTER LOCATION #36}

\textit{Finding Stereo Pairs with the PDS Planetary Image Locator Tool (PILOT)} \textit{[#1074]}

The Planetary Image Locator Tool (PILOT) aims to help planetary scientists and cartographers create topographic models with its new stereo-matching feature.

\begin{tabular}{l}
\textbf{LUNAR SURFACE PROPERTIES AND PROCESSES FROM A DISTANCE} & \textit{[#R704]}
\end{tabular}

Schultz P. H.  Bruck Syal M.  \textit{POSTER LOCATION #37}

\textit{Surface Processes Associated with Lunar Swirls} \textit{[#2438]}

Surface processes associated with the lunar swirls implicate a formation related to cometary impacts.

Paige D. A.  Hayne P. O.  Greenhagen B. T.  \textit{POSTER LOCATION #38}

Bandfield J. L.  Siegler M. A.  et al.

\textit{Lunar Surface Properties from New Diviner Eclipse Observations} \textit{[#2953]}

LRO Diviner has made the first multi-spectral orbital thermal emission measurements during a lunar eclipse.

Williams J.-P.  Sefton-Nash E.  Paige D. A.  \textit{POSTER LOCATION #39}

\textit{Temperatures of Giordano Bruno Crater: Application of an Effective Field of View Model Using LRO Diviner} \textit{[#2777]}

We use an effective FOV model for Diviner to grid data and show that the radiance of Giordano Bruno Crater reveals very heterogeneous thermophysical properties.
Hu G. P.  Zheng Y. C.  Xu A. A.  Tang Z. S.  

*POSTER LOCATION #40*

**Brightness Temperature Over Carter Tycho: Observation and Simulation [#1302]**

Some new features of crater Tycho from brightness temperature (TB) data observed by CE microwave radiometer are discussed in a single track view.

Plescia J. B.  

*POSTER LOCATION #41*

**Lunar Crater Forms on Melt Sheets — Origins and Implications for Self-Secondary Cratering and Chronology [#2054]**

Shallow circular features observed on the impact melt materials of Copernican craters are interpreted to be the result of impact into unsolidified impact melt.

Ostrach L. R.  Singer K. N.  Robinson M. S.  

*POSTER LOCATION #42*

**Non-Obvious Secondary Crater Detection on the Moon [#1082]**

Measures of crater density suggests locations for candidate-clustered non-obvious secondary craters in Mare Imbrium; probable source craters are identified.

Liu T.  Fa W.  Zhu M.-H.  

*POSTER LOCATION #43*

**Rules for Regolith Thickness Estimation Using Crater Morphology and Its Application to Oceanus Procellarum [#1253]**

Rules for regolith thickness estimation using crater morphology are summarized. Based on these rules, regolith thickness over Oceanus Procellarum is estimated.

Byrne C. J.  

*POSTER LOCATION #44*

**A Sequenced List of Lunar Impact Features Larger than 200 km [#1276]**

All lunar impact features more than 200 km in diameter are placed in a sequence, producing an improved match of sequence numbers to superposed crater density.

Brunetti M. T.  Xiao Z.  Komatsu G.  Peruccacci S.  Guzzetti F.  

*POSTER LOCATION #45*

**Large Landslides in Lunar and Mercurian Impact Craters [#1066]**

We compiled two inventories of rock slides mapped in Moon and Mercury impact craters and obtained the probability distribution functions of landslide areas.

Jögi P. M.  Paige D. A.  

*POSTER LOCATION #46*

**Directed Cratering Ejecta Ballistic Model for Antipodal Impact, Frictionally Heated, Melt Deposits on the Moon [#2779]**

A ballistic model is developed for the emplacement and melting of gravitationally focused antipodal ejecta deposits observed by LRO Diviner.

Matiella Novak M. A.  Cahill J. T. S.  

*POSTER LOCATION #47*

**Physical and Chemical Characterizations of a Selection of Lunar Impact Melt Flows [#2768]**

Melt generation is a fundamental aspect of impact processes; analyzing the chemical and physical properties of melts will provide insights into these processes.


*POSTER LOCATION #48*

**Impact Melts at Glushko Crater — LROC Revelations [#1308]**

Impact melts at lunar crater Glushko are investigated with high-resolution LROC data: Large flows and ponds to the NW of the crater are characterized.

Boyd A. K.  Robinson M. S.  Sato H.  

*POSTER LOCATION #49*

**Investigating Surface Textures Using LROC NAC Photometry [#2841]**

LROC NAC multi-temporal images with different illumination and viewing geometries are used to investigate surface roughness at scales less than 5 meters.
Liu D. L. Li L. L. 

*POSTER LOCATION #50*

**An Empirical Approach to Estimating Mass Fraction of Submicroscopic Iron in Lunar Soils [#2560]**

The mass fraction of SMFe in lunar soils can be estimated by the single scattering albedo ratio of 540 nm to 810 nm.

Legett C. IV Glotch T. D. Lucey P. G. 

*POSTER LOCATION #51*

**Modeling VNIR Signatures of Space Weathering Using the Multiple Sphere T-Matrix Model: Comparisons to Observations and Previous Models [#2802]**

Nanophase iron/Dark and reddened or just dark/Can we model it?

Kulchitsky A. V. Hurley D. M. Johnson J. B. Duvoy P. 

*POSTER LOCATION #52*

**Effect of Porosity on Access of Solar Wind to Lunar Regolith [#2649]**

This work links solar wind access depth and porosity of lunar regolith using Monte Carlo simulations of proton implantation in a discrete element method model.

Hapke B. Sato H. 

*POSTER LOCATION #53*

**The Porosity of the Upper Lunar Regolith [#1216]**

The porosity of the undisturbed, optically-active layer of the lunar regolith is 0.83 ± 0.02.

Thompson M. S. Zega T. J. Keane J. T. Becerra P. Byrne S. 

*POSTER LOCATION #54*

**The Oxidation State of Fe Nanoparticles in Lunar Soil: Implications for Space Weathering Processes [#2932]**

Measuring the oxidation state of nanoparticles in lunar soils with a range of maturities using electron energy-loss spectroscopy on an aberration-corrected TEM.

Dukes C. A. Bu C. Baragiola R. A. 

*POSTER LOCATION #55*

**Secondary Electron Yields from Lunar Soil Due to Low Energy Electron Impact [#2883]**

We report results of laboratory studies aimed at quantifying and understanding electron emission and charging of bulk lunar soil under 1–200 eV electron impact.


*POSTER LOCATION #56*

**Particle Radiation Environments and Their Effects at Planetary Surfaces: Lessons Learned at the Moon by LRO/Crater and Extension to Other Planetary Objects [#2862]**

We review mechanisms by which charged particles interact with planetary environments, using recent lunar measurements to extend to other planetary objects.


*POSTER LOCATION #57*

**Lunar Proton Albedo Anomalies: Soil, Surveyors, and Statistics [#2229]**

We map the cosmic-ray-albedo proton yield on the Moon, and discuss the possible origins of regions with anomalous proton yields.


*POSTER LOCATION #58*

**Lunar Dust Migration by Electrostatic Charging: Numerical Modelling [#1792]**

Dust hazard during lunar and asteroid exploration missions is modeled with the European numerical tool SPIS-Dust, focusing on electrostatic charging.


*POSTER LOCATION #59*

**Lunar Dust Migration by Electrostatic Charging: Key Parameters and Tests [#1808]**

The key parameters for dust hazard assessment during lunar and asteroid missions are tested experimentally under space-like conditions using VUV and electrons.


*POSTER LOCATION #60*

**Observation of Lunar Neutron Albedo During Solar Cycle 24 Using LEND Data [#1925]**

Monitoring of lunar neutron albedo variations along solar cycle 24 using the LEND/LRO data.
Lunar Surface Charging and Possible Dielectric Breakdown in the Regolith During Two Strong SEP Events \#1261
We investigate conditions under which dielectric breakdown, a process that contributes to space weathering on airless bodies, may occur in the lunar regolith.

Rovers moving through the regolith at plasma current-starved regions of the Moon will accumulate substantial charge. Adhering dust prevents perpetual charging.

Lunar Non-Mare Volcanism: Topographic Configuration, Morphology, Ages and Internal Structure of the Gruithuisen Domes \#1112
Darker and brighter deposits within the Gruithuisen dome gamma probably indicate alternating eruptions of materials of different composition as the dome grew.

Global Compositional Investigation of Mafic Silicate Phase of the Lunar Highland Crust Based on Remote Sensing Reflectance Spectra \#1822
Spectral analyses indicate that the dominant mafic silicate in the purest anorthosite layer in the lunar highland crust is low-Ca pyroxene.

Volcanism Within Mare Frigoris: Further Evidence for Recent Eruptions on the Moon \#2633
We report the identification of evidence for possible recent volcanic activity inside the southern margin of Mare Frigoris.

Understanding the Nature of Possible Olivine-Chromite Exposures at Crater Aristoteles Using High-Resolution Remote Sensing Data \#11403
Possible olivine-chromite coexisting phases have been identified from the northwestern flank of crater Aristoteles and Cr#, Mg# and LnKD has been derived.

Analysis of Pyroxene Mineralogy of Basalts at Hansteen-Billy, Moon Through Chandrayaan-I Moon Mineralogy Mapper (M3) \#1407
Compositional variability of mare basalts at Hansteen Billy has been studied based on spectral band parameters as obtained from Chandrayaan M3 data.

A pyroclastic mantle over the Mons Rumker uplift is spectrally distinct from nearby mare basalts. Cones with photometrically distinct mantles are also observed.

Morphologies and 1–10 m details of small lunar cones and terrestrial cinder cones are compatible with intermittent, monogenetic, basaltic-andesitic eruptions.
Weitz C. M. Staid M. Gaddis L. Besse S.  
*POSTER LOCATION #70*
**Investigation of Sinus Aestuum, Rima Bode, and Vaporum Regional Dark Mantle Deposits [#1908]**
We have produced M3 mineralogic parameter images to help map out the distribution of dark mantle deposits at Sinus Aestuum, Rima Bode, and Vaporum.

Gaddis L. R. Laura J. Horgan B. Hawke B. R. Giguere T.  
*POSTER LOCATION #71*
**Oppenheimer Crater Floor Deposits: Compositional Analyses with Kaguya Spectral Profiler Data [#2059]**
Kaguya Spectral Profiler data show that volcanic deposits in the floor of lunar farside Oppenheimer crater are composed of a mixture of low-calcium pyroxene and volcanic glass.

Hawke B. R. Giguere T. A. Peterson C. A.  
*POSTER LOCATION #72*
**Cryptomare, Lava Lakes, and Pyroclastic Deposits in the Gassendi Region of the Moon: Final Results [#1310]**
The Gassendi region of the Moon was investigated. Pyroclastic deposits, cryptomare deposits, and lava lakes were identified and characterized.

Mest S. C. Berman D. C. Petro N. E. Yingst R. A.  
*POSTER LOCATION #73*
**Update on the Geologic Mapping of the Lunar South Pole Quadrangle (LQ-30): Evaluating Mare, Cryptomare and Impact Melt Deposits [#2510]**
We are using image, spectral, and topographic data to map the lunar South Pole quadrangle (LQ-30) to evaluate its history and the distribution of materials.

Murl J. N. Spudis P. D. Kramer G. Y.  
*POSTER LOCATION #74*
**Geological Mapping of the Lunar Imbrium Impact Basin [#1719]**
Geological mapping of lunar Imbrium basin deposits with estimates of the petrological and geochemical compositions and locate accessible basin impact melt.

Morgan G. A. Campbell B. A. Hawke B. R. Campbell D. B.  
*POSTER LOCATION #75*
**Earth-Based Radar Perspective of Mare Imbrium: Understanding Volcanic Unit Boundaries and Stratigraphy [#2180]**
Our 70-cm wavelength radar map provides a unique view of volcanic structures and their relative stratigraphy that is unhindered by impact ejecta and rays.

Moriarty D. P. III Pieters C. M.  
*POSTER LOCATION #76*
**Compositional Diversity Across the Humboldtianum Basin [#2100]**
Four compositions are identified: two distinct mare basalts, low-Ca pyroxene-bearing materials within the south inner ring, and highland feldspathic materials.

*POSTER LOCATION #77*
**Compositional and Structural Characteristics of Schrodinger’s Basin Volcanism [#2829]**
Schrodinger beckons/Lava and pressure and fractures (oh my!)/But is there water?

*POSTER LOCATION #78*
**Mineralogical and Morphological Study of Lunar Crater Mosting Using Datasets from Recent Lunar Missions [#1410]**
Morphological and mineralogical analysis of crater Mosting has been carried out based on high-resolution data from recent lunar missions.

Petro N. E. Keller J. W.  
*POSTER LOCATION #79*
**The Second Extended Science Mission for the Lunar Reconnaissance Orbiter: Status, Science Goals, and Data Deliveries [#2278]**
LRO is in its second extended science mission (ESM2). The science focus of ESM2 is on five themes. LRO amassed a large volume of data, now in PDS for use by the community.
POSTER LOCATION #80
Petrography and Geochemistry of Lunar Meteorite Dhofar 1673 [2644]
An overview of the petrography, mineral chemistry, bulk chemistry, and oxygen isotopic composition of lunar meteorite Dhofar 1673.

Calzada-Diaz A.  Joy K H.  Crawford I A.  Spratt J.  Strekopytov S.  
POSTER LOCATION #81
Geochemical Analysis and Possible Launch Sites of Lunar Breccias Miller Range 090036 and Miller Range 090070 [1585]
Geochemical analysis of lunar meteorites Miller Range 090036 and Miller Range 090070. We discuss their petrology and their possible launch regions.

Korotev R. L.  Irving A. J.  Wittmann A.  
POSTER LOCATION #82
Petrology and Composition of Lunar Mare Basalt Meteorite Northwest Africa 8632 from Chwichiya, Morocco [1195]
New mare basalt from the Moon to Morocco for us to delight.

Korotev R. L.  Irving A. J.  
POSTER LOCATION #83
Keeping Up with the Lunar Meteorites — 2015 [1942]
Two dozen new Moon rocks/Mostly from the Sahara/Some of them are weird.

Zhou Q.  Yin Q. Z.  Zeigler R.  Korotev R.  Jolliff B.  et al.  
POSTER LOCATION #84
U-Pb Dating of Phosphates in Lunar Meteorite Dhofar 1442 [1771]
Here we report U-Pb dating results for phosphates from lunar meteorite Dhofar 1442, following our initial report of U-Pb ages on zircons from the same meteorite.

Garcia S.  Gross J.  Korotev R. L.  
POSTER LOCATION #85
Shisr 162: A Glimpse into Lunar Lithologies [2300]
Here we report petrography/mineral chemistry of lithologies present in lunar meteorite Shisr 162, to improve and enlarge our knowledge of highland rock types.

Korochantseva E. V.  Buikin A. I.  Hopp J.  Korochantsev A. V.  Trieloff M.  
POSTER LOCATION #86
Thermal History of Lunar Meteorite Dhofar 280 [2136]
We performed high-resolution 40Ar-39Ar dating of lunar meteorite Dhofar 280. This meteorite recorded at least four impact events within the last 1 Ga.

Korochantseva E. V.  Buikin A. I.  Hopp J.  Korochantsev A. V.  Ott U.  et al.  
POSTER LOCATION #87
Irradiation History of Lunar Meteorite Dhofar 280 [2158]
The new 40Ar-39Ar results concerning the exposure history of Dho 280 and the possibility of its pairing with some other lunar meteorites are discussed.

Wittmann A.  Korotev R. L.  Jolliff B. L.  Irving A. J.  
POSTER LOCATION #88
Petrogenesis of Lunar Poikilitic Impact Melt Meteorite Oued Awlitis 001 [1141]
Did an impact excavating a ≥500 m-Ø crater in the melt sheet of a ≥50 km-Ø impact crater in the Moon’s highlands launch poikilitic melt rock Oued Awlitis 001?
Hyung E. Zeng L. Jacobsen S. B.  
**POSTER LOCATION #89**  
*Mixing the Terrestrial Mantle Using $^{142}$Nd/$^{144}$Nd as a Tracer and Implications for the Earth and the Moon [#2795]*  
Using Nd-142 as a tracer, we model the mixing of Earth’s mantle to understand convection and infer the relation between the early differentiated Earth and Moon.

Barr A. C.  
**POSTER LOCATION #90**  
*Toward Isotopically Similar Earth and Moon: Iron-Enriched Impactors [#1495]*  
A giant impact between an iron-enriched planetary embryo and the proto-Earth can create a moon with 30% terrestrial material by mass.

Hori A. Nagahara H.  
**POSTER LOCATION #91**  
*The Role of Melt Percolation on Differentiation of Lunar Magma Ocean [#2381]*  
Density instability during lunar magma ocean differentiation would not develop as previously thought due to percolation between trapped melt and magma ocean.

**POSTER LOCATION #92**  
*Are the Clast Lithologies Contained in Lunar Breccia 64435 Mixtures of Anorthositic Magmas? [#1630]*  
We report new mineral chemistry and trace element abundances of a composite of ferroan anorthosite clasts contained in the lunar breccia 64435.

Simon J. I. Moore W. B. Webb A. A. G.  
**POSTER LOCATION #93**  
*The Case for a Heat-Pipe Phase of Planet Evolution on the Moon [#1184]*  
Outstanding lunar problems resolved if the crust is produced and refined through a widespread episode of heat-pipe magmatism rather than plagioclase flotation.

Go B. M. Righter K. Danielson L. Pando K.  
**POSTER LOCATION #94**  
*Experiments on Lunar Core Composition: Phase Equilibrium Analysis of a Multi-Element (Fe-Ni-S-C) System [#2285]*  
We conducted experiments on a lunar core composition at relevant pressures and temperatures to further constrain the Moon’s composition.

Grange M. G. Nemchin A. A. Whitehouse M. J. Merle R. E.  
**POSTER LOCATION #95**  
*Do REE and Ti in Lunar Zircons Reflect Temperature and Oxygen Fugacity of Lunar Magmas? [#1910]*  
REE and Ti data and calculated $f_O^2$ in lunar zircons indicate localized magmatic heterogeneities and cannot be used to extrapolate to large-scale phenomena.

Sonzogni Y. Treiman A. H.  
**POSTER LOCATION #96**  
*Parent Magma Compositions of Lunar Highlands Mg-Suite Rocks: A Melt Inclusion Perspective [#2671]*  
Original trapped melt composition of plagioclase-hosted melt inclusions in Mg-norite 78235,47 suggest minimal KREEP contribution in the petrogenesis of 78235.

Christoffersen R. Simon J. I. Mills R. D. Ross D. K. Tappa M.  
**POSTER LOCATION #97**  
*Microstructural and Compositional Relations of Granitoid Clasts in Lunar Breccias at the Micrometer to Sub-Micrometer Scale [#2604]*  
The microstructures/compositions of lunar granitoid breccia clasts investigated at the submicrometer scale expand the possibilities for their origins.

Provencio P. P. Bell A. S. Shearer C. K. Burger P. V.  
**POSTER LOCATION #98**  
*A TEM Study of the Sulfide Replacement Assemblages in Lunar Breccia 67915 [#2812]*  
We have conducted a TEM study of the sulfide replacement assemblages for the purpose of gaining a better understanding of how the sulfidation assemblages grew.
Carpenter P. K.  Jolliff B. L.  
**POSTER LOCATION #99**
*Electron-Probe Microanalysis of Fe Spherules in Lunar Agglutinate 76503,7020 [#2747]*
We present EPMA characterization of Fe spherules and agglutinate glass from 76503,7020 and discuss Monte Carlo simulation of the analytical volume.

Fagan A. L.  Neal C. R.  
**POSTER LOCATION #100**
*A Unique Lunar High-Ti Basalt Defined from Clasts in Apollo 16 Breccia 60639 [#1411]*
We examine three basalt clasts from Apollo 16 breccia 60639 that represent a unique type of high-Ti lunar basalt that has not been previously recognized.

Neal C. R.  Donohue P. H.  Fagan A. L.  O’Sullivan K. M.  
**POSTER LOCATION #101**
*Quantitative Petrography of Lunar Basalts: Insights to Origin and Flow Regime [#1299]*
Crystal-sized distributions from lunar basalts can be used to determine origin and the type of lava flow if was derived from.

Cronberger K.  Neal C. R.  
**POSTER LOCATION #102**
*Apollo 17 KREEP: New Data on 72275 Basalts Using EPMA, ICPMS, and Quantitative Petrography [#1298]*
KREEP basalt 72275 is analyzed using EPMA, ICPMS, and Quantitative Petrography. New data is reported. Contains one joke hidden in text.

DiFrancesco N. J.  Coraor A. E.  Nekvasil H.  
**POSTER LOCATION #104**
*Synthesis of “Large” Iron-Bearing Anorthitic Plagioclase Crystals for Lunar Spectroscopic and Space Weathering Studies [#1804]*
Making big crystals/Much iron and calcium/It looks like the Moon!

Brydges T. F. V.  Marriner C. M.  Donaldson Hanna K. L.  
**POSTER LOCATION #105**
*Characterisation of Miyake-Jima Anorthite as a Lunar Analogue [#1251]*
This abstract details the preparation and characterization of Miyake-jima anorthite as a lunar analog.

Marriner C. M.  Donaldson Hanna K. L.  Bowles N. E.  
**POSTER LOCATION #106**
*Spectral Characterisation of Spinel-Anorthite Mixtures in the Thermal Infrared [#1750]*
Spectral characterization of <25-µm physical mixture of spinel-anorthite across thermal infrared wavelengths compared to a forward-modelled linear mixture.

Kiely C.  Greenberg G.  Kiely C. J.  
**POSTER LOCATION #107**
*A New Look at Lunar Regolith Particle with Light, Scanning Electron and X-Ray Ultra Microscopy [#1567]*
High-resolution light, scanning electron, and X-ray micrographs of individual lunar particles offer a unique insight into their morphology and formation.

Shirley K. A.  Glotch T. D.  
**POSTER LOCATION #108**
*First Measurements from the Planetary and Asteroid Regolith Spectroscopy Environmental Chamber (PARSEC) [#2025]*
Measure me PARSEC/How do my spectra vary/Between Earth and Moon.

Blewett D. T.  Cahill J. T.  Nguyen N. V.  Boosalis A.  Lawrence S. J.  et al.  
**POSTER LOCATION #109**
*Optical Constants of Iron and Nickel Metal from 0.16 to 3.6 µm [#2433]*
We measured the optical constants of Fe and Ni metal from 0.16 to 3.6 µm. These data are important for modeling of the reflectance of planetary regoliths.
Crites S. T.  Lucey P. G.  Viti T.  
**A Multi-Wavelength Grain-by-Grain Survey of Lunar Soils [#2549]**
We developed a multiwavelength microscopic hyperspectral imaging system to perform a comprehensive study of lunar soil mineralogy and search for rare materials.

**POSTER LOCATION #111**
**Thermal Infrared Emission Studies of Bulk Apollo Soils: The Importance of Cross-Laboratory Analyses [#1377]**
Cross-laboratory measurements of bulk Apollo soil samples under simulated lunar conditions.

Macke R. J. SJ  Kent J. J.  Kiefer W. S.  Britt D. T.  
**POSTER LOCATION #112**
**3D-Laser-Scanning Technique Applied to Bulk Density Measurements of Apollo Lunar Samples [#1716]**
To get good data/For moon rock bulk densities/Shoot them with lasers.

Coman E. O.  Jolliff B. L.  Carpenter P.  
**POSTER LOCATION #113**
**New Data on the Effects of Chemistry, Mineralogy, Grain Size, and Maturity on UV-VIS Reflectance Spectra and Implications for LROC WAC-Derived TiO₂ [#2504]**
New lab measurements of lunar soils: analyzing the strong correlation between TiO₂ and the 320/415 ratio observed in LRO WAC UV-VIS data.

| NEW VIEWS OF THE MOON: MODELS, AND IMPROVEMENTS TO LUNAR DATA ANALYSIS | [R710] |
|---|
| Sriram S.  Anup D.  Dharmendra P.  
**POSTER LOCATION #114**  
Investigation of the Capability of H-α Decomposition of Compact Polarimetric SAR Data with Application to Lunar Surface [#1916]**  
Investigation of the capability of H-α decomposition method applied over compact polarimetric Mini-RF radar datasets.  
**POSTER LOCATION #15**  
**Cross Calibration of GCR Spectrum, Orbital and In-Situ Planetary Neutron Detections by Monte Carlo Simulations — Revisiting Apollo 17 LPNE Measurement [#1600]**  
Monte Carlo simulation of planetary neutron spallation process and detections.  
| Ishihara Y.  Hareyama M.  Ohtake M.  Lunar Geological-Map WG of Japan  
**POSTER LOCATION #116**  
**Unsupervised Classification of the Moon’s Surface Spectral Characteristics Based on SELENE Multiband Imager Data [#1633]**  
We conduct unsupervised classification for lunar multiband reflectance spectral data obtained by the SELENE Multiband Imager.  
| Yamashita N.  Prettyman T. H.  Reedy R. C.  
**POSTER LOCATION #117**  
**High-Resolution Gamma Ray Spectra for Lunar Geochemistry from Kaguya [#2223]**  
We propose to archive complete, fully-calibrated and corrected, high-resolution gamma-ray spectra of the Moon acquired by the Kaguya mission at PDS.  
| Durga Prasad K.  Rai Vinai K.  Murty S. V. S.  
**POSTER LOCATION #118**  
**A Thermal Model to Study the Effect of Top Porous Layer on Subsurface Heat Flow of Moon [#1768]**  
A finite element model to understand the effect of the topmost porous layer on the near-surface thermal behavior of Moon is developed and some results are presented.  
**POSTER LOCATION #119**  
**Lunar Phase Function in the Near-Infrared with the Lunar Orbiter Laser Altimeter [#1493]**  
We report preliminary results on the near-infrared lunar phase function observed with the Lunar Orbiter Laser Altimeter onboard the Lunar Reconnaissance Orbiter.  

POSTER LOCATION #120

Disk Integrated Hapke Photometric Parameters of the Lunar Surface in the Ultraviolet

We present the results of Hapke photometric modeling of the lunar surface in the ultraviolet using SOLSTICE data.

POSTER LOCATION #121

Planetary Volcanism: If You Can’t Stand The Heat, Get Out Of The Mantle

Whelley P. L.  Garry W. B.  Bleacher J. E.

LiDAR Signatures of Lava Flow Textures: Applications to Planetary Volcanism

We differentiate lava flow textures based on patterns in surface roughness on Earth, and identify the data necessary to similarly do so, on Mars.

POSTER LOCATION #122

Generation of Ultrahigh Spatial Resolution Digital Terrain Models for a Martian Lava Flow Analog from Kilauea Volcano, Hawaii

Scheidt S. P.  Hamilton C. W.

Very-high-resolution topographic data were created using photogrammetry of a lava flow at Kilauea, Hawaii for Cerberus Fossae 2 unit, Elysium Planitia, Mars.

POSTER LOCATION #123

Low-Shield Volcanism: A Comparison of Volcanoes on Syria Planum, Mars and Snake River Plain, Idaho

Henderson A. O.  Christiansen E. H.  Radebaugh J.

Low-shield volcanos on Syria Planum are compared to shields on Snake River Plain, Idaho. Syria Planum shields have lower slopes and larger diameters and volumes.

POSTER LOCATION #124

The Geology of Inferno Chasm, Idaho: A Terrestrial Analog for Lunar Rilles


We will compare field observations of Inferno Chasm, a low-shield with a sinuous channel in Idaho to Isis, a small lunar rille we argue formed by construction.

POSTER LOCATION #125

Testing Models of Lava-Water Interaction with Field Data

Keszthelyi L.  Baker L.  Dundas C.  Milazzo M.  Abramov O.  et al.

We test numerical models of lava water interaction against field observations of a sill that intruded lake sediments. Simple models fail, and more work is needed.

POSTER LOCATION #126

King’s Bowl, Idaho — A Volcanic Analog for Fissure Eruptions, Pit Craters and Dike Injection Along Rima Hyginus, Moon, and Cyane Fossae, Mars

Hughes S. S.  Kobs Nawotniak S. E.  Sears D. W. G.  Garry W. B.  Haberle C. W.  et al.

King’s Bowl eruptive fissure on the Snake River Plain is recognized as an analog to volcanic graben Cyane Fossae on Mars and Hyginus Rille on the Moon.

POSTER LOCATION #127

What Lies Beneath: Lava Inflation Plateaus on Earth and Mars

De Hon R. A.

On Mars and Earth smooth surfaces of lava inflation plateaus indicate a smooth buried surface. Pitted inflation plateaus indicate a more rugged buried surface.

POSTER LOCATION #128

Nornahraun Lava Morphology and Emplacement: A New Terrestrial Analogue for Planetary Lava Flows


The Nornahraun eruption is the largest effusive eruption in Iceland since the Laki eruption and is an exquisite analog to large lava flows seen on Mars and Io.
Spectral identification of hydrothermal alteration products in Costa Rica yields further insight into early Mars and the potential for habitability.

Cryovolcanic features on Enceladus and Titan are compared with some landforms on Earth using topographic data.

We describe a new planetary volcanism web site that is being implemented at the Pacific Regional Planetary Data Center, University of Hawaii.

We have developed an ArcGIS ModelBuilder tool that produces polygon features of individual planetary map units derived from classified raster images.

We mapped the fan-shaped deposit facies of Arsia Mons to examine possible interaction between glaciers and geologically recent volcanic activity.

We mapped the fan-shaped deposit facies of Arsia Mons to examine possible interaction between glaciers and geologically recent volcanic activity.

We mapped the fan-shaped deposit facies of Arsia Mons to examine possible interaction between glaciers and geologically recent volcanic activity.

Analyses of flow morphology, surface texture, superposition relationships, and ages of lava flows document the development of southern Tharsis flow fields.

Small volcanic vents are used to constrain the recurrence rate of volcanism within the caldera of Arsia Mons, Mars.

This work examines thermophysical properties of lava flows in Daedlia Planum and mantle thickness variations to interpret flow types and emplacement processes.
*Lava Flows on Arsia and Pavonis Mons, Mars: Rheology and Ages* [#2037]
We determined rheologic properties and absolute model ages of lava flows on Arsia and Pavonis Mons and compared them to results for Elysium Mons.

Peters S. I. Christensen P. R.  
*The Distribution and Implications of Flank Vents on Olympus Mons* [#2008]
This abstract highlights our efforts to understand the evolution and eruptive history of Olympus Mons using the distribution and characteristics of flank vents.

Zhao J. Huang J. Xiao L.  
*Characteristics and Origin of Sinuous Ridges in Solis Planum, Mars* [#1897]
We identified more than 50 sinuous ridges in Solis Planum, Mars, and conclude that they are most likely lava tubes in origin.

Zuschneid W. van Gasselt S.  
*Evidence for Volcanism on the Western Hellas Basin Floor* [#1858]
On the floor of Hellas Basin, a number of features of probable volcanic origin have been detected. We present two of these features in detail.

Brož P. Hauber E. Platz T. Balme M.  
*Evidence for Amazonian Highly Viscous Lavas in the Southern Highlands on Mars* [#2708]
We have identified small-scale volcanic edifices (domes and cones) in the southern highlands of Mars that have a relatively young Amazonian age.

Thomas R. J. Rothery D. A. Conway S. J. Anand M.  
*Pyroclastic Volcanism Within Lunar Floor-Fractured Craters* [#1354]
The Moon’s fair craters/Welcome magma to their hearts/By cold magma seas.

*Examining Spectral Variations in Localized Lunar Dark Mantle Deposits* [#1398]
Spectra of localized lunar DMDs (in Alphonsus, J. Herschel, Oppenheimer craters) were analyzed for variations in mineralogy and crystallinity relative to mare.

Gustafson J. O. Hawke B. R. Sato H. Gaddis L. R. Giguer T. A.  
*Analysis of Dark Mantle Deposits on the Southeastern Limb of the Moon Incorporating LROC WAC and M3 Multispectral Data Sets* [#2714]
Previous analysis of DMDs on the southeast limb of the Moon has been extended using topographic data and multispectral data to constrain composition and mineralogy.
Determination of Stratigraphic Age of the Lunar Mare Subsurface Boundary Identified from the SELENE Radar Sounder Data

The lunar subsurface boundaries are investigated from the SELENE radar sounder data, and these stratigraphic ages are inferred from the surface lava unit age.

Erosion by Lava on the Moon: Application to the Rille of Vallis Schröteri

Thermal erosion by lava produces erosion depths far smaller than the depth of Vallis Schröteri rille. It hardly played an important role in the rille formation.

Explosive Volcanism on Atmosphere-Less Bodies — A Comparison of the Moon, Mercury and Io

Small pyroclast deposits on the Moon, Mercury, and Io are produced by magma volatile exsolution; large deposits require gas concentration in shallow intrusions.

A Study of the King’s Bowl Phreatic Explosion Crater as a Planetary Analog

The King’s Bowl phreatic crater in Idaho, formed when lava encountered water, is explored as a planetary analog using the distribution of ejecta blocks.

A Pyroclastic Origin for Cones in Isidis Planitia: 1. Physical Modeling and Constraints

In Isidis thumbprint terrain is laid out in many cone chains. We modeled a flow and found that it showed that PDCs might be to blame.

Aromatum Chaos: Heating Up, Melting Ice, and Letting It Flow — A Preliminary Analysis

We investigate fluid flow from a dike-driven hydrothermal system and convecting permafrost melt layer through scale analysis at Aromatum Chaos, Mars.

Ring Fault and Caldera Formation: Insights Provided by Three-Dimensional Elastic Finite Element Models

We developed three-dimensional numerical models of ring fault initiation and caldera formation beneath a flat surface via COMSOL Multiphysics.

Using Map-Derived Hoop Strain and Elastic Models of Reservoir Inflation to Quantify the Degree of Dike Emplacement at Giant Radial Lineament Systems on Venus

The study of giant radial lineament systems on Venus shows when uplift assists in formation of topography, dike injection is needed to produce observed hoop strain.

An Assessment of Current Predictive Models for Phosphate Saturation in Silicate Liquids

Three phosphate saturation models were unable to reproduce numerous experimental results, indicating further work is needed to understand phosphate saturation.

Modeling NiO Activities in Silicate Melts Considering Separate Contributions from Ni^{2+} and O^{2-}: Dependence of O^{2-} on Melt Polymerization

We propose a model for trace element oxide activities successful for NiO. The activity of the oxide ion varies according to the polymerization of the melt.
### NEAR EARTH AND POTENTIALLY HAZARDOUS OBJECTS: BEST SEEN AND NOT HEARD [R712]

- **Robinson K. L.  Hellebrand E.  Taylor G. J.**  
  *POSTER LOCATION #161*
  **The Physical Setting for Felsite Formation [#1623]**
  We estimate the crustal depths, the cooling rates, and sizes of the felsites’ parental intrusions.

- **McCanta M. C.  Dyar M. D.  Rutherford M. J.  Lanzirotti A.  Sutton S.**  
  *POSTER LOCATION #162*
  **In Situ Measurement of Ferric Iron in Lunar Glasses Using Fe-XAS: Implications for Lunar Eruption Mechanisms [#1500]**
  We present new measurements of Fe$^{3+}$ contents of lunar orange and green glass beads. The range observed may be the result of late-ascent oxidation processes.

<table>
<thead>
<tr>
<th>Poster Location</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>#161</td>
<td>The Physical Setting for Felsite Formation</td>
<td>Robinson K. L.  Hellebrand E.  Taylor G. J.</td>
</tr>
<tr>
<td>#165</td>
<td>Rejuvenating Asteroids During Planetary Flybys: Applications to (99942) Apophis and Other Near-Earth Asteroids</td>
<td>Keane J. T.  Matsuyama I.</td>
</tr>
<tr>
<td>#167</td>
<td>NEO Follow-Up and Physical Characterization at Apache Point Observatory</td>
<td>Bruck Syal M.  Owen J. M.  Miller P. L.</td>
</tr>
<tr>
<td>#170</td>
<td>An Overview of the Los Alamos Program on Asteroid Mitigation</td>
<td>Weaver R. P.  Plesko C. S.  Gisler G. R.  Ferguson J. M.</td>
</tr>
</tbody>
</table>
AIDA: Asteroid Impact and Deflection Assessment

AIDA is an international cooperation between NASA and ESA to test spacecraft kinetic impact on an asteroid, to deflect the trajectory and measure the deflection.

Preliminary Results of Adler Planetarium NEO Characterization and Astrometric Follow-Up

We present results from Q4 2014 and Q1 2015 observations at the APO 3.5 m for the Adler Planetarium’s NEO astrometric follow-up and characterization program.

The Asteroid 2002 CE26

We obtained the light curve of the Asteroid 2002 CE26 and astrometry was carried out. We calculated the orbital elements. Our data was published by the MPC.

Crater Counting Throughout the Solar System

Gaspra’s Craters: Implications for Production Functions and Surface Processes

Asteroid belt’s secrets/Craters, craters, everywhere!/Gaspra, kiss and tell?

Crater Size-Frequency Distributions Accumulated on Ejecta Blankets of Fresh Primary Craters on Vesta

We have performed extensive analyses of size-frequency distributions accumulated on ejecta blankets of 42 fresh primary craters on Vesta.

Automated Crater Detection in Impact Basins on Mercury Surface

This paper presents the automated detection of impact craters on Mercury. The detections are performed on three large basins (Rachmaninoff, Mozart, and Raditladi).

Comparison of Large and Mid-Size Lunar Crater Distributions

Differences in lunar crater areal densities as a function of diameter (5–20 km vs. >20 km) reveal complexities of bombardment history and resurfacing events.

Lunar Light Plains and Cryptomaria Southwest of Orientale

The distribution, morphology, and composition of light plains surrounding the Orientale basin suggest that they are genetically linked to the basin itself.

Excavation Depths of Small Diameter Craters on a Pyroclastic Deposit Near Northern Rimae Bode, the Moon

Studying the mapped distribution of lunar pyroclastic deposits, possible source vents, and craters to analyze the extent and volume of pyroclastic deposits.

Regional Investigations of the Effects of Secondaries Upon the Martian Cratering Record

We present isochronal incongruities associated with the lack of “contamination” by martian secondary craters, which we will investigate with regional analyses.
Chuang F. C.  Crown D. A.  Tornabene L. L.

POSTER LOCATION #182

Secondary Craters Associated with the Rayed Crater Zumba, Daedalia Planum, Mars [#2488]

We present results on the mapping of Zumba secondary craters to investigate their distribution and density as a function of distance from the impact site.

Lagain A.  Bouley S.  Costard F.

POSTER LOCATION #183

Datation of Multiple-Layer Ejecta Crater on Mars [#1920]

We present a comparative study between a martian lobate crater map and ages obtained on each unit to establish a methodology to date this type of crater.

Zeilnhofer M. F.  Barlow N. G.

POSTER LOCATION #184

Distribution and Timing of Fluvial and Glacial Activity in South-Central Arabia Terra, Mars [#1022]

Arabia Terra, an ancient martian terrain, is a unique region due to crater morphologies that show interaction with volatiles.

Boyce J. M.  Mougins-Mark P.  Wilson L.

POSTER LOCATION #185

Flow Features on Martian Layered Ejecta [#1043]

Morphometric parameters of flow features on martian layered ejecta deposits reveal the difference between types of ejecta and similarities with geophysical flows.

**Properties of Impact Craters on Mars and Titan**

Schurmeier L. R.  Dombard A. J.

POSTER LOCATION #186

The Effects of Low Thermal Conductivity Sand on the Relaxation of Titan’s Impact Craters [#2913]

Are Titan’s craters/Relaxed or filled by dark sand?/Both! (Though mostly sand).

Liu Z. Y.-C.  Shirzaei M.

POSTER LOCATION #187

Constrain the Evolution of Martian Atmosphere Through Analysis of the Impact Ejecta [#1496]

Use martian ejecta mapping as inputs to inversely estimate atmospheric density at the time of impact by aerodynamic modeling; evolution of martian atmosphere.

Weiss D. K.  Head J. W.

POSTER LOCATION #188

Testing the Glacial Substrate Model for Double-Layered Ejecta Craters on Mars [#1081]

We test the hypothesis that the inner facies of double-layered ejecta (DLE) craters on Mars form as a landslide. Low-basal friction supports sliding on ice.

Barlow N. G.

POSTER LOCATION #189

Sizes and Distributions of the Two Morphologic Types of Double Layer Ejecta Craters in the Northern Hemisphere of Mars [#2216]

Two types of DLE morphologies are identified. A study of craters in the 30°–75°N latitude zone finds that diameter is the major contributor to DLE type.

Schwegman R. D.  Osinski G. R.  Tornabene L. L.

POSTER LOCATION #190

Layered Ejecta Morphologies on Syrtis Major and Implications for Regional Geology [#2645]

We investigate the regional distribution and nature of layered ejecta morphologies on Syrtis Major.

Schwegman R. D.  Osinski G. R.  Tornabene L. L.

POSTER LOCATION #191

A Morphometric Comparison of Martian Double Layered Ejecta Craters and Implications for the Effect of Target Lithology [#2607]

We compare the morphometry of double layered ejecta craters situated on volcanic terrains to those on non-volcanic terrains.

Bendo N. J.  Schwegman R. D.  Osinski G. R.

POSTER LOCATION #192

A Comparative Study of the Morphometric Properties of Single Layered Ejecta Craters on Mars [#2567]

The comparison of ejecta deposition of single layered ejecta craters in both volcanic and non-volcanic regions with respect to latitude.
Hynek B. M.  Herrick R. R.  
**POSTER LOCATION #193**

**Target Property Controls on Martian Impact Crater Morphologies [#1046]**
We tested the hypothesis that target properties influence final crater form on Mars using a global database and new geologic maps. It is true.

Herrick R. R.  Hynek B. M.  
**POSTER LOCATION #194**

**A Search for Impactor Effects on Martian Crater Morphologies at the Simple-Complex Transition Diameter [#1661]**
Martian craters of similar size (7 km < D < 9 km) in close proximity are examined to look for differences due to impactor properties.

Watters W. A.  Geiger L.  Fendrock M.  Gibson R.  
**POSTER LOCATION #195**

**Morphometry of Recent Simple Impact Craters on Mars: Size and Terrain Dependence [#2465]**
Elevation models from stereo HiRISE imagery were used to measure the dependence of simple crater morphometry on size, geologic setting, and modification state.

Maine A.  Barlow N. G.  Tornabene L. L.  
**POSTER LOCATION #196**

**Detailed Morphologic and Structural Mapping and Analysis of Esira, a Central Pit Crater Near Hypanis Vallis [#2944]**
We have mapped Esira, which is a central pit crater on Mars, in order to constrain a formation model for central pit craters on Mars.

D’Aoust B.  Tornabene L. L.  Osinski G. R.  McEwen A. S.  
**POSTER LOCATION #197**

**Morphological, Structural, and Spectral Mapping of the Central Uplift of Alga Crater, Mars [#2237]**
The detailed morphological, structural, and spectral mapping of Alga, a 19-km-diameter complex crater exposing fractured massive bedrock, is presented.

Johnson M. K.  Sharpton V. L.  
**POSTER LOCATION #198**

**Structural Mapping of Martian Crater Uplift to Test Acoustic Fluidization Models [#1280]**
High-resolution orbital images of Martin crater uplift on Mars reveals bedding orientations that are not consistent with acoustic fluidization models.

Banks M. E.  Daubar I. J.  Schmerr N. C.  Golombek M. P.  
**POSTER LOCATION #199**

**Predicted Seismic Signatures of Recent Dated Martian Impact Events: Implications for the InSight Lander [#2679]**
Investigation of potential impact-produced seismic activity from recent martian impacts utilizing crater morphometry and spatial information for crater clusters.

---

**PRODUCTS OF SHOCK METAMORPHISM [#R715]**

Fudge C.  Hu J.  Sharp T. G.  
**POSTER LOCATION #201**

**Transformation Textures and Crystallization of Wadsleyite and Ringwoodite in Sahara 00293, 98222 and 00350 [#2659]**
We report the presence of wadsleyite and ringwoodite in three ordinary chondrites, using crystallization assemblage to estimate shock conditions from impact.

Poelchau M. H.  
**POSTER LOCATION #202**

**A Look at Unindexed PDFs: How High Should the Value Be for Shocked Rocks? [#2473]**
The percentage of unindexed PDFs is a useful indicator to reveal incorrect recognition of shock metamorphism. Unindexed PDFs should lie below 16%.

Jaret S. J.  Glotch T. D.  Johnson J. R.  
**POSTER LOCATION #203**

**Micro-Raman and Micro-FTIR Spectroscopy of Experimentally Shocked Andesite [#2056]**
Experimental/Shock on andesine feldspar/Raman and IR.
Montalvo P. E.  Cavosie A. J.  
**POSTER LOCATION #204**

*Expanding the Distribution of Shocked Minerals at the Santa Fe Impact Structure (NM, USA)* [#1337]

Here we report the occurrence of detrital shocked zircon and detrital shocked apatite from colluvium and alluvium at the Santa Fe impact structure (NM, USA).

Montalvo S.  Cavosie A.  
**POSTER LOCATION #205**

*Detrital Shocked Zircons Detected 2,000 km Downriver from the Vredefort Dome, South Africa* [#1436]

We investigated extreme distal transport of detrital shocked zircons in the Orange River derived from the Vredefort impact structure, South Africa.

Pincus M. R.  Cavosie A. J.  Gibbon R. J.  
**POSTER LOCATION #206**

*Preservation of Detrital Shocked Minerals in Deep Time: Shocked Grains in the 300 Myr Dwyka Group Tillite, South Africa* [#1629]

Detrital shocked minerals (quartz, zircon, monazite) eroded from the Vredefort impact structure are documented in 300-m.y. Dwyka Group tillites, South Africa.

Pickersgill A. E.  Lee M. R.  Mark D. F.  Osinski G. R.  
**POSTER LOCATION #207**

*Shock Metamorphism in Impact Melt Rocks from the Gow Lake Impact Structure, Saskatchewan, Canada* [#2181]

The quartz is ballen/Toasted, or with PDFs/But only sometimes.

Hamann C.  Fazio A.  Schultze D.  Ebert M.  Hecht L.  et al.  
**POSTER LOCATION #208**

*Silicate Liquid Immiscibility in Natural and Experimental Impact Melts* [#2071]

We show on the basis of five case studies that silicate liquid immiscibility is a much more common process in impact melt development than previously thought.

**POSTER LOCATION #209**

*Chemical Composition of Middle Permian Glass Spherules in External Dinaric Alps, Croatia* [#1256]

Glass spherules of Guadalupian shales of the Outer Dinaric Alps are rich in Si and poor in Ca, but amorphous glass is rich in Ca and Ti and poor in Si oxides.

**POSTER LOCATION #210**

*First Discovery of Middle Permian Glass Spherules in External Dinaric Alps, Croatia — Evidence of an Oceanic Impact?* [#1257]

Guadalupian shales of External Dinaric Alps comprise impact spherules, glass gains, shocked quartz and feldspar grains. The impact caused local biotic crisis.

---

**ATMOSPHERES: TIME VARIABILITY IN THE OUTER SOLAR SYSTEM** [R716]

Simon A. A.  Wong M. H.  Rogers J. H.  Orton G. S.  de Pater I.  et al.  
**POSTER LOCATION #211**

*Dramatic Change in Jupiter’s Great Red Spot* [#1010]

Great Red Spot does shrink. Swirling redder than ever. How do eddies play?

Wong M. H.  Simon A. A.  Orton G. S.  de Pater I.  Sayanagi K. M.  
**POSTER LOCATION #212**

*Hubble’s Long-Term OPAL (Outer Planet Atmospheres Legacy) Program Observes Cloud Activity on Uranus* [#2606]

Multispectral images of Uranus in revealed ongoing bright cloud activity near 30°N. We present an initial analysis of data from November 2014.

Armstrong E. S.  Moses J. L.  Fletcher L. N.  Irwin P. G. J.  Hesman B. E.  et al.  
**POSTER LOCATION #213**

*Stratospheric Chemistry in Saturn’s Atmosphere During the Beacon Storm* [#1188]

Stratospheric chemistry is investigated to try to reconcile photochemical model outputs with Cassini/CIRS observations during the Beacon Storm (2010-12).
Tsang C. C. C.  Spencer J. R.  Lellouch E.  
Valverde M. L.  Richter M.  et al.  
**POSTER LOCATION #214**  
*Io’s Atmosphere in Jupiter Eclipse: Modeling Surface Temperatures and Atmospheric Densities to Elucidate Atmospheric Support [2043]*  
Io’s primary atmosphere in Jupiter eclipse/Potential indication atmosphere collapsed onto the surface/Loki, Thor, nor Prometheus can hold up the heavens.

Le Mouélic S.  Rousseau B.  Rodríguez S.  Cornet T.  Sotin C.  et al.  
**POSTER LOCATION #215**  
*Monitoring the Southern Polar Vortex on Titan with VIMS Onboard Cassini [1960]*  
We have computed series of global maps of Titan using VIMS spectral images to monitor the evolution of atmospheric features at the poles.

Tejfel V. G.  Karimov A. M.  Kharitonova G. A.  
**POSTER LOCATION #216**  
*South-North Hemispheric Asymmetry of the Albedo and Molecular Absorption on Saturn [1176]*  
The spectrophotometric observations of Saturn at its equinoxes have shown noticeable asymmetry for hemispheric distribution of the methane absorption.

---

**AEOLIAN PROCESSES**  
[R717]

**POSTER LOCATION #218**  
*Calibration and Validation of the Titan Wind Tunnel: A Community Resource at the Planetary Aeolian Laboratory [1028]*  
A high-pressure wind tunnel is available in the Planetary Aeolian Laboratory to simulate surface atmospheric conditions of Titan and other bodies.

Bridges N. T.  Blaney D. L.  Day M. D.  
Herkenhoff K. E.  Lanza N. L.  et al.  
**POSTER LOCATION #219**  
*Rock Abrasion and Landscape Modification by Windblown Sand as Documented by the MSL Curiosity Rover [2324]*  
We provide the latest measurements and interpretations of the rock abrasion record in Gale Crater, through Sol 438+.

Statella T.  Pina P.  Silva E. A.  
**POSTER LOCATION #220**  
*Comparing Wind Directions Estimated from Dust Devil Tracks Analysis with Wind Directions Predicted by the Mars Climate Database (MCD) [1014]*  
We have calculated the main direction of dust devil tracks in 200 images and have shown that the Mars Climate Database fails to predict local scale wind directions.

Hargitai H.  Látos T.  Horváth D.  Bakos D.  
**POSTER LOCATION #221**  
*Wind Streak-Like Yardang Terrain in Daedalia-Mangala, Mars [2273]*  
We describe features that appear as wind streaks but are intersecting yardang sets formed on one side of impact craters.

Pan C.  Rogers A. D.  
**POSTER LOCATION #222**  
*Understanding the role of Aeolian Processes and Physical Sorting on Martian Surface Compositions Through Analysis of Spectrally and Thermophysically Heterogeneous Dune Fields [1068]*  
We use orbital measurements to examine the compositional and thermophysical heterogeneity within martian dune fields.

Sullivan R.  Zimbelman J.  
**POSTER LOCATION #223**  
*Megaripples and Their Sedimentary Deposits on Earth and Mars [2762]*  
Fieldwork and wind tunnel experiments show grain sorting during megaripple migration helps distinguish ancient megaripple deposits as aeolian (vs. subaqueous).
Scheidt S. P. Zimbelman J. R.  
**POSTER LOCATION #224**

*Gravel-Mantled Aeolian Bedforms from Mono-Inyo Domes, California, USA: Morphology, Characteristics and Relevance to Mars* [#1056]

Terrestrial fieldwork characterizing the morphology of gravel-mantled ripples at the summit of North Mono Dome in California as an analog for martian TARs.

Berman D. C. Michalski J. R. Balme M. R.  
**POSTER LOCATION #225**

*Analyses of Transverse Aeolian Ridges on Mars* [#2210]

We examine TARs in terms of their mapped locations, morphology/morphometry, composition, and their age and changes in time.

Ebinger E. K. Zimbelman J. R.  
**POSTER LOCATION #226**

*Geospatial Classification of Transverse Aeolian Ridges on Mars* [#1137]

TARs were identified in ~1000 HiRISE images within pole-to-pole longitude swaths 290°–300°E and 240°–250°E. TAR abundance is highly spatially variable.

Geissler P. E. Wilgus J. T.  
**POSTER LOCATION #227**

*Antidunes on Mars?* [#1149]

Martian transverse aeolian ridges could be sediments deposited by turbulent winds with suspended aerosols concentrated close to the surface.

Zimbelman J. R. Johnson M. B.  
**POSTER LOCATION #228**

*Surface Slope Effects for Ripple Orientations on Sand Dunes in Lopez Crater, Terra Tyrrhena Region, Mars* [#1478]

DTM of sand dunes in Lopez Crater was used to evaluate deflection of wind ripples; for dune slopes <10°, the deflection is <17°.

Johnson M. B. Zimbelman J. R.  
**POSTER LOCATION #229**

*Ripple Orientations as an Indication of Recent Winds on Martian Dunes* [#1539]

Sand ripple patterns and DTMs are used to document recent winds, the possible effect of slope on ripple orientation, and other relationships.

Middlebrook W. M. Ewing R. C. Bridges N. T.  
**POSTER LOCATION #230**

*Three-Dimensional and Multi-Temporal Dune-Field Pattern Analysis in the Olympia Undae Dune Field* [#2757]

Pattern and image analysis to study aeolian processes operating in the north polar Olympia Undae Dune Field during the martian summer.

Bishop B. Radebaugh J. Christiansen E. H.  
**POSTER LOCATION #231**

*Dune Widths in Titan’s Belet Sand Sea Reveal Patterns in Dune Formation and Stability* [#3007]

Titan dune width across Belet Sand Sea shows minor correlation; reveals increasing stability with increasing distance from sand sea margin.

Erkeling G. Luesebrink D. Hiesinger H. Reiss D. Jaumann R.  
**POSTER LOCATION #232**

*The Multi-Temporal Database of High Resolution Stereo Camera (HRSC) Images: A Tool to Support the Identification of Surface Changes and Short-Lived Surface Processes* [#1847]

The HRSC database will help to identify areas with multi-temporal HRSC ND image coverage and gives researchers the option to easily detect surface changes.

Cardinale M. Tangari A. Pozzobon R. Marinangeli L. Pondrelli M.  
**POSTER LOCATION #233**

*Preliminary Analysis of a Dark Layer as a Possible Local Source of Dark Sand in Moreux Crater (Mars)* [#1790]

Our analysis in Moreux Crater suggests that the studied crevasses represent one of the local sources for the circulating dark material in the crater.
POSTER LOCATION #234

*The Identification of Acetylene on Titan’s Surface [#1522]*

We identify long-speculated acetylene on the surface of Titan using a 1.6-micrometer VIMS atmospheric window.

Wood C. A.  Lorenz R.  Wall S.  Anderson Y.  West R.  
POSTER LOCATION #235

*T108: Cassini’s Contortionist Flyby of Titan [#1599]*

Cassini made its 109th close flyby of Titan in January 2015. Radar searched for the Magic Island in Ligeia, probed the depths of Punga, and imaged the unknown.

Wood C. A.  
POSTER LOCATION #236

*North Polar Crater and Lake Basins: A Variety of Shapes — A Single Origin? [#2490]*

Volcanic crater-like depressions and irregular shaped ones coexist in Titan’s north polar regions. Are both volcanic in origin with the latter heavily modified?

Dougherty A. J.  Morris D. K.  
POSTER LOCATION #237

*Freezing of Methanol-Water Mixtures at High Pressure with Applications to Titan [#1894]*

We report crystallization temperatures for methanol/water mixtures at pressures ranging from 50 to 400 MPa, to help inform modeling of Titan’s subsurface ocean.

Chevrier V. F.  Luspay-Kuti A.  Singh S.  
POSTER LOCATION #238

*Experimental Study of Nitrogen Dissolution in Methane-Ethane Mixtures Under Titan Surface Conditions [#2763]*

Nitrogen is shown to be far more soluble in liquid methane than liquid ethane under Titan surface conditions, which has implications for hydrocarbons freezing.

Vu T. H.  Choukroun M.  
POSTER LOCATION #239

*Experimental Studies of Methane Clathrate Formation and Substitution with Ethane [#2484]*

A new high-pressure cryostage has been developed, and preliminary results on the kinetics of clathrate formation and substitution are presented.

POSTER LOCATION #240

*The Fate of Methane in Titan’s Hydrocarbon Lakes and Seas [#1502]*

The apparent ethane deficiency in Ligeia Mare may result from its interaction with a clathrate layer that progressively formed from the entrapment of ethane.

Horvath D. G.  Andrews-Hanna J. C.  Newman C. E.  
POSTER LOCATION #241

*The Effect of a High Permeability Polar Cap on the Latitudinal Lake Distribution at the North Polar Region of Titan [#2282]*

The effect of a non-uniform permeability aquifer in a polar cap geometry at the north polar region of Titan is explored using large-scale hydrology modeling.

Witek P. P.  Czechowski L.  
POSTER LOCATION #242

*Fluvial Deposition in Titan’s Lakes — The Role of Grain Size [#1737]*

We investigate the role of grain size in development of sedimentary landforms in titanian lakes and compare the results with terrestrial analogs.

Williams D. A.  Malaska M. J.  Lopes R. M. C.  Radebaugh J.  Barnes J. W.  et al.  
POSTER LOCATION #243

*Geologic Mapping of the Adiri Region of Titan [#1127]*

We discuss our new project to produce a geologic map of the Adiri region of Saturn’s moon Titan using Cassini data.
Outer Planetary Bodies: Plumes and Vents

Chilton H. T.  Mitchell K. L.  Schmidt B. E.  POSTER LOCATION #244
Encelexus’ South Pole: Conduction, Radiation, and Conduits [#3018]
Preliminary results of modeling a purely conductive and radiative model of a liquid-water filled vent and subsurface reservoir on Enceladus.

Abramov O.  Raggio D.  Schenk P. M.  Spencer J. R.  POSTER LOCATION #245
Temperatures of Vents Within Enceladus’ Tiger Stripes [#1206]
New thermal models, coupled with observations from the Cassini CIRS and ISS instruments, further constrain tiger stripe vent temperatures and widths.

Hurley D. M.  Perry M. E.  Waite J. H.  Perryman R.  POSTER LOCATION #246
Properties of the Vapor Release from Enceladus’ Tiger Stripes from Modeling and Cassini INMS Data [#2318]
We use Cassini INMS data and numerical modeling to constrain the properties of the plumes of Enceladus.

Dhingra D.  Hedman M. M.  Clark R. N.  Nicolson P. D.  POSTER LOCATION #247
Spectral Characterization of Spatially Resolved Water Ice Plumes at Enceladus Using Cassini VIMS Data [#1648]
Spatially resolved VIMS observations of Enceladus’ plumes have been analyzed. Spectral differences are hinted among the plumes along individual fractures.

Bouquet A.  Brockwell T. G.  Waite J. H.  Perryman R. S.  POSTER LOCATION #248
Evaluating the Quantity of Native H2 in Enceladus’ Plumes [#2320]
We assess the quantities of native H2 in Enceladus’ plumes by quantifying and subtracting the artifact H2 (produced by ice grains impact on the antechamber).

Kempf S.  Horanyi M.  Schmidt J.  Southworth B.  POSTER LOCATION #249
How Much Dust Does Enceladus Eject? [#1938]
We performed numerical simulations of the Enceladus dust plume to constrain the dust production rate and to verify whether the plume constitutes a dusty plasma.

Southworth B.  Kempf S.  Schmidt J.  Horanyi M.  POSTER LOCATION #250
Modeling Europa’s Dust Plume [#2729]
We explore the parameter space of potential dust plumes on Europa, simulating active plumes and the results of spacecraft flybys.

Phillips C. B.  POSTER LOCATION #251
Searching for Plumes and Ongoing Geologic Activity on Europa [#2704]
Was Europa plume/Off during Galileo?/Or just hard to see?

Hansen C. J.  Kirk R.  POSTER LOCATION #252
Triton’s Plumes — Solar-Driven Like Mars or Endogenic Like Enceladus? [#2423]New data and models of seasonal jets in Mars’ polar regions and Enceladus’ geophysical activity motivate reconsideration of the source of Triton’s plumes.

Outer Planetary Bodies: From the Depths to the Rings

Vance S.  Roberts J. H.  Ganse A.  POSTER LOCATION #253
Inverse Theory for Planning Gravity Investigations of Icy Moons [#2751]
We demonstrate the use of forward and inverse modeling to assess resolution of subsurface mass anomalies in Europa from proposed flyby mission trajectories.
Hay H. C. F. C. Matsuyama I.  
Numerically Simulating Tidal Dissipation in the Icy Satellites [1329]
We numerically investigate tidal dissipation in the icy satellites incorporating ocean loading, self-attraction, and deformation of the solid regions.

Rathbun J. A. Spencer J. R.  
Comparison of Tidal Dissipation Models to Global Distribution of Active Ionian Volcanoes from Galileo PPR and New Horizons LEISA [1546]
Heat flow on Io/Which model matches data/PPR, Leisa?

Helbert J. Maturilli A. Ferrari S. Breuer D. Spohn T.  
Studying Io’s Volcanic History Using Thermal Infrared Measurements [1906]
A new thermal infrared instrumentation to observe Io combined with the unique capabilities of PEL will provide new insights into the evolution of Io.

McGovern P. J.  
Formation and Growth of Mountains on Io: A Distinct Element Method Modeling Approach [2886]
Mountains on Io/Break from bottom up making/Some jagged rockbergs.

Diverse Origins of Enceladus’s Ridge Terrains Including Evidence for Contraction [2870]
On Enceladus/Plentiful ridges are found/Same or different?

Martin E. S. Watters T. R. Patthoff D. A.  
Ancient Ridges and Troughs on Enceladus [1620]
Stress cracked icy shell/Reveals long tectonic tale/Of early terrains.

Scipioni F. Schenk P. Tosi F.  
Spectroscopic Variation of Water Ice Abundance and Sub-Micron Ice Grains Across Enceladus, Mimas, and Tethys’ Surface Using Cassini VIMS Data [1919]
We present our work mapping the variation of the water ice bands and submicrometer ice grains across Mimas, Tethys, and Enceladus’ surfaces using VIMS-IR data.

Robbins S. J. Bierhaus E. B. Dones L. H.  
Craters of the Saturnian Satellite System: II. Mimas and Rhea [1654]
Saturn’s moons’ craters /Are many-varied things... so/What are their sources?

Hirata N. Miyamoto H.  
Rayed Craters on Dione [1803]
Dione, a saturnian mid-sized satellite, appears to have numerous rayed craters. We find 29 rayed craters exceeding 2 km in diameter on 69% on the surface.

Hoogenboom T. Johnson K. E. Schenk P. M.  
Contribution of Secondary Craters on the Icy Satellites: Results from Ganymede and Rhea [2530]
We investigate secondary crater processes on the icy satellite Ganymede to better understand ages of bodies in the outer solar system.

Schuman S. Chang V. Do V. Gambhir T. Lalinde B. et al.  
Examining Potential for Ice Extrusions in Relationships Between Furrows and Related Terrain on Ganymede [1242]
We hypothesize that furrows on Ganymede correlate with albedo and the presence or absence of adjacent craters, supporting the possiblity of ice extrusions.
Cofano A. Komatsu G. Pizzi A. Di Domenica A. Bruzzone L. et al.  
Ganymede’s Surface Investigation in Support of the Radar for Icy Moon Exploration (RIME) Instrument [#1382]

In order to support the JUICE mission and in particular RIME activities, we have initiated a research effort for understanding the geology of Ganymede.

Walker C. C. Schmidt B. E.  
Cracking Up-Wards: An Investigation into the Mechanical Failure of Ice on Europa [#2023]

We present results illustrating the propagation of basal fracture systems through icy satellite shells and their contribution to fragmentation of the surface.

Structural Analysis of Very High-Resolution Galileo Images of Europa: Implications for Surface Evolution [#2429]

Europa’s surface/Unveiling evolution/Through structural maps.

Byrne P. K. Schenk P. M. McGovern P. J.  
Tectonic Mapping of Rift Zones on Rhea, Tethys, and Dione [#2251]

Moons of Saturn are/Different sizes but cracked/In similar ways.

Clark C. S. Clark P. E.  
Mapping and Graphic Stress Analysis for Icy Satellites Using Constant-Scale Natural Boundary Methods [#1389]

We use constant scale natural boundary terrain projections with waterlining for icy satellites to provide insights into their surface morphology and processes.

Scott B. R. Bills B. G.  
Cataloging the Motion of Co-Orbitals of the Galilean Satellites [#1123]

We simulate the motion of bodies placed in a 1:1 orbital resonance with the Galilean satellites for several initial conditions.

Salmon J. Canup R. M.  
Accretion of Mid-Sized Ice-Rich Moons from Expansion of a Primordial Massive Saturnian Ring [#2314]

We use a hybrid N-body model to study the accretion of Mimas, Enceladus, and Tethys from a primordial massive ice-rich ring around Saturn.

Ohtsuki K. Yasui Y.  
Shapes and Dynamical Evolution of Aggregates Formed by Gravitational Accretion of Particles onto Embedded Moonlets in Saturn’s Rings [#1165]

Using N-body simulation, we examined shapes and dynamical evolution of aggregates formed by gravitational accretion of particles in Saturn’s rings.

Berger E. L. Keller L. P.  
Solar Flare Track Exposure Ages in Regolith Particles: A Calibration for Transmission Electron Microscope Measurements [#1543]

Oh solar flare tracks/How fast was your creation/Here at 1 AU?

McCanta M. C. Dyar M. D. Carey C. Mahadevan S. Lanzirotti A. et al.  

We present a new calibration and model for determining Fe³⁺ contents of glasses using XAS. The resulting errors are ±2.9% Fe³⁺, similar to that of Mössbauer.
Cochrane C. J.  Blacksberg J.  POSTER LOCATION #275
*A Fast and Fully Automated Classification Scheme for the Identification of Mineral Mixtures in Raman Spectroscopy* [#2336]
A fast method ideal for the classification of multivariate responses formed from spectroscopic mixtures using a large database composed of correlated predictors.

Stroud R. M.  Bassim N. D.  Brintlinger T. H.  POSTER LOCATION #276
*PRISM: A New Aberration-Corrected Scanning Transmission Electron Microscope Facility for Planetary Materials Research* [#2980]
PRISM (Picometer-Resolution Imaging and Spectroscopy Microscope) is a new scanning transmission electron microscopy facility at the Naval Research Laboratory.

Parente M.  Saranathan A. M.  Dyar D.  POSTER LOCATION #277
*A Spectroscopic Facility at UMass, Amherst* [#3019]
The abstract describes the new spectroscopic facility at UMass, Amherst and presents some demonstrations of its capabilities.

Corley L. M.  Gillis-Davis J. J.  POSTER LOCATION #278
*Temperature Effects on the Reflectance Spectra of Olivine and Plagioclase* [#2858]
New measurements of the reflectance spectra of olivine and plagioclase are made with a thermally controlled chamber at temperatures comparable to lunar PSRs.

Anderson R. C.  Beegle L.  Abbey W.  POSTER LOCATION #279
*Drilling on Mars: What We Have Learned from the Mars Science Laboratory Powder Acquisition Drill System (PADS)* [#2417]
The collection of martian samples from a mobile robotic platform on rough terrain creates unique engineering challenges to ensure scientific quality of data.

Glass B.  Mellerowicz B.  Davis A.  Zacny K.  McKay C. et al.  POSTER LOCATION #280
*Icebreaker-3 Mars-Analog Sample Acquisition Tests* [#1669]
The Icebreaker-3 drill was tested with a Phoenix mockup and the Haughton Crater Mars-analog site in the Arctic (with sample transfer arm) and in a Mars chamber.

Stein N. T.  Zanetti M.  Battel D.  Carsello A.  Cooperberg A. et al.  POSTER LOCATION #281
*A Screw Propulsion Design for Mobility in High-Sinkage Media* [#2352]
This abstract details the design and testing of a screw-pontoon mobility system for navigation in high-sinkage media such as lunar regolith.

Willson D.  Lemke L. G.  Stoker C. R.  Dave A.  McKay C. P.  POSTER LOCATION #282
*A Sample Sifter for the Proposed Icebreaker Mars Mission* [#2503]
We describe a unique sifting scoop end effector developed and tested for possible inclusion in the proposed Icebreaker Mars mission.

*SOLID SPU: A TRL 5-6 Sample Preparation Instrument for Wet Chemistry Analysis on Mars* [#1222]
We report the performance of an instrument for liquid extract preparation for planetary exploration under Mars relevant conditions.
Kang J. D.  
*Preserving Rock Cores for Mars Sample Return* [#2978]  
The project has provided design input to protect the sample integrity of rock cores collected during a proposed multi-phased MSR (Mars Sample Return) mission.

Valenzuela L. A.  Freeman P. M.  Gulick V. C.  Ishikawa S. T.  Bass S. M.  
*Towards Building an Automated Rock Classifier for Planetary Rover Missions* [#3009]  
This work focuses on building an automated classifier using Raman spectral data to identify key minerals contained in igneous rocks.

Dworkin J. P.  Adelman L.  Ajluni T. M.  
*OSIRIS-REx is a Pathfinder for Contamination Control for Cost Controlled Missions in the 21st Century* [#1147]  
The contamination control and contamination knowledge strategies and requirements to enable OSIRIS-REx to return a pristine sample of Bennu are discussed.

Calaway M. J.  Fries M. D.  
*Adventitious Carbon on Primary Sample Containment Metal Surfaces* [#1517]  
Metal surfaces used for flight hardware and curating astromaterials were cleaned and analyzed for adventitious carbon residue by XPS and Raman spectroscopy.

*Planetary Protection Cleaning Procedures for Life Detection on Mars* [#1318]  
We describe a cleaning procedure for decontamination of organic and biological that can be potential targets for life detection on Mars.

**INSTRUMENTS AND PAYLOAD CONCEPTS: DUST AND RADIATION**  
[R723]  
*Moon Electrostatic Potential and Dust Analyser (MESDA) for Future Lunar Mission* [#1167]  
This article presents lunar dust levitation modeling results and initial results of a Moon Electrostatic Potential and Dust Analyser for future lunar lander.

Oshigami S.  Senshu H.  Yamada R.  Namiki N.  Mizuno T.  et al.  
*Detectability of Levitation Dust Around the Asteroid by Hayabusa-2 LIDAR* [#1292]  
LIDAR instrument onboard Hayabusa-2 provides a function called dust count mode. We theoretically estimated the dust number density detectable by LIDAR.

*Using Dust from Asteroids as Regolith Microsamples* [#1991]  
Tiny particles/Lofted from asteroids are/Ex situ samples.

Li Y. W.  Srama R.  Bugiel S.  
*Dust Trajectory Detector Using Single Grid Electrodes Plane* [#2203]  
We introduced two future simplified designs with fewer electrodes and lower instrument mass with respect to the original LDX design.

*Piezoelectric Dust Detector Design and Calibration for the Armadillo Program* [#2191]  
Design and calibration of piezoelectric dust detector for LEO.
Dust count mode is one of operational modes of LIDAR onboard Hayabusa-2 in which the LIDAR detects faint scattered light from dust on the line of sight.

We have developed a correction method for normalizing the Diviner thermal wavelength emissivity data as a function of incidence angle.

This abstract summarizes a payload designed to investigate the radiation environment of the surface of Mars and its regolith’s ability to protect human missions.

In this poster, we report the results of optical calibration, end-to-end tests with meteorite samples, and the first light of the visible multi-band camera on Hayabusa 2.

An artificial impact experiment on the asteroid surface is scheduled in Hayabusa 2 mission. The scientific observation is conducted by a deployable camera DCAM3.

We report the results of optical calibration, end-to-end tests with meteorite samples, and the first light of the visible multi-band camera on Hayabusa 2.

Image pointing and position from Hayabusa and Dawn missions are refined to create digital elevation models. These images will be used for mapping and analysis.

The Atsa 1 Camera is a small human-tended telescope designed to prove out the concept of using commercial suborbital vehicles to enable space-based astronomy.
Jaumann R.  Neukum G.  Tirsch D.  Hoffmann H.  Mars Express HRSC Team  
*POSTER LOCATION #305*

*The High Resolution Stereo Camera (HRSC): Status and Facts* [#1057]
This is a status review of the capabilities and actual coverage of the Mars Express HRSC experiment also introducing data download platforms and team members.

*POSTER LOCATION #306*

*The Shortwave ImageR and Spectrometer for Europa (SIRSE)* [#1013]
We describe a combined visible wavelength panchromatic camera with stereo capability and near-IR spectrometer proposed for the Europa Flagship mission.

Suda R.  Demura H.  
*POSTER LOCATION #307*

*Calibration Tools of Fish-Eye Cameras for Monitoring/Navigation in Space Missions* [#1767]
Fish-eye cameras have advantages in few installation room and payloads because of a wide FOV. This shows fish-eye camera calibration tools for space mission.

*POSTER LOCATION #308*

*PanCam on the ExoMars 2018 Rover: A Stereo, Multispectral and High-Resolution Camera System to Investigate the Surface of Mars* [#1812]
A click and a snap/Red Mars caught for an instant/What lurks in shadows?

*POSTER LOCATION #309*

*The Infrared Investigation on the SuperCam Instrument for the Mars2020 Rover* [#1736]
The poster presents the instrument concept and performances of the IR spectrometer part of the SuperCam intrumental suite selected for the Mars 2020 rover.

*POSTER LOCATION #310*

*Remote Geochemical and Mineralogical Analysis with SuperCam for the Mars 2020 Rover* [#2781]
This paper describes the remote LIBS, Raman, and Time-Resolved Fluorescence capabilities of the SuperCam instrument selected for the Mars 2020 rover.

Maurice S.  Wiens R. C.  Anderson R.  Beyssac O.  Bonal L.  et al.  
*POSTER LOCATION #311*

*Science Objectives of the SuperCam Instrument for the Mars2020 Rover* [#2818]
Science objectives and observation modes of the SuperCam instrument onboard the Mars2020 rover.

Gasnault O.  Maurice S.  Wiens R. C.  Le Mouélic S.  Fischer W. W.  et al.  
*POSTER LOCATION #312*

*SuperCam Remote Micro-Imager on Mars 2020* [#2990]
SuperCam was selected on the Mars 2020 rover to perform high-resolution chemistry, mineralogy, and imaging at stand-off distances. We describe the imaging part.

---

**INSTRUMENTS AND PAYLOAD CONCEPTS: RAMAN SPECTROSCOPY**  
[R725]

*POSTER LOCATION #313*

*Baseline Removal in Raman Spectroscopy: Optimization Techniques* [#2464]
Automated baseline correction for Raman spectra is explored in the context of mineral identification tasks.

Wei J.  Wang Alian.  Connor K.  
*POSTER LOCATION #314*

*Quantification of Fluorescence Emission from Extraterrestrial Materials and Interference to Micro-Beam cw 532 nm Laser Raman Spectroscopy* [#2448]
We observed low fluorescence emission and >94% informative spectra in micro-beam 532 nm cw laser Raman auto-scanning of 97% of categories of stony meteorites.
We hope that you find this information useful and informative.

We look forward to seeing you at the conference.
Nagaoka H. Naito M. Hasebe N. Kusano H. Shimamura E. et al. POSTER LOCATION #325
X-Ray Generator for Active X-Ray Fluorescence Spectrometer On-Board Landing Rover for Future Planetary Missions [#2255]
Outline of X-ray generator of active X-ray spectrometer for future planetary landing missions and the present status of development are presented and discussed.

Ban C. Zheng Y. C. Zou Y. L. POSTER LOCATION #326
Inversion of Elemental Abundances from the Data of the First Detection by Active Particle-Induced X-Ray Spectrometer on Chang\'e-3 YuTu Rover [#2001]
Elemental abundances are inverted from the data of the first detection of the Moon by the Active Particle-induced X-ray Spectrometer on the Chang\'e-3 YuTu rover.

Turner S. M. R. Hansford G. M. Bridges J. C. POSTER LOCATION #327
A Study of Sulphate Minerals Using a Novel X-Ray Diffraction Technique [#2222]
A novel energy dispersive XRD instrument with back-reflection geometry enables unprepared whole rock analysis, which we apply to a Mars analogue site.

Lim L. F. Starr R. D. Evans L. G. Parsons A. M. Zolensky M. E. et al. POSTER LOCATION #328
Measuring Bulk Carbon, Hydrogen, and Sulfur from Orbit: Modeling Gamma-Ray Spectroscopy of Carbonaceous Asteroids [#1681]
C, H, O, and S can be measured by a Mars Odyssey-like orbital gamma-ray spectrometer in a Dawn-like orbit around a carbonaceous asteroid within 4.5 months.

Parsons A. M. Boynton W. V. Evans L. G. Hamara D. Harshman K. et al. POSTER LOCATION #329
Use of the Mars Odyssey High Purity Germanium (HPGe) Gamma Ray Detector Design for Orbital Asteroid Measurements [#2655]
A copy of the Mars Odyssey GRS can be produced at low risk and would be a valuable probe of the elemental composition of carbonaceous asteroids.

Parsons A. M. Evans L. G. Karunatilake S. McClanahan T. P. Moersch J. E. et al. POSTER LOCATION #330
High Sensitivity Subsurface Elemental Composition Measurements with PING [#2365]
The Probing In situ with Neutrons and Gamma rays (PING) instrument can measure the bulk elemental composition of the subsurface of any solid solar system body.

Prettyman T. H. Burger A. Lambert J. L. Castillo-Rogez J. Yamashita N. POSTER LOCATION #331
Strontium Iodide: An Ultra-Bright Scintillator for Planetary Gamma-Ray Spectroscopy [#2826]
We describe the development of a new, high-resolution scintillator for planetary applications that require low-cost, compact, rugged gamma spectrometers.

Prettyman T. H. Hendricks J. S. POSTER LOCATION #332
Nuclear Spectroscopy of Irregular Bodies: Comparison of Vesta and Phobos [#1501]
We explore the effects of shape and topography on mapping the chemical composition of small, irregular bodies with gamma ray and neutron spectroscopy.

Lawrence D. J. Elphic R. C. Miller R. S. Peflowski P. N. POSTER LOCATION #333
Resolving the Spatial and Depth Dependent Hydrogen Distribution Within Lunar Permanently Shaded Regions Using the Lunar Polar Low-Altitude Neutron Experiment [#2235]
Low-altitude neutron measurements over the Moon\'s south pole would provide significantly enhanced knowledge of polar hydrogen spatial and depth distribution.
**POSTER LOCATION #334**  
*Mars Organic Molecule Analyzer (MOMA) Mass Spectrometer Status and Science Operations on the ExoMars Rover [#2579]*  
We provide a status of the development of the mass spectrometer subsystem of the Mars Organic Molecule Analyzer (MOMA) investigation on the 2018 ExoMars rover.

Nottingham M. Cowpe J. Gilmour J. D.  
**POSTER LOCATION #335**  
*Resonance Ionization Mass Spectrometer for Krypton Isotopes: Current Developments [#2310]*  
Recent developments regarding the Resonance Ionisation Mass Spectrometer for Krypton Isotopes (RIMSKI) at The University of Manchester, UK.

Anderson F. S. Levine J. Whitaker T. J.  
**POSTER LOCATION #336**  
*Rb-Sr Dating of a Lunar Analogue with a Prototype In-Situ Dating Spectrometer [#1361]*  
Lunar analogue/An in situ instrument/Yields isochron age.

Getty S. A. Li X. Grubisic A. Uckert K. Cornish T. et al.  
**POSTER LOCATION #337**  
We report efforts to advance laser desorption/ionization mass spectrometry beyond single-color methods to provide confidence in identification of composition.

Clark P. E. Petro N. Reuter D. MacDowall R. Mandell A. et al.  
**POSTER LOCATION #338**  
*Lunar and Planetary Surface Water Distribution Systematics via Deep Space CubeSat Orbiter with Compact Broadband IR Instrument [#1108]*  
For EM1, we are developing a 6U bus with ‘workhorse’ payload capable and resource minimized enough for high priority volatile science on deep space cubesats.

Cable M. L. Vu T. H. Malaska M. J. Hodyss R.  
**POSTER LOCATION #339**  
*Fiber Optic Probes for In Situ Spectroscopy of Titan’s Lakes [#2638]*  
Fiber optic probe-based instruments for in situ chemical characterization of Titan’s hydrocarbon lakes could be included on a future lake lander or subsensible.

Kitazato K. Iwata T. Abe M. Ohtake M. Matsuura S. et al.  
**POSTER LOCATION #340**  
*In-Flight Performance of the Hayabusa-2 Near-Infrared Spectrometer (NIRS3) [#1856]*  
We present the results for on-ground calibration tests of the Hayabusa-2/NIRS3 and its actual performance estimated from the observing data after the launch.

Green R. O. Ehlmann B. L. Fraeman A. A. Blaney D. Liu Y. et al.  
**POSTER LOCATION #341**  
*Microimaging Spectroscopy for the Exploration of Small Bodies: First Laboratory Measurements of Carbonaceous Chondrite and HED Meteorites and a Proposed M6 Instrument for In Situ Measurement [#2154]*  
Microimaging spectroscopy for exploration: Laboratory measurements of carbonaceous chondrite and HED meteorites and a proposed M6 in situ instrument.

Uckert K. Chanover N. J. Voelz D. Xiao X. Boston P.  
**POSTER LOCATION #342**  
*A Portable AOTF IR Reflectance Point Spectrometer for In Situ Biosignature Detection [#2694]*  
We discuss the development of PASA, a portable NIR reflectance point spectrometer using an acousto-optic tunable filter (AOTF) as the dispersive element.

---

**INSTRUMENTS AND PAYLOAD CONCEPTS: FOR PLANETARY SCIENCE [R727]**

Gyalay S. Jr. Noe Dobrea E. Z.  
**POSTER LOCATION #343**  
*Determining Water Ice Content of Martian Regolith by Nonlinear Spectral Mixture Modeling [#2170]*  
Optical constants can be derived from a dessicated sample and modeled with water ice to determine the water-ice content of the original icy sample.
Plescia J. B.  Miller R. S.  Yu H.  Lawrence D. J.  Barnouin O.  
**POSTER LOCATION #344**

*Probing the Interior of Asteroids and Comets [#2632]*

We describe two techniques — seismic profiling and muon radiography — to understand the interior structure of small planetary bodies.

Grott M.  Plesa A. C.  Daubar I.  Spohn T.  Smrekar S.  
**POSTER LOCATION #345**

*Retrieving the Martian Planetary Heat Flow from Measurements at Shallow Depth [#1374]*

A data inversion algorithm to determine planetary heat flow from HP3-InSight measurements is presented.

Hecht M. H.  Hoffman J. A.  MOXIE Team  
**POSTER LOCATION #346**

*The Mars Oxygen ISRU Experiment (MOXIE) on the Mars 2020 Rover [#2774]*

A payload on NASA’s Mars 2020 mission, MOXIE is a 1% scale model of an oxygen-processing plant that might support a human expedition sometime in the 2030s.

Varga T. P.  Szilágyi I.  Varga K. R.  Bérczi Sz.  
**POSTER LOCATION #347**

*Assembly and Installation Concept for a Complex Planetary Surface Habitat and Industrial Module [#1357]*

Assembly can easily be done in low orbit. Submodules and building blocks can be launched individually and they can be assembled using already existing methods.

**POSTER LOCATION #348**

*Small Aperture Airborne Telescope for Planetary Science [#2087]*

Small-aperture airborne telescopes for planetary science multiple applications from Venus to KBO NASA platforms at AFRC and JSC are soon to deploy.

**POSTER LOCATION #349**

*Tunable Superconducting Gravity Gradiometer for Mars Climate, Atmosphere, and Gravity Field Investigation [#1735]*

We develop a compact tensor superconducting gravity gradiometer for the improved analysis of both static and time-variable gravity fields of Mars.

Lloyd J.  Matlock S.  Nieberding M.  Huang P. A.  
**POSTER LOCATION #350**

*Permanent Magnet Active Attitude Control of a CubeSat for Space Instruments [#1969]*

A novel, low-power, and active control attitude control system intended for instruments developed for interplanetary CubeSats visiting bodies with magnetic fields.

**POSTER LOCATION #351**

*Performance of Hayabusa-2 LIDAR in Acceptance and Verification Tests [#1798]*

Performance of the Hayabusa-2 laser altimeter was measured in acceptance and verification tests to calibrate measurements of physical properties of the asteroid.

**POSTER LOCATION #352**

*Thermal Tolerance Test for the Development of a Hollow Retroreflector for Future Lunar Laser Ranging [#1248]*

Thermal tolerance test was conducted for monocrystalline silicon as mirror material for development of the future Lunar Laser Ranging retroreflector.

Kahn E. G.  Barnouin O. S.  Daly M. G.  Johnson C. L.  Seabrook J.  
**POSTER LOCATION #353**

*Reconstruction of the Eros Shape Model Using NEAR Laser Rangefinder Data [#2874]*

We present an approach for reducing errors in NEAR Laser Rangefinder (NLR) data and reconstructing a 3-D triangular plate model of the Eros asteroid.

Smith D. E.  Zuber M. T.  Sun X.  
**POSTER LOCATION #354**

*Optical Ranging in the Solar System: Science Requirements and Opportunities [#1288]*

Laser ranging over planetary distances with high accuracy offers many scientific and operational possibilities and will be possible in the next several years.
Hibbitts C. A.  Kremic T.  Cheng A.  Bernasconi P.  Rivkin A.  

*POSTER LOCATION #355*

Stratospheric Infra-Red Imaging and Spectroscopy for Planetary Science (SIRIS-PS) [#2152]

This infrared imaging and spectroscopy mission would conduct unique and valuable Decadal science at relatively low cost with a brief development period.

Hurford T. A.  Mandell A.  Reddy V.  Young E.  

*POSTER LOCATION #356*

Observatory for Planetary Investigations from the Stratosphere [#2003]

High-altitude science/OPIS mission showcases/WASP capability.


*POSTER LOCATION #357*

Lab-on-a-Chip Organic Analyzer: Instrumentation and Methods for Detecting Trace Organic Molecules and Amino Acid Chirality in Planetary Science [#2813]

A novel design for a flight-ready integrated microfluidic processor comprising capillary electrophoresis and laser fluorescence detection of organic molecules.


*POSTER LOCATION #358*

Studies on Solar System Explorations Using DESTINY: The Demonstration and Experiments of Space Technology for Interplanetary Voyage [#1727]

We present possible instruments and model missions for solar system sciences and space astronomy using DESTINY, a Japanese new small satellite bus.

Klaus K.  

*POSTER LOCATION #359*

The Space Launch System and Missions to the Outer Solar System [#2346]

The Space Launch System (SLS) enables a variety of planetary science missions. The SLS can be used for the NRC’s Decadal Survey missions to the outer planets.

---

**EARLY RESULTS FROM THE MAVEN MISSION:**

**INTERACTIONS WITH SOLAR WIND AND COMET SIDING SPRING**

Yelle R. V.  Benna M.  Mahaffy P. R.  Elrod M.  Epsley J.  et al.  

*POSTER LOCATION #361*

MAVEN Observations of the Effect of Comet Siding Spring on the Mars Atmosphere [#2534]

Comet Siding Spring passed within 140,000 km of Mars on October 19, 2014, perturbing the atmosphere. The suite of in situ MAVEN measurements will be described.

Espeley J. R.  Connerney J. E. P.  DiBraccio G. A.  

*POSTER LOCATION #362*

A Comet Swallows Mars: MAVEN’s Magnetometer’s Observations During Comet Siding Spring’s Closest Approach of Mars [#2498]

Comet Siding Spring’s coma enveloped Mars, temporarily distorting its magnetosphere — possibly like a solar storm would but with water ions instead of protons.

Andersson L.  Weber T.  Malaspina D.  Crary F.  Ergun R. E.  et al.  

*POSTER LOCATION #363*

Dust Measurements from the Langmuir Probe and Waves Instrument on the MAVEN Mission [#2356]

Dust observed by the MAVEN mission and how Comet Siding Spring impacted the dust environment at Mars.


*POSTER LOCATION #364*

Dust Observations Using Common Mode Measurements from the Langmuir Probe and Waves Instrument on the MAVEN Mission [#2431]

Using the MAVEN Langmuir Probe and Waves instrument, we study the distribution and dynamics of dust flux around Mars.

Poppe A. R.  Curry S. M.  Fatemi S.  McFadden J. P.  Delory G. T.  

*POSTER LOCATION #365*

Modeling the Phobos and Deimos Neutral Gas Tori: Implications for Detection by MAVEN [#1399]

We present a model of the neutral and ionized components of the Phobos and Deimos neutral gas tori. We discuss the possibility of detection by MAVEN.
**POSTER LOCATION #366**

*Oxygen Pickup Ions at Mars: Model Comparisons with MAVEN Data and Implications for Oxygen Escape [72063]*

The implications of the oxygen pickup ion model comparisons with MAVEN SEP data for the escape of neutral oxygen from Mars will be discussed.

Lillis R. J. Larson D. E. Luhmann J. G. Jakosky B. M.  
**POSTER LOCATION #367**

*Absorption of Solar Energetic Particles by Mars: First Results from MAVEN [72806]*

The patterns of absorption by Mars’ atmosphere of solar energetic particles contain important information about the angular distribution of such particles.

**POSTER LOCATION #368**

*MARSVIEWS Observations of Marsward Ion Flux in the Near Mars Magnetotail [72158]*

We present MAVEN observations of Marsward-traveling ions in the near-Mars magnetotail and discuss dynamics of the martian magnetotail.

**POSTER LOCATION #369**

*MAVEN Characterization of Low-Frequency Plasma Waves in the Martian Magnetosphere [72184]*

We report results from an investigation that was carried out to characterize low-frequency waves in the martian magnetosphere based on MAVEN observations.

**POSTER LOCATION #370**

*MAVEN Observations of Magnetosonic Like Waves Upstream of Mars [72594]*

We report MAVEN observation of a magnetosonic type wave upstream of Mars. The observation was aided by the SWIA and MAG instruments onboard MAVEN.

### EARLY RESULTS FROM THE MAVEN MISSION: IONS AND THE IONOSPHERE  
**[72729]**

**POSTER LOCATION #371**

*First Results of the Martian Plasma Environment Below 500 km from the Langmuir Probe and Waves Instrument on the MAVEN Mission [72115]*

First results of the martian plasma environment below 500 km from the MAVEN Langmuir Probe are presented, focusing on the hot and cold plasma populations observed.

**POSTER LOCATION #372**

*Density Structures Within the Martian Ionosphere from the Langmuir Probe and Waves Instrument on the MAVEN Mission [72157]*

Electron density structures within the martian ionosphere will be presented, including variations of 2 orders of magnitude within 40 km along the orbital track.

**POSTER LOCATION #373**

*Langmuir Probe Observation of Mars Ionosphere by MAVEN/LPW [72508]*

The first results of the electron density and temperature characteristics of the Mars ionosphere observed by MAVEN/LPW will be presented.

**POSTER LOCATION #374**

*Design and Performance of the Langmuir Probe on the MAVEN Mission [72662]*

Here we describe the design and initial performance of the Langmuir Probe on the Mars Atmosphere and Volatile EvolutioN (MAVEN) mission.

Cravens T. E. Mitchell D. Sakai S. Rahmati A. Bougher S. W. et al.  
**POSTER LOCATION #375**

*Auger Electrons in the Martian Ionosphere: Model Comparisons with MAVEN Data [72581]*

Solar radiation produces 500 eV Auger electrons in the martian atmosphere measured by the MAVEN SWEA instrument and interpreted in this paper.
Mendillo M. Narvaez C. Lawler G. Kofman W. Mouginot J. et al. **POSTER LOCATION #376**

*Using Ionospheric Slab Thickness Data to Predict MAVEN Observations of Thermospheric Temperatures [#1391]*

The slab thickness of Mars’ ionosphere can be related to the scale height and temperature of the neutral atmosphere measured by MAVEN.

Hara T. Mitchell D. L. McFadden J. P. Halekas J. S. Espley J. R. et al. **POSTER LOCATION #377**

*Estimation of Ionospheric Plasma Content Inside Martian Magnetic Flux Ropes Based on MAVEN Observations [#1773]*

The ionospheric plasma content contained inside the martian flux rope observed by MAVEN is surveyed by the Grad-Shafranov reconstruction technique.

Livi R. McFadden J. **POSTER LOCATION #378**

*Observation of Ionospheric Expansion in MAVEN STATIC Data [#2910]*

Expansion of Mars ionosphere from <200 km to >500 km shortly after an SEP event.

Crary F. J. Connerney J. E. P. Espley J. R. McFadden J. P. **POSTER LOCATION #379**


We present initial observations of both ion cyclotron waves and proton pickup ions from the first few months of the MAVEN science mission.

Koyama K. Seki K. Terada N. Terada K. **POSTER LOCATION #380**

*Effects of Ion-Ion and Electron-Neutral Collision on Vertical Distribution of CO$_2^+$ in Martian Ionosphere Based on Multi-Fluid MHD Simulations [#3022]*

Our multi-fluid MHD code includes chemical reaction, velocity difference for each ion and collisions. This code reproduce CO$_2^+$ density in the martian ionosphere.

Montmessin F. Schneider N. M. Stewart A. I. Deighan J. Yelle R. et al. **POSTER LOCATION #381**

*MAVEN IUVS in Stellar Occultation Mode: A First Look at Martian Atmospheric Density and Temperature Profiles [#2026]*

We will present a first series of results obtained by IUVS using stellar occultation, which allows one to retrieve CO$_2$ density and temperature from 30 to 150 km.

Stevens M. H. Evans J. S. Stewart A. I. Deighan J. Jain S. K. et al. **POSTER LOCATION #382**

*N$_2$ in the Martian Upper Atmosphere Identified Using Dayglow Observations from the Imaging Ultraviolet Spectrograph on MAVEN [#1801]*

The IUVS instrument on MAVEN detected N$_2$ in the martian dayglow. These mid-UV observations of the Vegard-Kaplan bands can be used to obtain N$_2$ number densities.

Lefèvre F. Montmessin F. Schneider N. M. Stewart A. I. Deighan J. et al. **POSTER LOCATION #383**

*Ozone Mapping on Mars: First Results from MAVEN IUVS [#1718]*

This paper presents an overview of the first six months of ozone mapping on Mars by the IUVS spectrograph.

Stiepen A. Stewart A. I. F. Jain S. K. Schneider N. M. Deighan J. et al. **POSTER LOCATION #384**

*Preliminary Analysis of Martian Nightglow and Aurora Observed by MAVEN’s Imaging Ultraviolet Spectrograph [#2937]*

The Imaging UV Spectrograph on MAVEN has obtained unexpected vertical profiles and spatial distributions of nightglow and auroral emissions on Mars.
**POSTER LOCATION #385**

**Preliminary Analysis of Martian Dayglow Observed by the Imaging Ultraviolet Spectrograph Onboard MAVEN [#2761]**

We present the first martian dayglow observations obtained by the Imaging Ultraviolet Spectrograph (IUVS) onboard MAVEN.

Deighan J.  Chaffin M. S.  Chauffray J. Y.  Stewart A. I.  Schneider N. M.  et al.  
**POSTER LOCATION #386**

**The Martian Hot Oxygen Corona: First Results from MAVEN IUVS [#2529]**

First results from MAVEN IUVS observations of the oxygen corona are presented.

Lee Y.  Combi M. R.  Tenishev V.  Bougher S. W.  Deighan J.  et al.  
**POSTER LOCATION #387**

**A First Comparison Between First MAVEN Results and 3D Hot Oxygen Corona Model Predictions [#2055]**

This work performs a simulation to predict the martian exospheric oxygen and makes a comparison with the in situ observations from IUVS/MAVEN.

Thiemann E. M. B.  Eparvier F. G.  Chaffin M. S.  Clarke J. T.  
**POSTER LOCATION #388**

**Solar Lyman-Alpha Occultation Measurements of the Mars Hydrogen Corona [#2780]**

The MAVEN-EUV instrument has demonstrated the capability of characterizing the martian hydrogen exosphere via solar Lyman-alpha occultations.

Evans J. S.  Lumpe J. D.  Stevens M. H.  Schneider N. M.  Stewart A. I.  et al.  
**POSTER LOCATION #389**

**Optimal Estimation Retrieval of Neutral and Ion Composition in the Martian Thermosphere Using Dayglow Observations from the Imaging Ultraviolet Spectrograph on MAVEN: Preliminary Results [#2790]**

We present results from the first direct retrieval of neutral and ion composition in the martian thermosphere from observations by IUVS on NASA’s MAVEN mission.

Fox J. L.  Mahaffy P. R.  Jakosky B. J.  NGIMS Team  
**POSTER LOCATION #390**

**O/CO₂ Ratio in the Thermosphere and Implications for the Ionosphere of Mars: First Results from Maven [#2668]**

We investigate and discuss the first results from the MAVEN NGIMS instrument for the O and CO₂ densities and implications for the ion densities.

Elrod M. K.  Mahaffy P. R.  Benna M.  
**POSTER LOCATION #391**

**Reduction and Post-Processing of Early Data from MAVEN’s Neutral Gas and Ion Mass Spectrometer (NGIMS) [#2661]**

MAVEN Neutral Gas Ion Mass Spectrometer (NGIMS) is designed to characterize Mars’ upper atmosphere. An explanation of the spectra and profiles NGIMS produces.

Matta M.  Mahaffy P.  Evans J.  Schneider N.  Mc Clintock B.  et al.  
**POSTER LOCATION #392**

**Insights for Chemistry at Mars: Integrating Atmospheric Measurements from MAVEN NGIMS and IUVS into a 1-D Photochemical Model [#2384]**

MAVEN NGIMS and IUVS measurements are compared and used to constrain a one-dimensional model to provide insights into key chemical reactions in Mars’ ionosphere.

---

**ANCIENT MARTIAN CLIMATE AND ATMOSPHERE [R731]**

Loizeau D.  Carter J.  Mangold N.  Poulet F.  Rossi A. P.  et al.  
**POSTER LOCATION #393**

**Widespread Surface Weathering on Early Mars: Possible Implication on the Past Climate [#1843]**

Vertical clay sequences are identified and dated on multiple surfaces of Mars and interpreted as weathering profiles, with implications for the early climate.
A Study of Martian Mid-Latitude Ice Using Observations and Modeling of Terraced Craters

Combining HiRISE and SHARAD observations with numerical modeling of terraced crater formation, we find evidence for decameters of ice in Arcadia Planitia, Mars.

Classifying Martian Mid-Latitude Post-Impact Crater Fill Morphologies and Their Preservation States: Insights into Climate History on Mars

Using Mars Reconnaissance Orbiter Context Camera (CTX) images, we distinguish eight classes of mid-latitude post-impact crater fill material based on morphology.

Degradation State of Noachian Highland Craters: Assessing the Role of Crater-Related Ice Substrate Melting in a Cold and Icy Early Mars

We test the hypothesis that the degraded state of Late Noachian highland craters formed in hectometers-thick surface ice deposits in a cold and icy early Mars.

The Martian Paraglacial Period and Implications for Late Amazonian Climate

Observations from mid-latitude martian glaciated craters can constrain the timing and duration of deglaciation and the transition into a post-glacial climate.

Testing the Regional Ice-Sheet Collapse Model: Evidence of Glacial Modification of Plains Units in Deuteronilus Mensae, Mars

Characteristics of plains at the distal margins of lobate debris aprons indicate that mid-latitude glaciation on Mars may have been more extensive in the past.

3D Modelling of the Climatic Impact of Outflow Channel Events on Hesperian Mars

GCM modelling of the climatic impact of the Hesperian outflow channels show that it is very limited.

Late Noachian Icy Highlands Climate Regime: A Hydrological System Conceptual Model Bases on the McMurdo Dry Valleys

The McMurdo Dry Valleys hydrological system and cycle are documented to gain insight into the configuration of the Late Noachian icy highlands.

Sources of Water for Groundwater-Fed Outflow Channels on Mars: Implications of the Late Noachian “Icy Highlands” Model for Melting and Groundwater Recharge on the Tharsis Rise

We investigate Late Noachian ice deposits across Tharsis rise and the implications for melting in response to elevated geothermal heat fluxes.

Lava-Loading of Ice Sheets in a Late Noachian “Icy Highlands” Mars: Predictions for Meltwater Generation, Groundwater Recharge, and Resulting Landforms

We model the accumulation of lava flows atop Late Noachian ice deposits and outline predictions for melting, groundwater recharge, and resulting geomorphology.

Late Noachian Icy Highlands: Spatial Distribution of Top-Down Melting and Volumes of Meltwater for Single-Year Warming Events

We present the response of supply-limited Late Noachian icy highland ice sheets to single-year climate events as might be caused by volcanism or meteor impacts.
Alteration on Mars: The View from Orbit [R732]

Bultel B. Klein F. Andréani M. Quantin C. POSTER LOCATION #405
Serpentinization and Carbonation of the Martian Crust with Chlorine-Rich Fluids [#2128]
Modeling of fluid rock interaction with chlorine-rich fluid for serpentinization and carbonation of the martian crust.

Bultel B. Quantin C. Flahaut J. Andréani M. POSTER LOCATION #406
Carbonates and Phyllosilicates Detections in Coprates Chasma, Valles Marineris, Mars [#2112]
Crustal exposure of carbonates and phyllosilicates in the wall of Coprates Chasma.

Huang J. Salvatore M. R. Christensen P. R. Xiao L. POSTER LOCATION #407
Chlorides Predated Clay in a Lacustrine Environment on Mars and Its Astrobiology Application [#1918]
Here we identify that chlorides are stratigraphically below iron-magnesium smectite clay in a basin west of Knobel Crater (near Gale Crater).

Horgan B. Rice M. S. Ackiss S. POSTER LOCATION #408
Constraints on the Formation and Alteration History of Mt. Sharp, Gale Crater, Mars, from a New CRISM Mineral Map [#2943]
New mineral mapping at Gale Crater shows diversity in the mineral stratigraphy around the mound, iron redox reactions, and supports a pyroclastic upper mound.

Weitz C. M. Bishop J. L. POSTER LOCATION #409
Stratigraphy and Distribution of Clays Within Coprates Catena and Hydrae Chasma [#1383]
Two depressions in Coprates Catena contain clays in sedimentary deposits and terraced fans. Layered Fe/Mg-smectites dissected by valleys occur in Hydrae Chasma.

Korn L. K. Gilmore M. S. POSTER LOCATION #410
Possible Carbonate Minerals Within an Unnamed Gullied Crater in Eridania Basin, Mars [#2224]
Potential ankerite, siderite, aragonite, and/or brugnatellite mineral mixtures with silicates have been found in a gullied crater in Eridania Basin, Mars.

Amador E. S. Bandfield J. L. POSTER LOCATION #411
Localized Alteration of the Capping Unit in Nili Fossae, Mars: Evidence for Multiple Episodes of Aqueous Alteration [#1189]
We present evidence for the localized alteration of the capping unit in NE Nili Fossae, adding to the complex and diverse aqueous history of the region.

Brown A. J. Bishop J. L. Viviano-Beck C. POSTER LOCATION #412
Spectral Analysis of Carbonate Deposits at Nili Fossae, Mars [#2701]
We report on an analysis program to learn more about signatures of carbonate spectra at Nili Fossae in order to better characterize their formation processes.

Tirsch D. Bishop J. L. Voigt J. Tornabene L. L. Erkeling G. et al. POSTER LOCATION #413
Diverse Morphology and Mineralogy of Aqueous Outcrops at Libya Montes, Mars [#1738]
We present the results of a photogeological mapping as well as the various morphologies of aqueous mineral outcrops and deduce a probable formation history.

Flahaut J. Offringa M. Rossi A. P. Poulet F. Carter J. et al. POSTER LOCATION #414
Hydrated Mineral Detections in Arabia Terra: Another Evidence for Two Episodes of Deposition at Meridiani [#2569]
This present study describes the mineralogy, morphology, and extent of the Arabia Terra deposits and compares them to the sediments of Meridiani Planum.
Wiseman S. M.  Beyer R. A.  
*Stratigraphy of Phyllosilicate and Hydrated Sulfate Deposits in Eastern Sinus Meridiani [#2143]*
Fe/Mg smectites correlate with a stratigraphic horizon, whereas hydrated sulfates were deposited in topographic lows after erosion of older sedimentary units.

Robertson K. M.  Li S.  Milliken R. E.  
We apply Hapke modeling to CRISM spectral data from Mawrth Vallis to estimate modal mineralogy and test the ability to differentiate minor and major phases.

Gross C.  Carter J.  Tornabene L. L.  Sowe M.  Bishop J. L.  
*Stratified Phyllosilicate-Bearing Deposits Within Impact Craters in the Northern Plains of Mars [#1817]*
We report the presence of uplifted, stratified, phyllosilicate-rich material in a set of 50-km-wide impact craters located in the northern plains of Mars.

Jain N.  Chauhan P.  
*Identification of Deposits of Aqueous Minerals in Northern Part of Hellas Planitia Region on Mars Using MRO-CRISM: Implications for Past Aqueous History of Mars [#1838]*
Aqueous minerals from the northern part of the Hellas Planitia region on Mars give hints about the past environment history of Mars.

Hanna R. D.  Hamilton V. E.  
*Evidence for Localized Variations in Olivine Weathering on Mars [#2481]*
Using modeled olivine content and thermal inertia derived from TES and THEMIS, we examine several areas that display differing trends of olivine weathering.

Allender E. J.  Stepinski T. F.  
*Towards Automatic Exploratory Mineralogical Mapping of CRISM Imagery [#1034]*
We develop a novel method for unsupervised mineralogical mapping of CRISM imagery, which will process multiple images automatically using a single pipeline.

*Mineral and Other Materials Mapping of CRISM Data with Tetracorder 5 [#2410]*
New mapping of minerals, amorphous materials, organic, and inorganic chemical compounds in Mars CRISM is underway, searching for hundreds of new compounds.

Popa I. C.  Carrozzo F. G.  DiAchille G.  Silvestro S.  Esposito F.  et al.  
*First Supergene Enrichment Zone Discovered in Shalbatana Valley: Constrains on Martian Early Atmosphere [#2653]*
We present constrains for the oxidative state of Mars early atmosphere from evidences given by the only known martian supergene enrichment in Shalbatana Valley.

Ackiss S. E.  Horgan B.  
*Possible Sources of Sulfates in the Sisyphi Montes Region of Mars [#2230]*
Here we explore possible sources for sulfate signatures in the Sisyphi Montes region by correlating mineralogic and geomorphologic datasets.

*Latitudinal Variation in the Association of H₂O with Sulfur in Martian Soil [#1175]*
We assess the latitudinal variation in sulfate hydration state of martian regional bulk soil. This reveals the nature and importance of hydrous sulfates in soil.
Pathare A. V.  Feldman W. C.  Prettyman T. H.  Jensen E.  Maurice S.

**POSTER LOCATION #425**

*Global Mapping of Near-Surface Water-Equivalent Hydrogen [#2459]*

Our improved mapping of Mars Odyssey Neutron Spectrometer near-surface water-equivalent hydrogen better correlates with recent ice-rich mid-latitude craters.

Kuzmin R. O.  Litvak M. L.  Mitrofanov I. G.  Zabalueva E. V.

**POSTER LOCATION #426**

*Analysis of the Seasonal Variations of the Water Equivalent of the Hydrogen Amount in the Subsurface Regolith on Mars Based on the HEND Data Accumulated During Five the Martian Years [#2007]*

We will present the results of analysis of seasonal variations of the water in the martian surface layer based on HEND multi-year observations.

---

**MARS ROVER AND LANDER OBSERVATIONS:**

**GEOCHEMISTRY, MINERALOGY, AND DATA PROCESSING**  [R733]

Schröder C.  Bland P. A.  Golombek M. P.
Ashley J. W.  Athena Science Team

**POSTER LOCATION #427**

*Late-Amazonian Chemical Weathering Rate for Meridiani Planum, Mars, Derived from Candidate Stony Meteorite Finds [#2354]*

We used the ferric iron content of stony meteorite finds on Mars and dated their fall to the formation of Victoria Crater to derive a chemical weathering rate.

Mittlefehldt D. W.  Gellert R.  Ming D. W.
Morris R. V.  Schröder C.  et al.

**POSTER LOCATION #428**

*Noachian Impact Ejecta on Murray Ridge and Pre-Impact Rocks on Wdowiak Ridge, Endeavour Crater, Mars: Opportunity Observations [#2705]*

Endeavour rim rocks/Ancient impact breccias/Pre-impact rocks too. Opportunity has continued to study the rim of the Noachian-aged Endeavour crater.

Vasavada A. R.

**POSTER LOCATION #429**

*Latest Results from the Mars Science Laboratory Mission and Curiosity Rover [#2715]*

The latest results from the Mars Science Laboratory Curiosity rover mission will be discussed, including samples drilled in early 2015.

Schmidt M. E.  Mangold N.  Fisk M.  Forni O.  McLennan S. M.  et al.

**POSTER LOCATION #430**

*Classification Scheme for Diverse Sedimentary and Igneous Rocks Encountered by MSL in Gale Crater [#1566]*

We present a rock classification framework that is adapted for MSL imaging and analytical capabilities and for rock types distinctive to Mars.

Blaney D L.  Wiens R.  Maurice S.  Anderson R.  Bridges J.  et al.

**POSTER LOCATION #431**

*The Diversity of Sediments at Gale Crater from Chemcam Observations: Evidence for Multiple Sediment Source Chemistries, Diverse Alteration Histories, and Multiple Diagenetic Episodes [#2093]*

Gale sediments have at least three primary chemical source compositions. Alteration is variable and there are at least four different diagenetic fluid chemistries.

Franz H. B.

**POSTER LOCATION #432**

*Isotopic Composition of Carbon Dioxide Released from Confidence Hills Sediment as Measured by the Sample Analysis at Mars (SAM) Quadrupole Mass Spectrometer [#3014]*

Isotopic composition of CO₂ evolved from thermal processing of the Confidence Hills drill sample.

Le Deit L.  Mangold N.  Forni O.  Blaney D.  Cousin A.  et al.

**POSTER LOCATION #433**

*The Potassic Sedimentary Rocks in Gale Crater, Mars as Seen by ChemCam Onboard Curiosity [#1438]*

We present a synthesis of the chemical composition of the potassic rocks at Cooperstown and Kimberley according to their stratigraphic unit and facies.
Fluorine and Lithium at the Kimberley Outcrop, Gale Crater [1989]
The Kimberley outcrop is characterized by a large amount of fluorine. We will discuss the potential mineralogies related to these observations.

ChemCam Chemostratigraphy of the Pahrump Outcrop, Gale Crater [2099]
We report here a summary of the chemical variations occurring at the Pahrump waypoint based on the 400 observation points probed by ChemCam onboard Curiosity.

Detection of Phosphorus by ChemCam in Gale Crater [2850]
This presentation will showcase P measurements made by the ChemCam LIBS instrument in Gale Crater and provide some context as to why they are cool.

Detection of Zn with ChemCam on Mars [1413]
We report here the detection of high Zn content targets with ChemCam at the Kimberley location at Gale Crater that are linked to high-Mn concentrations.

Hardgrove C.  Johnson J.  Rice M.  Bell J.  Kinch K.  et al.  
Detecting High Manganese Phases in Curiosity Mastcam Multispectral Images and ChemCam Passive Visible to Near Infrared Spectra [2748]
Comparison of MSL Mastcam multispectral images and ChemCam passive spectra for rock surfaces found to be elevated in manganese throughout Curiosity’s traverse.

Schieber J.  Sumner D.  Bish D.  Stack K.  Minitti M.  et al.  
The Pahrump Succession in Gale Crater — A Potential Evaporite Bearing Lacustrine Mudstone with Resemblance to Earth Analogs [2153]
Basal deposits of Mt. Sharp are mudstone-dominated strata that resemble lacustrine evaporites on Earth and record the presence of a long-lived body of water.

Hydration State of Calcium Sulfate Veins as Observed by the ChemCam Instrument [2966]
We present results on the hydration state of calcium sulfates observed by ChemCam in Gale Crater; the study suggests the presence of bassanite.

Nachon M.  Mangold N.  Cousin A.  Anderson R. B.  Blank J. G.  et al.  
Dagenetic Features Analyzed by ChemCam/Curiosity at Pahrump Hills, Gale Crater, Mars [1524]
ChemCam instrument onboard Curiosity/MSL analyses of diagenetic features (concretions, light-toned veins) at Pahrump Hills (lower Mt Sharp), Gale Crater, Mars.

ChemCam Investigation of the John Klein and Cumberland Drill Tailings [2301]
Geochemical investigation by MSL’s ChemCam of drill tailings taken from the Sheepbed Mudstone, to provide spatial context to the mineralogy obtained by CheMin.

Caswell T. E.  Milliken R. E.  
Burial History of the Yellowknife Bay Formation: Insight from Fracture Morphology and Mechanics [1889]
Analysis of the stresses required to form sulfate-filled fractures at Yellowknife Bay yields estimates of burial depth.
Thermal Conductivity of the Near-Surface Martian Regolith Derived from Variations in MSL Passive Neutron Counts and Ground Temperature

Variation in MSL DAN passive data are analyzed and used to estimate bulk thermal conductivity of the near-surface martian regolith.

Pahrump Soils and Comparisons with Previous Aeolian Deposits

This study is focused on the aeolian deposit observed at Pahrump area. This deposit is then compared with previous aeolian deposits observed with ChemCam.

ChemCam Soil Analyses — Unusually High Hydrogen in the Hidden Valley Soils at Gale Crater, Mars

ChemCam data obtained from the soils in the sandy-floored Hidden Valley showed the highest H signal measured with ChemCam on MSL up to date.

Update on the Chemical Composition of Crystalline, Smectite, and Amorphous Components for Rocknest Soil and John Klein and Cumberland Mudstone Drill Fines at Gale Crater, Mars

Improved unit cell parameters resulted in revised chemical compositions for crystalline and XRD amorphous components for soil and mudstone at Gale Crater, Mars.

Crystal-Chemical Analysis of Martian Minerals in Gale Crater

Mineral phase compositions are estimated with crystal-chemical techniques on unit-cell parameters obtained by CheMin (X-ray diffractometer) in Gale Crater, Mars.

Potential Cement Phases in Sedimentary Rocks Drilled by Curiosity at Gale Crater, Mars

We present the secondary mineralogy of rocks drilled by Curiosity and discuss past aqueous environments and potential crystalline and amorphous cements.

The X-Ray Amorphous Components of the Rocknest Soil and Sheepbed Mudstone (Gale Crater, Mars): Minimum Abundance, Compositional Ranges and Possible Constituents

Based on mass balance calculations, the X-ray amorphous components of the Rocknest soil and Sheepbed mudstone show striking compositional similarities.

DAN Observations of Subsurface Water at Pahrump Hills, Lower Mt. Sharp/Gale Crater

This study presents analysis of DAN observations at Pahrump Hill areas to test local variations of bulk distribution of subsurface water and chlorine.

Statistical Variability of ChemCam LIBS Spectra from Gale Crater Exploration by Curiosity (MSL): Characterizing the Sources of Uncertainties

Statistical data treatment of ChemCam spectra at the lowest level of acquisition.

Laser Induced Breakdown Spectroscopy Sampling in Martian Polymict Breccia Northwest Africa 7034

The martian breccia meteorite NWA 7034 is used to study the limitations of ChemCam laser sampling of heterogeneous rock targets encountered on Mars.
Updated Perspective on ChemCam Data Through Clustering [#2789]

We define six groups in the ChemCam data in support of the classification effort of targets encountered by Curiosity in Gale Crater, Mars. Examples are discussed.

Discovering Chemical Structure in ChemCam Targets Using Gaussian Graphical Models: Compositional Trends with Depth [#2940]

Machine learning helps us identify depth trends in ChemCam LIBS data.

A new common-factor removal data cleaning method that utilizes multiple ISE measurements simultaneously to find the hidden shared factors of all measurements.

Using a ChemCam LIBS spectra binning procedure, results are presented for MSL/ChemCam quantitative chemical composition and compared with MSL/APXS.

Reducing placement uncertainty and improving interpretation of APXS raster targets with visually distinct phases through MAHLI images and APXS spectral data.

Linear ridges exposed in the Nilosyrtis Highlands and Nili Fossae on Mars were mapped to determine the hypothesis of their formation.

We present detailed mapping of geomorphologic units within a pit along the NW circum-Hellas rim. Datasets used include CTX, HiRISE, THEMIS, and CRISM.

Comprehensive photogeological map (1:2,000,000) of Hellas basin floor and adjacent areas based on state-of-the-art datasets (for analyses see abstract #1336).

We use three wavelengths of radar data plus optical imagery to study the complex layering of lava flows and Medusae Fossae Formation material.

The interior layer deposit in Ophir Chasma consists of at least two units, each with distinct layer thicknesses. The contact between the units is unconformable.
Schmidt G. Flahaut J. Fueten F. Hauber E. Stesky R. POSTER LOCATION #464
Evidence for an Unconformity Within the Interior Layered Deposit of Hebes Chasma, Valles Marineris, Mars [#1237]
Examination of layer thickness and attitudes of ILDs within Hebes Chasma help to define the contact between the central ILD mound and a separate eastern ILD.

Marcucci E. C. Herrick R. R. POSTER LOCATION #465
Stereo-Derived Topography of Inflated Lava Flows Near Elysium Mons, Mars [#1488]
We created high-spatial-resolution DEMs of inflated flows near Elysium Mons, Mars, to assist in the study and identification of pahoehoe flows.

Crown D. A. Mest S. C. POSTER LOCATION #466
Geologic Mapping of the Tyrrhenus Mons Lava Flow Field, Mars [#2122]
Geologic mapping of the Tyrrhenus Mons flow field includes delineation and analysis of lava flow lobes and various types of erosional channels.

This study explores the history of the east rim of Hellas where important spatial and temporal relationships between volcanism and volatiles are preserved.

Bramble M. S. Mustard J. F. POSTER LOCATION #468
Stratigraphy of Olivine-Carbonate-Bearing Units Forming Mesas and Linear Features in Northeast Syrtis Major: Implications for Emplacement [#2090]
Mesas and linear features bearing olivine–carbonate mineral signatures in the Northeast Syrtis Major region were investigated using orbital spacecraft data.

Fortezzo C. M. Kumar P. S. Platz T. POSTER LOCATION #469
Geologic Mapping of Central Valles Marineris, Mars [#2319]
Mapping results from the eastern portion of central Valles Marineris, and initial results from western portion of central Valles Marineris.

Caprarelli G. POSTER LOCATION #470
Stratigraphic Relations of Hesperian Transition Units in the Nepenthes Region, Mars [#1584]
This work examines the stratigraphic relation between units HNt and eHt in the Nepenthes region, using impact crater dimension statistics.

Kukkonen S. Kostama V.-P. Raitala J. POSTER LOCATION #471
Mapping and Dating the Outflow Channels on the Northeastern Hellas Rim Region of Mars by Using High-Resolution Images: A Case Study of Harmakhis Vallis [#2374]
The work outlines the history of geologic activity within Harmakhis Vallis based on the mapping and dating results of high-resolution CTX and HiRISE images.

Stein T. C. Arvidson R. E. Zhou F. POSTER LOCATION #473
PDS Analyst’s Notebook for MSL and Addition of Context Mosaics [#1435]
The Analyst’s Notebook integrates MSL engineering and science data and documentation. Newly added are context mosaics created from Mastcam and Navcam data.

Photometric Lambert Correction for Global Mosaicking of HRSC Image Data [#1434]
For global mosaicking of HRSC we present a first-order systematic photometric correction for the single image sequences based on a Lambertian reflectance model.
**POSTER LOCATION #475**

*Color HRSC+OMEGA Image Mosaics of Mars [#1404]*

We will demonstrate a new, improved, second approach for mosaicking MEx/HRSC images, focusing on the color processing when using this new second approach.

**POSTER LOCATION #476**

*Log-Likelihood Method of Reducing Noise in CRISM Along-Track Oversampled Hyperspectral Images [#1708]*

We develop an iterative log maximum likelihood method with a penalty function regularization approach to process and reduce noise in CRISM ATOs.

Palafox L. F.  Alvarez A. M.  Hamilton C. W.  
**POSTER LOCATION #477**

*Automated Detection of Impact Craters and Volcanic Rootless Cones in Mars Satellite Imagery Using Convolutional Neural Networks and Support Vector Machines [#2316]*

Using Convolutional Neural Networks and Support Vector Machines, we classify craters and volcanic rootless cones in images like those for the MRO, HiRISE.

**POSTER LOCATION #478**

*Systematic Processing of Mars Express HRSC Image Mosaic Quadrangles [#2387]*

In the absence of a full atmospheric correction, we introduce a technique for equalizing HRSC images in a mosaic based on a brightness reference map.

Mayer D. P.  Kite E. S.  
**POSTER LOCATION #479**

*The Planetary GIS/Data Lab at the University of Chicago [#2901]*

The University of Chicago has a new Planetary GIS/Data Lab. A primary focus of the lab is Mars geomorphology. Initial results from the lab are described.

Sutton S.  Chojnacki M.  Kilgallon A.  HiRISE Team  
**POSTER LOCATION #480**

*Precision and Accuracy of Simultaneously Collected HiRISE Digital Terrain Models [#3010]*

We discuss potential errors, as well as the intrinsic accuracy and precision of HiRISE DTMs, as they relate to the magnitude of topographic surface changes.

**POSTER LOCATION #481**

*MRO/HiRISE Radiometric Calibration Update [#1498]*

Calibrated; now/HiRISE radiometric/Numbers have meaning.

---

**MARS GEOMORPHOLOGY: RECURRING SLOPE LINEAE, SLOPE STREAKS, AND GULLIES [#R736]**

Mitchell J. L.  Christensen P. R.  
**POSTER LOCATION #483**

*Recurring Slope Lineae and the Presence of Chlorides in the Southern Hemisphere of Mars [#1624]*

The colocation of southern-hemisphere RSL and local chloride deposits was measured to assess the role of chloride brines as mechanisms of RSL formation.

Fergason R. L.  Dundas C. M.  Anderson R. B.  
**POSTER LOCATION #484**

*In-Depth Regional Assessment of Thermophysical Properties of Active Gullies on Mars [#2009]*

Results of detailed characterization of gully morphology and advanced thermal modeling to investigate the role of seasonal CO₂ frost, subsurface ice, and water.

**POSTER LOCATION #485**

*The Effect of Regolith Density on the Simulation of Martian Gullies [#1569]*

Experiments using different densities of JSC Mars-1 were conducted in an attempt to simulate formation of martian gullies.
Contemporary aeolian activity, recurring slope lineae, and mass wasting conspire to modify the steep slopes of Valles Marineris.
Schofield R. E.  Hausrath E. M.  Gainey S. R.

POSTER LOCATION #495
Zeolite Weathering in Laboratory and Natural Settings, and Implications for Mars [#2160]
Zeolites dissolve more rapidly than the clay minerals with which they are found on Mars, and may therefore provide a sensitive indicator of aqueous conditions.

Hurowitz J. A.  Fischer W. W.  Grotzinger J. P.  McLennan S. M.  Tosca N. J.

POSTER LOCATION #496
The Importance of Fe-Redox Processes in Groundwater Chemistry on Earth and Mars [#2769]
Fe (and S) redox chemistry in terrestrial basaltic groundwaters highlight the importance of oxidant availability as the driver of fluid acidification on Mars.

Dehouck E.  Gaudin A.  Chevrier V.  Mangold N.

POSTER LOCATION #497
Influence of Redox Conditions on the Secondary Mineralogy of Early Mars [#1225]
Experimental results suggest that strong oxidants would have inhibited the formation of widespread Fe/Mg-smectites on early Mars.

Steiner M. H.  Hausrath E. M.  Elwood Madden M. E.

POSTER LOCATION #498
Dissolution of Nontronite in Brines and Implications for Habitable Environments on Mars [#2350]
Brine dissolution of nontronite can help provide an understanding of aqueous conditions on Mars and implications for habitability.

Bartlett C. L.  Hausrath E. M.  Adcock C. T.

POSTER LOCATION #499
Phosphate Release: The Effect of Prebiotic Organic Compounds on Dissolution of Mars-Relevant Phosphate Minerals [#2451]
Phosphate mineral interaction with prebiotic organic compounds may impact phosphate mobility in early, potentially habitable environments on Mars.

Cino C. D.  Dehouck E.  McLennan S. M.

POSTER LOCATION #500
Geochemical Modeling of Aqueous Alteration Processes Within the Burns Formation, Meridiani Planum, Mars [#2144]
A mass balance algorithm incorporating available uncertainties was used to better constrain potential phyllosilicate mineralogy in the Burns Formation, Mars.

Sekhar P.  Lowell R. P.

POSTER LOCATION #501
Preliminary Numerical Modeling of Brine Formation on Mars During Impact-Driven Hydrothermal Circulation: The Chesapeake Bay Analog [#2998]
Numerical modeling of martian hydrothermal system formed by impact crater to explain brine formation on the martian surface: The Chesapeake Bay Analog.

Schwenzer S. P.  Bridges J. C.  Leveille R.  Wiens R. C.  Mangold N.  et al.

POSTER LOCATION #502
Fluids, Evaporation and Precipitates at Gale Crater, Mars [#1441]
Diagenetic fluids at Gale Crater form clays at low temperature. These fluids, if evaporated, are capable of forming sulfates as found in light-toned veins.

Bell M. S.

POSTER LOCATION #503
Experimentally Shocked and Altered Basalt: SEM and XRD Analysis of Laboratory Analogs for Calibration of Mars Remote Sensing and In Situ Data [#2475]
Comparison of SEM and XRD analysis results from experimentally shocked and unshocked Mars analog basalt altered under Mars-like conditions.

Friedlander L. R.  Glotch T.  Michalski J. R.

POSTER LOCATION #504
Comparison of VNIR Reflectance and MIR Emissivity Spectroscopic Changes for Impact-Altered Phyllosilicates [#2623]
VNIR reflectance and MIR emissivity results for five clays exposed to experimental impacts are discussed to reveal trends in spectral change by clay and pressure.
Impact-Induced Clay Mineral Formation and Distribution on Mars [#2554]
Impacts make much melt/Allowing Mars clays to form/But where are clays now?

The Effects of Shock Pressure on the Raman Spectrum of High Purity Quartz Crystals [#1848]
Quartz crystals were impacted at a range of velocities to generate varying degrees of shock before changes in their
Raman spectra were observed and analyzed.

Initial Results from the Desert Fireball Network [#1693]
We present the initial results and future plans for the Desert Fireball Network, the meteorite hunting camera network now in the Australian outback.

In-Situ Imaging and Spectroscopic Observations of Artificial Shooting Stars [#2766]
Artificial shooting stars were produced using a two-stage light gas gun. The results of high-speed imaging and time-
resolved spectroscopy are presented.

Cometary Dust Tails in NEOWISE [#2820]
Cometary dust in the NEOWISE data objects near the Sun.

Size of ISON changed/Sublimation can’t explain/ISON thrice broke up!

Investigating Dusty Plasma of Cometary Coma with NASA Stardust Data [#2326]
Data from NASA’s Stardust flyby of Comet Wild 2 is used to investigate the possibility that coulomb lattice structures exist within cometary coma dusty plasmas.

Chemical Recycling in the Comae of Comets [#1749]
We investigate the coma chemistry of HCN and other molecules and find that HCN “recycles” via protonation reactions and subsequent dissociative recombination.

BOPPS Rapid Response Planetary Science: First Results [#1409]
The first images of comets from a stratospheric balloon observatory have been obtained by the Balloon Observation Platform for Planetary Science (BOPPS) mission.

We evaluate the feasibility of radar imaging inside complex small bodies (comets), with primary focus on data sampling along realistic orbital trajectories.

A technique for precisely encoding fireball trajectory timing using a shutter modulated by a de Bruijn sequence for simpler high-resolution meteor cameras.
Chelyabinsk: A Worthy Fall

POSTER LOCATION #517
Mineralogy, Petrology, Chronology, and Exposure History of the Chelyabinsk Meteorite and Parent Body [#2686]
Chelyabinsk exhibits three lithologies, evidence for multiple impact, and heating events from 4.6 Ga to almost present day, and has a very young exposure age.

POSTER LOCATION #518
$^{26}$Al and $^{10}$Be Activities in Chelyabinsk (LL5): Implications for Cosmic-Ray Exposure History [#1453]
Modeling of Chelyabinsk as an object 5 m in radius irradiated in one stage for 1.3 to 1.4 Ma can explain most but not all measurements of $^{26}$Al, $^{10}$Be, and $^3$He.

POSTER LOCATION #519
Chelyabinsk Ar-Ar Ages — A Young Heterogeneous LL5 Chondrite [#2226]
We present Ar-Ar ages from 6 lithologically distinct fragments of the Chelyabinsk meteorite. Integrated and plateau ages range from 264 ± 2 to 2083 ± 5 Ma.

Nabelek L., Mazanec M., Kdyr S., Kletetschka G.  
POSTER LOCATION #520
Magnetic, In Situ, Mineral Characterization of Chelyabinsk Meteorite Thin Section [#3006]
Meteorite, taenite, kamacite, coercivity.

POSTER LOCATION #521
Recycling of an Asteroid via a Comet Inferred from the Chelyabinsk Meteorite [#1865]
Comprehensive geochemical analyses revealed that a 20-m-sized Chelyabinsk body formed by catastrophic impact on 150 Ma and subsequently interacted with fluid.

Korycansky D. G.  
POSTER LOCATION #522
Modeling the Chelyabinsk Impact, 2 [#1144]
Efforts to model the 2013 Chelyabinsk impact with the CTH code are described.

Kuzmicheva M. Yu., Losseva T. V., Lyakhov A. N.  
POSTER LOCATION #523
Transient Magnetic Fields Caused by Air-Blast Events [#1947]
Geomagnetic field disturbances after air-blast events such as the Tunguska bolide and the Chelyabinsk bolide are considered.

Luther R., Lukashin A., Artemieva N., Shuvalov V., Wünnemann K.  
POSTER LOCATION #524
Snow Compaction During the Chelyabinsk Meteorite Fall [#1724]
Simulations of snow funnels (iSALE) demonstrate the capability of the material models to describe the penetration of projectiles into highly porous materials.

Itoikawa: Musing Over the Big Picture Through Small Grains

Nishiizumi K., Caffee M. W., Welten K. C.  
POSTER LOCATION #525
Measurements of Cosmogenic Radionuclides in a Hayabusa Sample [#2499]
Concentrations of cosmogenic nuclides $^{10}$Be and $^{26}$Al in a Hayabusa particle were measured in order to study exposure age and escape rate of Itoikawa surface materials.

Tatsumi E., Sugita S.  
POSTER LOCATION #526
Dynamical Evolution of Itoikawa Inferred from Impact Experiments on Rubble-Pile Targets [#1909]
Impact experiments on coarse-grain targets yielded a crater size scaling with armoring effect, supporting a much younger crater retention age of Itoikawa.
Yada T.  Uesugi M.  Uesugi K.  Karouji Y.  Suzuki Y.  et al.  

**POSTER LOCATION #527**

**Three Dimensional Structures and Detail Morphologies of Aggregate-Type Itokawa Particles Analyzed by Dual-Energy Synchrotron Radiation Computed Tomography and Field Emission Secondary Electron Microscope [#1850]**

Aggregate-type Itokawa particles were analyzed by SR-CT and Fe-SEM, and their results imply two types of them should have formed in different environments.


**POSTER LOCATION #528**

**Petrology of Two Itokawa Particles: Comparison with Equilibrated LL Chondrites [#1884]**

We report the petrography of two Itokawa particles and TEM study of one, and compare them to Antarctic LL chondrites with variable petrologic types.


**POSTER LOCATION #529**

**Luminescence Spectroscopical Properties of Plagioclase Particles from Hayabusa Sample Return Mission [#2931]**

We report a systematic spectroscopical investigation of plagioclase particles returned by the Hayabusa spacecraft from asteroid Itokawa.

Busemann H.  Meier M. M. M.  Altmann F.  Alwmark C.  Bajt S.  et al.  

**POSTER LOCATION #530**

**New Noble Gas Data and Further Examinations of Dust from Asteroid Itokawa [#2113]**

New data support the idea of a freshly rejuvenated Itokawa regolith. SRXTM provides precise grain masses, and a new FIB method was tested to reduce SW interferences.

Christoffersen R.  Keller L. P.  

**POSTER LOCATION #531**

**Solar Ion Processing of Itokawa Grains: Constraints on Surface Exposure Times [#2084]**

A model for the rate of growth of ion-damaged rims on olivine grains from asteroid Itokawa suggests rims form during 1000–15,000 years of surface exposure.

Abe M.  Yada T.  Uesugi M.  Karouji Y.  Nakato A.  et al.  

**POSTER LOCATION #532**

**Current Status of JAXA’s Extraterrestrial Sample Curation Center [#1245]**

We report the current status of JAXA’s Extraterrestrial Sample Curation Team (ESCuTe) and the preparation plan for Hayabusa 2 return sample receiving.

---

**CHONDRITES: MAKING AND BREAKING PARENT BODIES [R741]**

Irving A. J.  Kuehner S. M.  Ziegler K.  Kuntz F.  Sipiera P. P.  

**POSTER LOCATION #533**

**Northwest Africa 7135: An Unusual Reduced, Unequilibrated Chondrite Containing Oldhamite, Daubreelite, Schreibersite and Djerfisherite, and with a Unique Oxygen Isotopic Composition [#2437]**

We describe an ungrouped specimen with highly reduced mineralogy that may derive from a previously unrecognized chondritic parent body.

Davidson J.  Alexander C. M. O’D.  Schrader D. L.  Nittler L. R.  Bowden R.  

**POSTER LOCATION #534**

**Miller Range 090657: A Very Pristine Renazzo-Like (CR) Carbonaceous Chondrite [#1603]**

We report isotopic, chemical, and mineralogical data that suggest Miller Range 090657 is one of the most pristine CR chondrites analyzed to date.

Hochleitner R.  Kaliwoda M.  Guenther A.  

**POSTER LOCATION #535**

**The New Bavarian Meteorite Machtenstein — A H5 Ordinary Chondrite Found Around 1956 [#2453]**

First results about petrography, mineralogy, and Raman spectroscopy of the new Bavarian meteorite Machtenstein (H5 ordinary chondrite) are reported.

Farsang S.  Fagan A. L.  Kring D. A.  

**POSTER LOCATION #536**

**LL-Chondrite LAR 12325: A Product of an Asteroid Impact Cratering Event [#1402]**

The study explores the petrography, chemistry, and cooling rates of meteorite LAR 12325 in order to interpret its formation and evolution.
Corrigan C. M.  Lunning N. G.  Ziegler K.  

**POSTER LOCATION #537**

*An H Chondrite Melt Clast in an LL Chondrite: Evidence for Mixing of Ordinary Chondrite Parent Bodies [#2678]*

H chondrite melt clast/Mixed into an LL host/How did you get there?

Yamaguchi A.  Kimura M.  Barrat J. A.  Greenwood R. C.  Franchi I. A.  

**POSTER LOCATION #538**

*Petrology, Bulk Chemical and Oxygen Isotopic Composition of a Low-FeO Ordinary Chondrite, Yamato 982717 [#1679]*

Y-982717 is the lowest-FeO H chondrite found to date. We suggest that the H chondrites are more compositionally diverse than has been previously recognized.

Armstrong K.  Ruzicka A. M.  

**POSTER LOCATION #539**

*Major-Element Geochemistry of Large, Igneous-Textured Inclusions in Ordinary Chondrites [#1572]*

The petrography and major-element bulk chemistry of 29 large igneous inclusions from a diverse array of host O chondrites.

Mayne R. G.  Crossley S.  Gregory J.  

**POSTER LOCATION #540**

*Analyzing Unclassified Meteorites [#2118]*

Work is underway to continue building a library of XRF meteorite spectra from samples in the Monnig Meteorite Collection. Xray a space rock/Can I tell what type it is?/Can make a good guess.

Torrano Z. A.  Mittlefehldt D. W.  Peng Z. X.  

**POSTER LOCATION #541**

*Petrology and Cosmochemistry of a Suite of R Chondrites [#1229]*

An analysis of R chondrites in order to examine whether there are compositional effects caused by high-T, high-fluid metamorphism of nebular materials.

Khan R.  Shirai N.  Ebihara M.  

**POSTER LOCATION #542**

*Systematic Variation of Volatile Elements in a Petrologic Suite of R Chondrites [#2006]*

Volatile elements (Zn, In, Cd, Tl, Pb, and Bi) were determined in a petrologic suit of 15 R chondrites to study their formation processes.

Gregory T.  Zolensky M. E.  Trieman A.  Berger E.  Le L.  et al.  

**POSTER LOCATION #543**

*Lithologies Making Up CM Carbonaceous Chondrites and Their Link to Space Exposure Ages [#1227]*

A study into the link between the matrix composition and exposure age of CM regolith breccias.

Hyde B. C.  Tait K. T.  Rumble D. III  

**POSTER LOCATION #544**

*Achondritic Impactor Clasts in Northwest Africa 869 [#1983]*

Two achondritic clasts have been found in NWA 869, a L3-6 chondritic regolith breccia. One clast is from the HED parent body. The source of the second clast is unknown.

Holstein J. L.  Schmitz B.  Heck P. R.  

**POSTER LOCATION #545**

*Spinel Grains in Unequilibrated L Chondrites (L3.1, L3.4, and L3.7): Preliminary Data for Classification of Fossil Meteorites [#1479]*

We present a study of spinel group minerals from modern unequilibrated L chondrites that may aid in the identification of unequilibrated fossil meteorites.

Steer E. D.  Schwenzer S. P.  Wright I. P.  Grady M. M.  

**POSTER LOCATION #546**

*Trace Element Mobility in Cold Desert Alteration Systems [#1820]*

We look at how small quantities of water interact in cold environments with common minerals in L6 meteorites and how trace elements are stripped out and added.
Welten K. C.  Caffee M. W.  Meier M. M. M.
Riebe M.  Nishiizumi K.  et al.  POSTER LOCATION #547
The Short Cosmic Ray Exposure Ages of Two H Chondrites: Evidence of a Common Ejection Event 0.1 Million Years Ago [#2866]
We report short CRE ages of two Antarctic H-chondrites and discuss if the ejection of these meteorites is linked to a recent asteroid breakup event ~0.1 m.y. ago.

CHONDRITES AND THEIR COMPONENTS: ALL THINGS REFRACTORY [R742]

Tachibana S.  Takigawa A.  POSTER LOCATION #549
Condensation Coefficient of Forsterite in the H2-H2O-Mg2SiO4 System [#2192]
Condensation coefficient of forsterite in the H2-H2O-Mg2SiO4 system was evaluated to be 0.038 ± 0.005 at 1235 K and a supersaturation ratio of ~230.

Han J.  Keller L. P.  Brearley A. J.  POSTER LOCATION #550
Microstructural Evidence for the Condensation Origin of Hibonite-Spinel Inclusions from ALH A77307 (CO3.0) [#2214]
We present the microstructures of two hibonite-spinel CAIs in ALH A77307 (CO3.0) using FIB/TEM to better understand their formation conditions and processes.

Ustunisik G.  Ebel D. S.  Walker D.  POSTER LOCATION #551
An Experimental Study of Trace and Rare Earth Element (REE) Partitioning Between CAI-Type Melts and Grossite: Implications for Processes During CAI Formation [#2051]
Trace-element partitioning experiments between grossite and CAI-type melts reveal that REEs, HFSEs (Zr, Nb, Hf, Ta, Th), and LILE (B) are incompatible in grossite.

Fukuda K.  Hiyagon H.  Takahata N.  Sano Y.  Hashimoto A.  POSTER LOCATION #552
A Silicon Isotopic Study of FUN-Like Forsterite-Bearing Inclusion from Allende [#2275]
We report Si isotopic compositions of a FUN-like inclusion AL1B-F from Allende, which show large mass-dependent fractionation of up to ~22‰/amu.

Aléon J.  Marin-Carbonne J.  McKeegan K. D.  POSTER LOCATION #553
Coupled O and Mg Isotopic Investigations of Compact Type A Refractory Inclusions [#2711]
O and Mg isotopes in two compact type A CAIs show that O isotopes of the gas evolved from 16O-rich to 16O-poor during their formation when 26Al was canonical.

Two Generations of Sodic Metasomatism in an Allende Type B CAI [#2552]
Faults and mineral chemistry in an Allende CAI suggest two separate generations of sodic chemical alteration, both pre- and post-parent body assembly.

Ivanova M. A.  Krot A. N.  MacPherson G. J.  POSTER LOCATION #555
Genetic Link Between Fluffy Type A, Compact Type A and Type B CAIs from CV3 Chondrites NWA 3118 and Efremovka [#2371]
To understand evolution and genetic relationship between FTA, CTA, and Type B CAIs we studied mineralogy and bulk chemical compositions of these CAI types.

Mineralogy and Petrology of EK-459-5-1, a Type B1 CAI from Allende [#2610]
This article reports results from a detailed in situ petrologic study of a Type-B1 CAI from the Allende meteorite.
Fu R. R. Weiss B. P. Schrader D. L.  
Magnetic Fields in the Late-Stage Solar Nebula Recorded in CR Chondrites  
Chondrules from CR chondrite LAP 02342 formed in a weak magnetic field <15 µT, suggesting decline of the solar nebula by 3.6 to 4.1 m.y. after CAIs.

Jacobsen B. Bigolski J. N. Dobrică E.  
Oxygen Isotopes in Microchondrules and Rine Grained Rims: Co-Gentic Origin of Chondrules, Micro-Chondrules and Rims in UOCs?  
We present oxygen isotope data from chondrules, microchondrules, and fine-grained rims (FGRs) to determine their relationship and origin in UOCs.

Harju E. R. Kohl I. E. Rubin A. E. Young E. D.  
Silicon Condensation in Type 1AB Chondrules at Near Equilibrium Conditions  
New data collected to determine if chondrules incorporated a silicon-bearing gas indicates that if the process occurred it was at near equilibrium conditions.

Tenner T. J. Kimura M. Kita N. T.  
High-Precision SIMS Chondrule Oxygen Isotope Ratios from the Yamato 82094 Ungrouped Carbonaceous Chondrite  
Chondrule oxygen/Is C-chondrite chondrule-like/Still, I have no group.

Bigolski J. N. Zolensky M. E. Christoffersen R.  
Fine-Grained Rims and Matrix in Unequilibrated Ordinary Chondrites: A Comparative Study of Northwest Africa 5717 (Ung. 3.05) and Semarkona (LL3.00)  
A microanalytical comparison between two unequilibrated ordinary chondrites suggests different alteration histories for primary materials within each chondrite.

Bellino G. Leroux H. Roskosz M.  
ATEM Investigation of an Agglomeratic Chondrule in the Bishunpur LL3.15 Chondrite  
The characteristics at the submicrometer scale of the fine-grained fractions of an agglomeratic chondrule have been investigated by ATEM for the first time.

Baecker B. Rubin A. E.  
Observations on Multiple Melting Processes in a Barred Pyroxene-Olivine (BPO) Chondrule in LL3.00 Semarkona  
A BPO chondrule from Semarkona has been melted several times; it shows prominent multiple overgrowth layers on low-Ca pyroxene phenocrysts.

Baecker B. Rubin A. E. Wasson J. T.  
Evidence for Multiple Melting Events in Porphyritic Chondrules from LL3.00 Semarkona  
Low-Ca pyroxene phenocrysts in porphyritic chondrules show sawtooth zoning caused by multiple melting, mesostasis mixing, and fractional crystallization.

Hobart K. K. Crapster-Pregont E. J. Ebel D. S.  
Decoding the History of a Layered Chondrule Through Olivine Grain Orientation Measurements Using EBSD  
Examination of an extraordinary layered chondrule in Acfer 139 using EBSD reveals a complex accretionary history not adequately explained by current mechanisms.
The Formation Conditions of CV Chondrules: Clues from Distribution and Isotopic Compositions of Sulfides [1805]

We report a petrographic and isotopic study of CV chondrule sulfides. The results support that gas-melt exchanges took place during the chondrule-forming event.

Metal-Centric Perspective of a Layered Chondrule in the CR Chondrite Acfer 139: Insights from Electron Backscattered Diffraction [1561]

Orientation and textural analysis of multiple, concentric metal layers in a layered chondrule from Acfer 139 yielding chondrule formation constraints.

The Formation Conditions of CV Chondrules: Clues from Distribution and Isotopic Compositions of Sulfides [1805]

We report a petrographic and isotopic study of CV chondrule sulfides. The results support that gas-melt exchanges took place during the chondrule-forming event.

Metal-Centric Perspective of a Layered Chondrule in the CR Chondrite Acfer 139: Insights from Electron Backscattered Diffraction [1561]

Orientation and textural analysis of multiple, concentric metal layers in a layered chondrule from Acfer 139 yielding chondrule formation constraints.

Dergaon (H 4-5) Chondrite: Diverse Chondrule Morphology and Evidences of Shock Induced Melting [1063]

Dergaon Chondrite is an inventory of diverse chondrule types, which shows evidence of locally impact-induced Fe-rich silicate melting.

Early Size Distributions of Chondrule Subgroups Overprinted by the Final Accumulation Process of Particle Components in Allende [2896]

A survey of >5100 particles in Allende reveals very broad size distributions and a final sorting event overprinting distinctive subparticle size distributions.

Semarkona: Constraining Chondrule and Chondrite Formation [2695]

The thermal processing of Semarkona’s matrix and the size of its chondrules imply that only a small fraction of the ambient dust was melted to form chondrules.

Primary Feldspar in Semarkona (LL3.00) Chondrules [2067]

We report our investigations into the occurrences and compositions of primary feldspar in Semarkona chondrules.

Size-Frequency Distributions and Physical Properties of Chondrules from X-Ray Microtomography and Digital Data Extraction [1937]

We present 3D-based chondrule size-frequency distributions for three ordinary and one EL chondrite. We examine the frequency and type of compound chondrules.

Primary Nebular Sulfides in CR and CM Chondrites: Formation by Sulfidization and Crystallization [1059]

This study details our observations of potential primary sulfides which formed in the solar nebula from sulfidization and crystallization.

Complementary rare Earth Element Abundances in Enstatite and Oldhamite in EH3 Chondrites [2619]

New data confirm flat REE in bulk EH3 with 60 vol% enstatite elevated in heavy REE and depleted in Eu and Yb, and 1 vol% REE-rich CaS with the complementary patterns.

Chemical Composition and Iron Oxidation State of the Amorphous Silicate Matrix in Acfer 094 [1172]

We report on analytical transmission electron microscopy investigations of the amorphous silicate matrix in six electron-transparent Acfer 094 samples.
Dawn FC Band Parameters for the Detection of Fe-Bearing Phyllosilicates on Ceres [#2220]  
Ceres possible hydrated mineralogy may reveal Fe-bearing phyllosilicates. We present a combination of FC color filter band parameters for their detection.

Penttilä A. Kohout T. Muinonen K.  
Online Spectral Fit Tool (OSFT) for Analyzing Reflectance Spectra [#2186]  
Tool for fitting continuum and absorption bands to UV-VIS-NIR reflectance spectra is presented. Implementation is done in Javascript and HTML.

Wang Alian. Joliff B. L.  
Phyllosilicate-Like Species in Tagish Lake Meteorite as Seen by Raman Spectroscopy [#2493]  
Most phyllosilicate-like species has low-crystallinity with a polymerization degree similar to chain-silicates. Crystalline dioctahedral phyllosilicates are rare.

Welzenbach L. C.  
On-the-Fly Calibration for Rapid Raman Chondrite Classification [#2771]  
Rapid Raman classification of ordinary chondrites can be made more confidently with real-time calibration using a sub-cm⁻¹ accurate reference spectrum.

Caplan C. E. Huss G. R. Hammer J. E. Ogiore R. C. Nagashima K.  
Crystal Orientation Effects for Oxygen-Isotope Measurements of Chromite [#2794]  
We measured the oxygen isotopic compositions of terrestrial chromite to investigate instrumental mass fractionation due to crystal orientation.

Amari S. Matsuda J. Morishita K. Nara M.  
Noble Gas and Raman Spectroscopic Study of Residues from Saratov (L4) [#1061]  
Raman analysis of Saratov residues indicates that either Q is a discrete carrier, or Q gases are released by structural changes of carbon during oxidation.

Cathodoluminescence Microscopy and Spectroscopy of Forsterite from the Tagish Lake Meteorite: An Implication for Asteroidal Processes [#2117]  
This study emphasizes the cathodoluminescence (CL) and Raman spectroscopical properties of the Tagish Lake meteorite to identify the meteoritic forsterite.

Daly L. Bland P. A. Trimby P. W. Moody S. Yang L. et al.  
Transmission Kikuchi Diffraction Applied to Primitive Grains in Meteorites [#1752]  
Transmission Kikuchi diffraction when applied to submicrometer grains in meteorites reveals incredibly complex nanometer-scale variations.

Hochleitner R. Hoffmann V. H. Kaliwoda M. Yamamoto Y. Mikouchi T. et al.  
Moessbauer and Raman Spectroscopical Data of the New German Meteorite Braunschweig (Fall 2013, L6 Ordinary Chondrite) [#1471]  
Mössbauer and micro-Raman spectroscopical data of the Braunschweig meteorite, a L6 ordinary chondrite (fall 2013, N Germany), are reported.

D IFFERENTIATED METEORITES AND BODIES: IRONS, PALLASITES, AND MESOSIDERITES [R744]

Correlative TEM and Atom-Probe Tomography of a Kamacite-Taenite Interface in the Bristol Iron Meteorite [#2938]  
We present a correlative TEM and Atom-Probe tomographic study of the kamacite-taenite interface within the Bristol IVA meteorite.
Isa J. McKeegan K. D. Wasson J. T.  
**POSTER LOCATION #587**

*Study of Inclusions in Iron Meteorites, Cr-Bearing Sulfide Inclusions in IVA Iron Meteorites* [#3013]

We searched for Cr-bearing inclusions in IVA iron in an attempt to find bulk Cr concentrations and volatile abundances during fractional crystallizations.

Dottin J. W. III Farquhar J. Labidi J.  
**POSTER LOCATION #588**

*Sulfur Isotopes of Main Group Pallasites Support Links to IIIAB Iron Meteorites* [#2597]

We provide sulfur isotope data that support links to IIIAB Iron meteorites.

Matthes M. Fischer-Gödde M. Kruijer T. S. Leya I. Kleine T.  
**POSTER LOCATION #589**

*Accretion and Cooling History of the IIIAB Iron Meteorite Parent Body* [#2382]

Pd-Ag ages of IIIAB irons indicate very rapid cooling within ~4 Ma after CAI, requiring a small parent body or early impact disruption of a larger body.

Breen J. P. Rubin A. E. Wasson J. T. Pitt D.  
**POSTER LOCATION #590**

*Metal-Sulfide Shock Features in the Willamette IIIAB Iron* [#2960]

Embayments of metal into sulfide nodules in Willamette result from penetration of the nodules by a metal-sulfide melt during a severe shock event.

Fischer-Gödde M. Kruijer T. S. Kleine T. Wasson J. T.  
**POSTER LOCATION #591**

*Isotopic Constraints on the Origin of IIE Iron Meteorites* [#2697]

We present the first results of a Ru, Mo, W, Pt isotope study of IIE iron meteorites. New Ru isotope data may link IIE iron meteorites and ordinary chondrites.

Wang L. Y. Hsu W. B. Li J. W.  
**POSTER LOCATION #592**

*In Situ LA-ICP-MS Study of Platinum Group Elements and Au in Mesosiderite Metallic Phase* [#1791]

The PGEs and Au distributions within mesosiderite metallic phase resemble those of Waber IIIAB irons indicates they have a close genetic relationship.

Sugiura N. Kimura M.  
**POSTER LOCATION #593**

*Reheating and Cooling of Mesosiderites* [#1646]

Cooling rates of several mesosiderites derived from silicates and schreibersite seem to correlate, suggesting that they stayed in the regolith down to ~400°C.

Bono R. K. Tarduno J. A.  
**POSTER LOCATION #594**

*Preliminary Paleomagnetic Analysis of Mesosiderite Northwest Africa 8368* [#2605]

Paleomagnetic data recorded by olivine crystals from mesosiderite Northwest Africa 8368 are studied to constrain models of parent body formation.

**POSTER LOCATION #595**

*Cold Desert Weathering Effects on Magnetic Properties of L6 Chondrites* [#2046]

The main magnetic minerals of L chondrites are the first to breakdown in weathering processes and so we look at how the alteration affects primary magnetism.

Varela M. E. Sylvester P. Souders K. Saavedra M. Zucolotto M. E.  
**POSTER LOCATION #596**

*Patos de Minas: A Compositional Study of Sulfides, Schreibersite and Cohenite* [#1503]

Various phases of the Patos de Minas (IIAB) iron meteorite were analyzed in order to understand metal partitioning and origin of the meteorite.
DIFFERENTIATED METEORITES AND BODIES: 
PRIMITIVE, UNGROUPED, AND ANOMALOUS ACHONDrites [R745]

POSTER LOCATION #598
Classification of Meteorites Based Purely on Bulk Elemental Compositions for Analysis of Data Obtained Through Space Missions [R1802]
Our new statistical classification scheme using bulk compositions of meteorite roughly reproduce the current classification scheme on the level of class to clan.

Dunlap D. R. Ku Y. J. Garvie L. A. J. Wadhwa M. 
POSTER LOCATION #599
Petrology of Ungrouped and Anomalous Achondrites SaU 493, NWA 4470, NWA 6962, and NWA 5297 [R2570]
In this work, we investigate the petrology of four ungrouped and otherwise anomalous achondrites SaU 493, NWA 4470, NWA 6962, and NWA 5297.

Kuehner S. M. Irving A. J. Ziegler K. Jost M. Aaronson A. 
POSTER LOCATION #600
Evidence for Late-Stage Magmatic or Subsolidus Reduction in Paired Anomalous Lodranites Northwest Africa 8410 and 8422 [R2411]
Reduction features in olivine similar to those observed for ureilites and some brachinites are described in two anomalous lodranites.

Farley K. R. Ruzicka A. M. Armstrong K. 
POSTER LOCATION #601
NWA 8614: The Least Heated Winonaitae? [R1821]
Northwest Africa 8614 is classified as a winonaitae and it contains numerous and readily apparent chondrules. The possible significance is discussed.

POSTER LOCATION #602
Nitrogen and Noble Gases in a Diamond-Bearing Pebble from SW Egypt [R1312]
This study confirms the extraterrestrial origin of Hypatia, a diamond-rich pebble, and puts new constraints on its cosmochemical origin.

Archer G. J. Walker R. J. Irving A. J. 
POSTER LOCATION #603
Highly Siderophile Element and 187Re-187Os Isotopic Systematics of Ungrouped Achondrite Northwest Africa 7325 [R1987]
Highly siderophile elements and 187Re-187Os constrain metal-silicate equilibration, late accretion, and magmatic differentiation on the NWA 7325 parent body.

Sanborn M. E. Yin Q.-Z. 
POSTER LOCATION #604
Investigating a Common Source for Brachinites and Graves Nunataks 06128 and 06129 Meteorites Using High Precision Chromium Isotopes [R2241]
High-precision Cr isotope measurements for Brachina, NWA 3151, GRA 06128, and GRA 06129 are used to discuss petrogenetic links and their formation history.

Varela M. E. Hwang S. L. Shen P. Yui T. F. Iizuka Y. 
POSTER LOCATION #605
High Ni-Bearing Metal and Sulfide Phases in the D’Orbingy Angrite [R1497]
The presence of high-Ni bearing metal and sulfide host by anorthite and anorthite + olivine give evidence that the early events during D’Orbingy formation were reducing.

Hwang S. L. Shen P. Chu H. T. Yui T. F. Iizuka Y. et al. 
POSTER LOCATION #606
FeS Grains with Abundant Fe1–xO–Fe3O4 Core-Shell Crystals in the Angrite D’Orbingy [R1516]
The presence of FeS grains with abundant Fe1–xO–Fe3O4 core shell crystals in the angrite D’Orbingy show that the latest event was highly oxidizing.
Comparative Non-Destructive Study of the Zaklodzie and NWA 4301 Enstatite Achondrites via Micro-Computed Tomography [2817]

Micro-CT scanning of Zaklodzie and NWA 4301 meteorites show differences in silicate intensity, metal distribution, shape, and connectivity from 3-D image rendering.

Posters Location #607

NWA 5363/NWA 5400 and the Earth: Isotopic Twins or Just Distant Cousins? [2732]

We present a multi-isotopic study of the ungrouped achondrites NWA 5363/NWA 5400 and investigate their relation to chondrites and the Earth-forming reservoir.

Posters Location #608

Highly Siderophile Element Abundances and Os Systematics of Acapulcoite-Lodranite Meteorites [1595]

Highly siderophile element (HSE: Os, Ir, Ru, Pt, Pd, Re) abundances and Os isotopic ratios in acapulcoite and lodranite meteorites to examine differentiation.

Posters Location #609

Modeling and Comparing the Crystallization Processes and Magmatic Properties Among a Kolbeinsky Mid-Ocean Ridge Basalt and HED Meteorites from 4 Vesta [2107]

Meteorites from Vesta are comparable with basaltic rocks found on Earth. The objective is to compare the geochemistry of magmas generated on Earth and Vesta.

Posters Location #610

Spectral Characterization of Piplia-Kalan Meteorite in Visible/Near Infrared Spectral Region [1437]

VNIR spectra of Piplia Kalan meteorite has been obtained and derived spectral parameters have been plotted on spectral data of other HEDs and compared.

Posters Location #611


Piplia Kalan is a less-fractionated main group basaltic eucrite similar to Juvinas (MG Eucrite), and less evolved as compared to Neuvo Laredo (NL trend Group).

Posters Location #612

Geochemistry of Texturally Different Fractions of Piplia Kalan Eucrite and Lohawat Howardite [1464]

REE composition in bulk and texturally different fractions was used to understand petrogenetic relationships among them in Piplia Kalan and Lohawat.

Posters Location #613

Agglutinates in Howardite NWA 1769: Space Weathering on Vesta [1706]

Coordinated SEM, TEM, and reflectance spectral measurements on agglutinates in howardite NWA 1769 suggest lunar-style weathering on Vesta.

Posters Location #614

Impact History on Vesta: Petrographic, Compositional and Future Chronological Studies of Melt Clasts in Howardites [1452]

We are studying impact melt clasts in howardites to gain a better understanding of the timing of impact events in the asteroid belt, with comparison to the Moon.

Posters Location #615

Characterisation of Howardite Regolith Breccia Miller Range 11100 [1996]

Here we present a study of MIL 11100, a howardite regolith breccia collected in Antarctica in 2011 by ANSMET.
THUR POSTERS

**POSTER LOCATION #617**

**The Mineralogy and Petrology of Anomalous Eucrite Emmaville** [#2108]


In this study, we present our preliminary petrological and mineral composition results for the anomalous eucrite Emmaville.

**POSTER LOCATION #618**

**NWA 7188 Eucrite: Petrology, Chemical Compositions and Evolution History** [#1084]

Che S. He Q. Xiao L.

This work focuses on the petrographic description and geochemical analysis of an eucrite, NWA 7188. Also provided is its proposed forming process.

**POSTER LOCATION #619**

**Petrology of Diogenite NWA 5480, a Pristine Olivine-Rich Deformed Harzburgite** [#2221]

Peslier A. H. Brandon A. D. Tarduno J. A. Mittlefehldt D. W.

Diogenite NWA 5480, potentially a sample of the interior of asteroid Vesta, is unique with mantle deformation features and preservation of a magnetic field.

**POSTER LOCATION #621**

**The Colors of Irradiated Mixed Ices and Application to the Trojan Asteroids** [#2265]

Poston M. J. Blacksberg J. Brown M. Carey E. Carlson R. et al.

Laboratory investigation of space-weathered mixed ices focusing on the resulting color.

**POSTER LOCATION #622**

**Weathering Effects of Solar Wind Protons on Spectral Shape of Silicate Minerals** [#1828]


Our experiment suggest that the influence of proton irradiation on hydrated silicate minerals was more difficult to appear than unhydrated silicate minerals.

**POSTER LOCATION #623**

**Calculating the Scattering Properties of Fine Particulates on Planetary Surfaces** [#1535]

Ito G. Glotch T. D.

Better model light scattering process by small particulates using a new method, and compare the results to prior methods.

**POSTER LOCATION #624**

**Near-Infrared Spectroscopy of 3:1 Kirkwood Gap Asteroids III** [#1048]

Fieber-Beyer S. K. Gaffey M. J.

NIR spectra of asteroids (335), (1368), (1447), (1587), (1854), (2497), and (5676) were analyzed. Pyroxene chemistries and meteorite affinities were determined.

**POSTER LOCATION #625**

**Low and High Albedo Jovian Trojans and Hildas: A Similar or Different Origin?** [#1860]

Marsset M. Vernazza P. Gourgeot F. Dumas C. Birlan M. et al.

We report the first spectroscopic characterization of a sample of high albedo Trojans and Hildas.

**POSTER LOCATION #626**

**The Dirty Dozen: NIR Spectral and Mineralogical Interpretations for 12 Vp-Type Asteroids as Candidate Vestoids** [#1775]

Hardersen P. S. Reddy V. Roberts R.

This work reports continuing efforts to identify basaltic asteroids in the main asteroid belt. NIR spectra will be reported for 12 Vp-type asteroids.

**POSTER LOCATION #627**

**Photometric Properties of Candidate Planetary Surface Regolith Materials at Small Phase Angle: Relevance to Small Bodies in the Outer Solar System** [#2584]


We provide laboratory measurements that are essential for the proper understanding of the physical properties of planetary regoliths from remote sensing data.
We present updated onset times of the five solar particle events measured by the Radiation Assessment Detector (RAD) during the MSL cruise phase to Mars.


Laboratory Simulation of the Effect of FeS on Space Weathering [1890]
Nanosecond pulse laser irradiation experiments suggest FeS can promote vapor deposition type space weathering, especially overall spectral darkening.

Reedy R. C.
Recent Solar-Proton Fluxes and Severe Solar-Activity Events in the Past [2343]
Recent solar-proton fluences were compared with other data and were usually low. There is evidence for past severe energetic solar activity.

Senske D. A., Ford P. G.
The South Pole of Venus: Geology at 90 Degrees South [1432]
An overview and geologic analysis of the south pole of Venus and an assessment of mapped units in relation to the broader regional geology is carried out.

Hansen V. L., López I., Thaisen K. G.
Geologic Map of the Aphrodite Map Area, Venus [1888]
We present the 1:10M geologic map of the Aphrodite Map area (1-2476; 0°–57°S/60°–180°E) and the geologic history of this region.

Bondarenko N. V., Basilevsky A. T., Shalygin E. V., Markiewicz W. J.
Microwave Properties and the 1-Micron Emissivity of Crater-Related Radar-Dark Parabolas and Other Surface Features in Five Areas of Venus [1135]
1-µm emission (Venus Express, VMC) and microwave properties (Magellan) seen for five Venus radar-dark parabolas are sensitive to ejecta sorting and packing.

Bondarenko N. V., Kreslavsky M. A.
Venus Surface Small-Scale Roughness: View Through the Principal Component Analysis of Magellan Radar Altimeter Data [1917]
The principal component analysis of the backscattering solutions from SCVDR allows detection of diffuse scattering distribution over four regions on Venus.

López I., Hansen V. L.
Geologic Mapping of the 1:10M Niobe Map Area, Venus: Results from Structural Mapping of the Volcanic Plains and Initial Delineation of Units [2050]
We present the 1:10M geologic map of the Niobe Map area (0°–57°N/60°–180°E, I-2467) and the geologic history of this region.

Tovar D., Hansen V. L., Swenson J. B.
Preliminary Detailed Structural Map of an Equatorial Fracture Zone (15S–20S/110E–124E), Western Aphrodite Terra, Venus [2555]
We construct a detailed structural map of part of a fracture zone in Aphrodite Terra in order to gain insight into possible mechanisms of heat transfer on Venus.
Graff J. R.  Ernst R. E.  Samson C.  
Delineating Rift Faults on Radar Images in Hecate Chasma, Venus [#2217]
Detailed mapping and analysis of rift systems on SAR images along Hecate Chasma, Venus. Addresses systematic difference between rift faults and graben fissures.

Sawford W. C.  Ernst R. E.  Samson C.  Davey S. C.  
Pit Crater Chains in the Nyx Mons Region, Venus [#1283]
Pit crater chains associated with the graben-fissure system at Nyx Mons, Venus include even-sized, trough, and ’tadpole’ types.

Helbert J.  Ferrari S.  Dyar M. D.  Müller N.  Smrekar S.  
Studying the Surface Composition of Venus in the Near Infrared [#1793]
New high-temperature emissivity measurements can provide important insights into the evolution of Venus.

Radoman-Shaw B. G.  Harvey R. P.  Jacobson N. S.  Costa G. C. C.  
Preliminary Analysis of Pyrite Reactivity Under Venusian Temperature and Atmosphere [#2027]
Pyrite is characterized and exposed to Venus temperature and a carbon dioxide atmosphere at ambient pressure using a TGA apparatus for different durations.

Weller M. B.  Lenardic A.  
Diverging Worlds: Bi-Stability, the Evolution of Terrestrial Planets and Its Application to Venus and Earth [#2670]
A Venus late start/High surface temperature/Diverses occur.

IONOSPHERES AND ISOTOPES [R749]

EUV Oxygen Dayglow at Venus Observed by Hisaki [#1776]
Using the Extreme Ultraviolet Spectroscope for Exospheric Dynamics (EXCEED) onboard Hisaki, we study variations of EUV oxygen dayglow in Venus’ thermosphere.

Royer E. M.  Esposito L. W.  Wahlund J. E.  Wilson R. J.  
Bright and Sudden Nitrogen Emission in the Atmosphere of Titan, While the Satellite was in the Magnetosheath During T-32 [#2573]
On June 13, 2007, Cassini-UVIS observed a sudden, very localized bright nitrogen emission in the atmosphere of Titan, possibly correlated with an electron burst.

Morgan D. D.  Dieval C.  Gurnett D. A.  Lester M.  ISSI Team: Mars Induced Magnetosphere  
Intense Vibrations of the Martian Ionosphere Observed by MARSIS Active Sounding During a Sun-Earth-Mars Conjunction [#2198]
We infer that intense vibrations of the martian ionosphere occur as a result of interaction with space weather events.

Madanian H.  Cravens T. E.  Ledvina S. A.  Richard M. S.  
The Role of Transport in the Ionosphere of Titan [#2014]
The research abstract considers the effects of transport mechanism on the dayside and nightside ion densities in the ionosphere of Saturn’s biggest moon, Titan.

Williamson H. N.  Johnson R. E.  Leblanc F.  Tucker O. J.  
Parameter Study of Plasma-Induced Atmospheric Sputtering and Heating at Mars [#1554]
We create a direct simulation Monte Carlo model to study a wide range of solar wind conditions and the response of the martian exosphere, leading to escape.

Zahnle K. J.  
Xenon Fractionation and Archean Hydrogen Escape [#1549]
Xenon alone among the noble gases can escape from planetary atmospheres as an ion.
Kurokawa H. Kurosawa K. Usui T. POSTER LOCATION #649
Escape of Early Martian Atmosphere and Hydrosphere: Constraints from Isotopic Compositions [#1643]
This study of the evolution of the martian isotopic compositions suggests the presence of thick early atmosphere lost during the heavy bombardment period.

Lyons J. R. Stark G. Pack A. de Oliveira N. Nahon L. POSTER LOCATION #650
Oxygen Isotope Fractionation During Spin-Forbidden Photolysis of CO₂: Relevance to the Atmosphere of Mars [#2957]
Broadband spin-forbidden photolysis experiments on CO₂, a key reaction in the Mars atmosphere, yield O₂ with a depletion in O₁₇, in contrast with earlier work.

Luspay-Kuti A. Mandt K. E. Mousis O. POSTER LOCATION #651
Photodissociative Fractionation of Nitrogen Isotopes in the Atmospheres of Mars, Titan, and Pluto [#2785]
Photolytic fractionation is modeled using low- and high-resolution N cross sections. Photolytic fractionation is more effective on Pluto and Titan than on Mars.

ORIGINS OF THE SOLAR SYSTEM: DISK EVOLUTION AND ACCRETION [R750]

Milam S. N. Adande G. Cordiner M. A. Wirstrom E. Charnley S. B. POSTER LOCATION #653
Molecular Tracers of Nitrogen Enrichment in Prestellar Cores: Amines vs. Nitriles [#1934]
Nitrogen isotope ratios were measured in nitriles and amines toward prestellar cores and protostars. Comparison to theory and the solar system will be made.

Numata M. Nagahara H. POSTER LOCATION #654
Temporal and Spacial Variation of the Organic Particles in the Proto-Solar Disk [#2591]
The time evolution of compositional distribution of silicate-organics suggest a moving C/N bump region and it implies compositional variation of planetesimals.

Nuth J. A. III Johnson N. M. POSTER LOCATION #655
The Morphology of Fischer-Tropsch-Type Products [#1193]
FTT products deposited at active sites grow away from the catalytic surface, forming fluffy coatings that may increase grain-grain coagulation in the nebula.

Locke D. R. Yazzie C. A. Burton A. S. Niles P. B. Johnson N. M. POSTER LOCATION #656
Pyrolysis-GCMS Analysis of Solid Organic Products from Catalytic Fischer-Tropsch Synthesis Experiments [#1986]
Presented here are new PY-GCMS organic analyses of solid FTT organic products generated by varying reaction temperatures and number of experimental cycles.

Tsueiyama A. Miyake A. Hama T. Tachibana S. Terasaki H. et al. POSTER LOCATION #657
Deposition of Amorphous Silicate Films for Experiments on Surface Reactions in Molecular Clouds and Protoplanetary Disks [#1840]
Amorphous silicate films formed using PLD for substrates used in surface reaction experiments that mimic processes in molecular clouds and protoplanetary disks.

Yamamoto D. Tachibana S. Nagahara H. Ozawa K. Tsueiyama A. POSTER LOCATION #658
Experimental Study on Hydrous Mineral Formation Reaction Between Amorphous Forsterite and Water Vapor [#1930]
Reaction experiments between amorphous forsterite and water vapor showed that hydrous phases form metastably at higher temperatures than their stability limits.

Miura H. Yamamoto T. Nakamoto T. POSTER LOCATION #659
Evaporation of Icy Grains in Nebular Shocks [#1861]
Recent ALMA observations suggested evaporation of icy grains by accretion shocks. We investigated shock condition for evaporation by numerical simulations.
Desch S. J. Turner N. J.  
High-Temperature Ionization of Dusty Gases [2311]  
At high temperatures (>800 K), emission of electrons and ions from dust grains dominates the charging of gas in protoplanetary disks and exoplanet atmospheres.

Smallwood J. L. Matthews L. S. Hyde T. W.  
Photophoresis: Potential Sorting Mechanism in a Proto-Planetary Disk [2864]  
This study examines the photophoretic force acting on aggregates including the effects of grain rotation. Photophoresis could sort material in an accretion disks.

Hofmeister A. M. Criss R. E.  
Implications of Axial Spin, Spin Attenuation, and Orbital Energy on the Planets and Stars on Solar System Formation [1212]  
Rotational energies of stars and the planets show that accretion converts gravitational potential mostly to kinetic energy, not heat. Dust collapse is key.

Whizin A. D. Blum J. Colwell J. E.  
Accretion of Proto-Planetesimals Through Microgravity Collisions of Dust Aggregates [2693]  
We did hundreds of microgravity experiments involving collisions between clusters of centimeter-sized SiO2 aggregates to characterize the strengths and sticking regimes.

Ipatov S. I.  
The Role of Collisions of Rarefied Condensations in Formation of Embryos of the Earth and the Moon [1355]  
The embryos of the Earth-Moon system could form as a result of contraction of the rarefied condensation that got its angular momentum mainly at collisions.

Kalyaan A. Desch S. J.  
Simulations of Protoplanetary Disk Evolution Including External Photoevaporation and MRI Viscosity with Dust [2206]  
We present simulations of protoplanetary disk evolution with non-uniform alpha and external photoevaporation, which have dramatic effects on planet formation.

Cuzzi J. N. Hartlep T.  
Turbulent Concentration of Millimeter-Size Particles in the Protoplanetary Nebula: Scale-Dependent Cascades [1691]  
Giant tornados spin gently/Sandy clouds form/Look! primitive bodies.

Nagahara H. Nakata M. Ozawa K.  
Chemical Evolution of the Early Stage of a Protoplanetary Disk and Its Inference on the Chemical Composition of Chondrites [2968]  
Protoplanetary disk physical-chemical evolution was investigated, which suggests formation of planetesimals at the early stage than usually thought.

Jackson C. R. M Bennett N. R. Fei Y.  
Experimental Investigations of Noble Gas Behavior During Accretion: First Results of Argon Solubility in Mafic Liquids at High Pressure [2496]  
We report new measurements of Ar solubility in high-pressure melts and explore implications for noble gas behavior during accretion.

Righter K. Danielson L. Pando K. M. Marin N. Nickodem K.  
Origin of Volatiles in Earth: Indigenous Versus Exogenous Sources Based on Highly Siderophile, Volatile Siderophile, and Light Volatile Elements [2650]  
Metal/silicate equilibrium during accretion of Earth explains abundances of many volatile elements in the mantle — post-core-formation addition not required.
Hubbard A., Ebel D. S.  
*Explaining Earth’s Missing Moderate Volatiles [#2677]*
We offer a model that explains Earth’s volatile depletion pattern by baking dust and thermally altering its aerodynamics through accretion events such as FUors.

Herd R. K.  
*A Simple Framework to Observe and Interpret the Origin of Meteorites [#2824]*
Ordinary and carbonaceous chondrite meteorites exhibit the same sequence of stages in their development, reflecting stages in the processes forming them.
PROGRAM AUTHOR INDEX

* Denotes speaker.

Aaronson A. R745
Abby W. T625, R722
Abe M. R726, R740
Abe S. R727
Abedin M. N. R725
Abell P. T646, R739
Abell P. A.
Abraham J. T631
Abraham M. H. R722
Abramov O. R711, R719
Abreu N. M. M153*, R454
Accolla M. M103
Accostillo J. M. R725, R740
Acosta T. E. R725
Acton C. H. Jr. R702
Adande G. R750
Adelman L. R722
Adkin R. C. T640
Agarwal J. M103, T631
Agee C. B. T202, R453*, F502, T624, R733
Agresti D. W352, R739
Aharonson O. T205
A’Hearn M. F. M103*, T631
Ahern A. A. T641
Ahmed M. T638
Airey M. W. F504*
Aitken M. M102, T625
Aitken J. T649, T650
Aitken E. J. R732
Allton J. H. T601
Allums K. K. T601
Allwood A. C. T627
Alonso-Pinilla N. F553
Altiere F. T627
Altmann F. R740
Altobelli N. M103, T631
Altrock K. M103, T631
Alvarado G. E. T625, R711
Alvarez A. M. R735
Alvarez K. R452
Álvarez O. T252
Alvarez C. T251, R740
Amador E. S. R732
Amari S. T635, R743
Amelin Y. T256*, T636, T637
Amerom F. H. W. T644
Amet Q. T201
Amils R. T625
Ammannito E. M103, T631
Anderson B. J. M104
Anderson D. E. T625
Anderson F. S. T276
Anderson J. A. R702, R703
Anderson L. R711
Anderson R. F552, T624, R733
Anderson R. B. M102, M154*, R724, R733, R736
Anderson R. C. M102, T252, R722, R733
Anderson R. W. R401
Anderson Y. R718
Andersson L. W303*, R728, R729
Ando K. W354
Andre S. L. T602
Andréani M. R732
Andreasen R. T202*, T256, R402, T624, T638, R742
Andreoli M. A. G. T610, R745
Andrews D. M103, W303, R728, R729
Andrews-Hanna J. C. M101, T205, W351, T620, R718
Andronikov A. V. R722
Angel S. M. R724, R725
Antonenko L. W351*
Anup D. R710
Aponte J. C. T253*
Appel J. R747
Applin D. T625, T627, T640
APXS Team M102
Arai T. T205, T609, R724, R726, R727, R740
Arakawa M. R724
Araki H. R727
Archer D. F502
Archer D. P. Jr. T627
Archer G. J. T256*, R745
Archer P. D. M102, T625, R733
Archer P. D. Jr. M102, W352, F552*, T625
Archinal B. A. R702, R703
Arevalo R. T644, R726
Aritomi A. T201
Arkani-Hamed J. T614, T641
Armstrong E. S. R716
Armstrong J. C. R452
Armstrong K. R741, R745
Arnold G. M103, T631
Arnold J. T626, T627
Aronica A. R702
Artemieva N. T614, R739
Arvidson R. E. M154, W352, R401, R402, R452, F552*, T617, T619, T627, T644, R702, R733, R735
Arzoumanian Z. T626
Asakura H. T649
Asari K. R727
Asay-Davis X. R716
Ashley J. W. T625, R733
Asker R. T711
Asmar S. W. M101, T603, T629

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

INDEX
Asphaug E.     T205, R453, T631, T646, R738
Assayag N.     T202
Athena Science Team     W352, F552, R733
Atreya S.     F502
Atreya S. K.     M102
Atwood-Stone C.     T610
Aubele J. C.     T648
Audouard J.     M154*, F502*, R711, R735
Aureli K. L.     T252
Avice G.     R745
Avila J. N.     W304
Aylward D. S.     T627
Ayoub F.     R401
Ayres T. R.     T638
Bachman N. J.     R702
Backer J. C.     R703
Backlas J. M.     T627
Baecker B.     R742
Baek S. M.     T604
Bailen M.     T609, R703
Bailey B. E.     R701
Bailey J.     T612
Baines K. H.     F553, R716
Baird D.     W303
Bajo K.     T601
Baje S.     R740
Baker D. M. H.     T608, R731
Baker L.     T711
Baker M. B.     F552, R733
Baker S. R.     T621
Baker V. R.     T252, T618, T643
Baklouti D.     M103
Bakos D.     R717
Balcerski J. A.     T603
Balme M.     T618, T622, T645, R711
Balme M. R.     M152, T252, W302, R403, T618, T622, T645, R717
Baloga S. M.     R403, F553
Balzara M. A.     T626
Balsiger H.     M103, T631
Balta J. B.     T202*, T624
Ban C.     R726
Bandeira L.     R713
Bandfield J. L.     R451*, R704, R732
Banderd W. B.     T641
Banerjee D.     R723
Banerjee N. R.     T251, W301, R707
Banks M. E.     T602, T606, R714
Banks S.     R726
Baoyin H. X.     T628
Bapst J.     T622
Baragiola R. A.     R705
Barata T.     T650
Baratoux D.     T252, R452
Barclay D. J.     M154, R705
Barclay D.     T602, T606, R714, R718
Barnes N.     T647
Barnes R.     T639
Barnouin O. S.     T602, T623, T646, R713, R727
Barnouin O.     T631
Barucci A.     T631
Barucci M. A.     T631
Bass S. M.     R722
Bassim N. D.     R721
Bastian N.     W304
Bastien R.     T634
Basu K.     T647
Basu Sarbadhikari A.     T624, R746
Battel D.     R722
Battler M.     T650
Bauer A.     R724
Bauer B. P.     T611
Bauer J. M.     R738
Bauhm F.     R711
Bayaraa T.     T609
Bazell D.     W351, T628
Beard S. B.     T637
Beard S. P.     T626
Beaty D. W.     R452, T644, R701
Beauchamp P.     F503
Beaudin G.     T631
Beaulieu K.     T642
Bebout G. E.     R739
Becerra P.     M152*, T647, R705
Beck A.     R453*, T631
Becker D.     R702, R735
Becker K. J.     T602, R702, R703, R724
Becker T.     R702, R703
Beckerman L. G.     T625
Beckett J. R.     T624, T638
Beddingfield C. B.     M154*, T641
Beegle L.     R722, R733
Beigun C.     M103
Belgacem I.     R733
Bell A. S.     T202*, W301*, T624, R708, R711
Bell J.     T646, R733
Bell J. F. III     R402, R403, T619
Bell J. M.     W353
Bell M. S.     T626, R737
Bellino G.     R742
Bellucci J.     W301, F551, T624
Belmahdi I.     T253
Belser V.     T626
Belton M.     T254, T633
Bender S.     F552, T627, R733
Bendo N. J.     R714
Benecchi S.     T254, T633
Benedix G. K.     R454, R738
Benfield M. P. J.     T651
Benkhoff J.     T602, T628
Benna M.     M101, W303, W353, T644, R728, R730

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

202 46th LPSC Program

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyce J. W.</td>
<td>M153*, T607,</td>
</tr>
<tr>
<td></td>
<td>T624</td>
</tr>
<tr>
<td>Boyd A.</td>
<td>T610, R703, R704</td>
</tr>
<tr>
<td>Boyd N.</td>
<td>M102, F552, R733</td>
</tr>
<tr>
<td>Boyet M.</td>
<td>R743</td>
</tr>
<tr>
<td>Boynton W. V.</td>
<td>M151, F552, T646, R705, R722, R726, R732, R733</td>
</tr>
<tr>
<td>Braden S. E.</td>
<td>T606</td>
</tr>
<tr>
<td>Bradley A. T.</td>
<td>T610, R703, R704</td>
</tr>
<tr>
<td>Bradley J. P.</td>
<td>F505</td>
</tr>
<tr>
<td>Brain D. A.</td>
<td>W303*, W353, R452, R728, R729</td>
</tr>
<tr>
<td>Bramble M. S.</td>
<td>T634</td>
</tr>
<tr>
<td>Bramson A. M.</td>
<td>R731</td>
</tr>
<tr>
<td>Brand H. E. A.</td>
<td>T627</td>
</tr>
<tr>
<td>Brandenburg J. E.</td>
<td>T624</td>
</tr>
<tr>
<td>Brandon J. A.</td>
<td>T624, R746</td>
</tr>
<tr>
<td>Brandtätter F.</td>
<td>T631</td>
</tr>
<tr>
<td>Bray V.</td>
<td>T522</td>
</tr>
<tr>
<td>Brearley A. J.</td>
<td>M153, R742, R743</td>
</tr>
<tr>
<td>Breen J. P.</td>
<td>R744</td>
</tr>
<tr>
<td>Breen S.</td>
<td>T604</td>
</tr>
<tr>
<td>Breitenfeld L. B.</td>
<td>T627, R725</td>
</tr>
<tr>
<td>Brennecke G.</td>
<td>T202, T204, T638</td>
</tr>
<tr>
<td>Breton H.</td>
<td>T624</td>
</tr>
<tr>
<td>Breuer D.</td>
<td>M154, R452, R720</td>
</tr>
<tr>
<td>Breuninger J.</td>
<td>T626</td>
</tr>
<tr>
<td>Breves E. A.</td>
<td>T627, R726</td>
</tr>
<tr>
<td>Bridges J. C.</td>
<td>T202, R402*, F522, F555, T634, T645, R726, R733, R737, R742</td>
</tr>
<tr>
<td>Bridges N. T.</td>
<td>R401*, R402, T619, T626, R717, R733</td>
</tr>
<tr>
<td>Brinckerhoff W. B.</td>
<td>T253, F502, T644, R726</td>
</tr>
<tr>
<td>Brinklinger T. H.</td>
<td>R721</td>
</tr>
<tr>
<td>Brinza D. E.</td>
<td>T616, R747</td>
</tr>
<tr>
<td>Brion Ch.</td>
<td>M103</td>
</tr>
<tr>
<td>Brissaud O.</td>
<td>T627</td>
</tr>
<tr>
<td>Brissaut O. B.</td>
<td>M152</td>
</tr>
<tr>
<td>Bristow T. F.</td>
<td>M102, T625, R726, R733</td>
</tr>
<tr>
<td>Britt D. T.</td>
<td>M101, F505, T644, T646, R709</td>
</tr>
<tr>
<td>Brintlinger T. H.</td>
<td>T721</td>
</tr>
<tr>
<td>Brinza D. E.</td>
<td>T616, R747</td>
</tr>
<tr>
<td>Briosi Ch.</td>
<td>M103</td>
</tr>
<tr>
<td>Brissaud O.</td>
<td>T627</td>
</tr>
<tr>
<td>Brissaut O. B.</td>
<td>M152</td>
</tr>
<tr>
<td>Bristow T. F.</td>
<td>M102, T625, R726, R733</td>
</tr>
<tr>
<td>Brit D. T.</td>
<td>M101, F505, T644, T646, R709</td>
</tr>
<tr>
<td>Brockwell T. G.</td>
<td>R719</td>
</tr>
<tr>
<td>Broiles T. W.</td>
<td>M103</td>
</tr>
<tr>
<td>Broll B.</td>
<td>R724</td>
</tr>
<tr>
<td>Brophy B. H.</td>
<td>F503*</td>
</tr>
<tr>
<td>Brouet Y.</td>
<td>T631</td>
</tr>
<tr>
<td>Brown A. J.</td>
<td>T626, R732</td>
</tr>
<tr>
<td>Brown B. H.</td>
<td>F553</td>
</tr>
<tr>
<td>Brown J.</td>
<td>T610, R723</td>
</tr>
<tr>
<td>Brown J. J.</td>
<td>T610</td>
</tr>
<tr>
<td>Brown J. M.</td>
<td>T639</td>
</tr>
<tr>
<td>Brown M.</td>
<td>T203, R747</td>
</tr>
<tr>
<td>Brown R. H.</td>
<td>R716</td>
</tr>
<tr>
<td>Brown S. M.</td>
<td>M104, W301*</td>
</tr>
<tr>
<td>Brownlee D. E.</td>
<td>W304*</td>
</tr>
<tr>
<td>Broz P.</td>
<td>R403, R711</td>
</tr>
<tr>
<td>Brucato J. R.</td>
<td>R722</td>
</tr>
<tr>
<td>Bruce J. I.</td>
<td>T640</td>
</tr>
<tr>
<td>Brucker M. J.</td>
<td>R712</td>
</tr>
<tr>
<td>Bruck Syal M.</td>
<td>M104, T205*, R704, R712</td>
</tr>
<tr>
<td>Brygman K. K.</td>
<td>T617</td>
</tr>
<tr>
<td>Brunetti M. T.</td>
<td>R704</td>
</tr>
<tr>
<td>Brunner A.</td>
<td>T251, F502</td>
</tr>
<tr>
<td>Brusnikin E. S.</td>
<td>W302*</td>
</tr>
<tr>
<td>Buzzzone L.</td>
<td>R720</td>
</tr>
<tr>
<td>Brydges T. F. V.</td>
<td>R709</td>
</tr>
<tr>
<td>Bryrve S.</td>
<td>R736</td>
</tr>
<tr>
<td>Bryson K. L.</td>
<td>R737</td>
</tr>
<tr>
<td>Bu C.</td>
<td>F503*, R705</td>
</tr>
<tr>
<td>Buch A.</td>
<td>T253*, F502, T644</td>
</tr>
<tr>
<td>Buchanan P. C.</td>
<td>R454</td>
</tr>
<tr>
<td>Buczkwiski D. L.</td>
<td>M102, M154, T203, T602, T618, T629, T644</td>
</tr>
<tr>
<td>Budde G.</td>
<td>T256*, T636, T638</td>
</tr>
<tr>
<td>Bue B. D.</td>
<td>T627</td>
</tr>
<tr>
<td>Buettner I.</td>
<td>T630</td>
</tr>
<tr>
<td>Buffo J.</td>
<td>T647</td>
</tr>
<tr>
<td>Bugiel S.</td>
<td>R723</td>
</tr>
<tr>
<td>Biue M.</td>
<td>T254, T633, T646</td>
</tr>
<tr>
<td>Buiak I. A. R.</td>
<td>R707</td>
</tr>
<tr>
<td>Buitenhuiss E.</td>
<td>T251</td>
</tr>
<tr>
<td>Bullock E. S.</td>
<td>T255, T256*</td>
</tr>
<tr>
<td>Bullock M. A.</td>
<td>R451, T607, R733</td>
</tr>
<tr>
<td>Bulter B.</td>
<td>R702, R732</td>
</tr>
<tr>
<td>Bunch T. E.</td>
<td>R454</td>
</tr>
<tr>
<td>Buratti B. J.</td>
<td>T254, F553, R716</td>
</tr>
<tr>
<td>Burbine T. H.</td>
<td>T628</td>
</tr>
<tr>
<td>Burch J. L.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Burchell M. J.</td>
<td>T613, T625, R737</td>
</tr>
<tr>
<td>Burger A.</td>
<td>R726</td>
</tr>
<tr>
<td>Burger P. V.</td>
<td>T202, W301, T624, R708</td>
</tr>
<tr>
<td>Burgess K. D.</td>
<td>T627, T632, R721</td>
</tr>
<tr>
<td>Burgess R.</td>
<td>T643</td>
</tr>
<tr>
<td>Burkhardt C.</td>
<td>T204, T255, R745</td>
</tr>
<tr>
<td>Burmeister S.</td>
<td>T747</td>
</tr>
<tr>
<td>Burnett D. S.</td>
<td>T601, T638</td>
</tr>
<tr>
<td>Burr D. M.</td>
<td>M154, T252, R401*, F553, T618, T641, R717</td>
</tr>
<tr>
<td>Busermann H.</td>
<td>W304, T636, R740</td>
</tr>
<tr>
<td>Bussey D. B. J.</td>
<td>R451, F505, T607, R702</td>
</tr>
<tr>
<td>Buss M.</td>
<td>T204</td>
</tr>
<tr>
<td>Bussoletti E.</td>
<td>M103</td>
</tr>
<tr>
<td>Butterworth A. L.</td>
<td>W304, R727</td>
</tr>
<tr>
<td>Bütter I.</td>
<td>T203</td>
</tr>
<tr>
<td>Button N. E.</td>
<td>T626, T643, R732</td>
</tr>
<tr>
<td>Buxner S.</td>
<td>T648, T649, T650, T652</td>
</tr>
<tr>
<td>Buz J.</td>
<td>T619, T624</td>
</tr>
<tr>
<td>Bykova E.</td>
<td>T613</td>
</tr>
<tr>
<td>Byrne C. J.</td>
<td>T603, R704</td>
</tr>
<tr>
<td>Byrne P. K.</td>
<td>M104*, M154, T602, R720</td>
</tr>
<tr>
<td>Byrne S.</td>
<td>M152*, T201, R451, F555, T606, T622, T627, R705, R731</td>
</tr>
<tr>
<td>Bystrov A. Yu.</td>
<td>R703</td>
</tr>
<tr>
<td>Cabane M.</td>
<td>T253, F502</td>
</tr>
<tr>
<td>Cable M. L.</td>
<td>F503, R726</td>
</tr>
<tr>
<td>Čadek O.</td>
<td>R711</td>
</tr>
<tr>
<td>Caffee M. W.</td>
<td>R740, R741</td>
</tr>
<tr>
<td>Cahill J. T.</td>
<td>R709</td>
</tr>
<tr>
<td>Cahill J. T. S.</td>
<td>R451, F551*, T627, R704, R711</td>
</tr>
<tr>
<td>Cai R.</td>
<td>R723</td>
</tr>
<tr>
<td>Cai Z. C.</td>
<td>T605</td>
</tr>
<tr>
<td>Caine J. S.</td>
<td>M154</td>
</tr>
<tr>
<td>Caïs P.</td>
<td>R724</td>
</tr>
<tr>
<td>Calaway M. J.</td>
<td>T642, R722</td>
</tr>
<tr>
<td>Calcutt S. B.</td>
<td>T641</td>
</tr>
<tr>
<td>Calderon L. P.</td>
<td>T617</td>
</tr>
<tr>
<td>Calef F. J. III</td>
<td>M102, R402, T619, T645, R733</td>
</tr>
<tr>
<td>Callahan M. P.</td>
<td>T253*, T640, R722, R726</td>
</tr>
<tr>
<td>Calmonte U.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Calogovic M.</td>
<td>R715</td>
</tr>
<tr>
<td>Name</td>
<td>Session Codes</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Calzada-Diaz A.</td>
<td>R707</td>
</tr>
<tr>
<td>Cameron M. E.</td>
<td>T641</td>
</tr>
<tr>
<td>Campbell A. J.</td>
<td>R404</td>
</tr>
<tr>
<td>Campbell B. A.</td>
<td>M152*, R452, F504, R706, R734</td>
</tr>
<tr>
<td>Campbell D. B.</td>
<td>R706, R712</td>
</tr>
<tr>
<td>Campbell J. L.</td>
<td>M102, R402, F552, R733</td>
</tr>
<tr>
<td>Canalias E.</td>
<td>T646</td>
</tr>
<tr>
<td>Canipe M.</td>
<td>T648</td>
</tr>
<tr>
<td>Cannon K. M.</td>
<td>T253*, T627</td>
</tr>
<tr>
<td>Cantor B.</td>
<td>W303</td>
</tr>
<tr>
<td>Canup R. M.</td>
<td>F501, R720</td>
</tr>
<tr>
<td>Cao F. K.</td>
<td>T627</td>
</tr>
<tr>
<td>Capaccioni F.</td>
<td>M103*, T203, T627</td>
</tr>
<tr>
<td>Canario A. G.</td>
<td>T203, T626</td>
</tr>
<tr>
<td>Canfield T.</td>
<td>T630, T631</td>
</tr>
<tr>
<td>Cardenas B. T.</td>
<td>T618</td>
</tr>
<tr>
<td>Cardines M.</td>
<td>R717</td>
</tr>
<tr>
<td>Carey C.</td>
<td>R721, R725</td>
</tr>
<tr>
<td>Carey E.</td>
<td>R747</td>
</tr>
<tr>
<td>Carli C.</td>
<td>T602, T627</td>
</tr>
<tr>
<td>Carlson R.</td>
<td>T638, R716, R747</td>
</tr>
<tr>
<td>Carmena-Reyes J. A.</td>
<td>T623</td>
</tr>
<tr>
<td>Carnelli I.</td>
<td>R712</td>
</tr>
<tr>
<td>Carpenter J. D.</td>
<td>T643</td>
</tr>
<tr>
<td>Carpenter K.</td>
<td>R403</td>
</tr>
<tr>
<td>Carpenter P.</td>
<td>T627, R708, R709</td>
</tr>
<tr>
<td>Carr C.</td>
<td>M103</td>
</tr>
<tr>
<td>Carrier B. L.</td>
<td>F502*</td>
</tr>
<tr>
<td>Carroll K. A.</td>
<td>T604</td>
</tr>
<tr>
<td>Carrozzio F. G.</td>
<td>R732</td>
</tr>
<tr>
<td>Carsello A.</td>
<td>T622</td>
</tr>
<tr>
<td>Carsey U.</td>
<td>T203</td>
</tr>
<tr>
<td>Carsten J.</td>
<td>T619</td>
</tr>
<tr>
<td>Cartacci M.</td>
<td>T631</td>
</tr>
<tr>
<td>Carter J.</td>
<td>M103*, R452, F555, T631, T645, R711, R731, R732</td>
</tr>
<tr>
<td>Carter L. M.</td>
<td>R451, T646, R734</td>
</tr>
<tr>
<td>Cartigny P.</td>
<td>T202</td>
</tr>
<tr>
<td>Cartwright J. A.</td>
<td>R746</td>
</tr>
<tr>
<td>Cartwright R. J.</td>
<td>F553*</td>
</tr>
<tr>
<td>Casey A. W.</td>
<td>R451, R705</td>
</tr>
<tr>
<td>Cassanelli J. P.</td>
<td>T252, R731</td>
</tr>
<tr>
<td>Cassata W. S.</td>
<td>T202*</td>
</tr>
<tr>
<td>Codes</td>
<td>Names</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>CIOC Team</td>
<td>W353</td>
</tr>
<tr>
<td>Cipriani F.</td>
<td>R705</td>
</tr>
<tr>
<td>Cisneros J.</td>
<td>R401*</td>
</tr>
<tr>
<td>Claeys Ph.</td>
<td>T634</td>
</tr>
<tr>
<td>Clark A.</td>
<td>T652</td>
</tr>
<tr>
<td>Clark B.</td>
<td>W352, R402, R452, F552, T619, T645, R722, R733</td>
</tr>
<tr>
<td>Clark C. S.</td>
<td>R720</td>
</tr>
<tr>
<td>Clark G.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Clark J. D.</td>
<td>T606</td>
</tr>
<tr>
<td>Clark K.</td>
<td>T647</td>
</tr>
<tr>
<td>Clark L. E.</td>
<td>T643, R720, R726</td>
</tr>
<tr>
<td>Clark N.</td>
<td>F553, R719, R732</td>
</tr>
<tr>
<td>Clarke J. T.</td>
<td>W303, W353*, R730</td>
</tr>
<tr>
<td>Clayton D. D.</td>
<td>T635</td>
</tr>
<tr>
<td>Clayton R. N.</td>
<td>T256</td>
</tr>
<tr>
<td>Cleaves H. J.</td>
<td>T253</td>
</tr>
<tr>
<td>Clegg R. N.</td>
<td>W351*, F551</td>
</tr>
<tr>
<td>Cleaves H. J.</td>
<td>T253</td>
</tr>
<tr>
<td>Clegg S. M.</td>
<td>M102, R402, F552, T625, T627, R724, R725, R733</td>
</tr>
<tr>
<td>Clemett S. J.</td>
<td>F502</td>
</tr>
<tr>
<td>Cloquet C.</td>
<td>T204</td>
</tr>
<tr>
<td>Cloutis E. A.</td>
<td>F552, T611, T625, T627, R618, R722, R711</td>
</tr>
<tr>
<td>Coates A. J.</td>
<td>T646</td>
</tr>
<tr>
<td>Cobb W.</td>
<td>T649, T652</td>
</tr>
<tr>
<td>Cochrane C.</td>
<td>R721, R725</td>
</tr>
<tr>
<td>Cockell C. S.</td>
<td>T643</td>
</tr>
<tr>
<td>Cody G. D.</td>
<td>W354*, R454, T638, T640</td>
</tr>
<tr>
<td>Coe P.</td>
<td>T641</td>
</tr>
<tr>
<td>Cofano A.</td>
<td>T648</td>
</tr>
<tr>
<td>Cohen B. A.</td>
<td>T251, T626, T643, R723, R726</td>
</tr>
<tr>
<td>Cohen E.</td>
<td>T624, T636</td>
</tr>
<tr>
<td>Cohen T. E.</td>
<td>T626</td>
</tr>
<tr>
<td>Colangeli L.</td>
<td>M103</td>
</tr>
<tr>
<td>Colaprete A.</td>
<td>M101*, T626, T643, T644</td>
</tr>
<tr>
<td>Cole H. M.</td>
<td>T620</td>
</tr>
<tr>
<td>Cole M. C.</td>
<td>T613</td>
</tr>
<tr>
<td>Cole M. J.</td>
<td>T625, R737</td>
</tr>
<tr>
<td>Coleman J.</td>
<td>W352</td>
</tr>
<tr>
<td>Coles B. J.</td>
<td>T204</td>
</tr>
<tr>
<td>Coll P.</td>
<td>T253, F502, T644</td>
</tr>
<tr>
<td>Collier M. R.</td>
<td>T626</td>
</tr>
<tr>
<td>Collinet M.</td>
<td>T602</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

INDEX

208 46th LPSC Program
INDEX

Eustice D.  R723
Evans A. J.  M104*
Evans C. A.  T626, T642
Evans J. S.  W303, W353, R730
Evans L. G.  M151, T628, R705, R710, R726
Everett D. F.  R722
Ewing R. C.  R401, R717
ExoMars 2018 LSSWG  T645
Ezoe Y.  R727
Fa W.  T201, R704
Fabre C.  M102, R402, R733
Fagan A. L.  F551*, R708, R741
Fagan T. J.  R740
Faiia A. M.  W352
Fairchild L.  T251
Fairen A.  T252, F502, T618, T621
Fairen A. G.  M102, F552, T618, T621
Falkner C.  R723
Fang B. D.  T628
Fang W.  R733
Fantinati C.  T631
Farcy B. J.  R452
Farkaš J.  T612
Farley K. A.  T645
Farley K. R.  R745
Farmer J. D.  M102, T625, R733
Farquhar J.  T638, R744
Farr T. G.  R401, F553
Farrand W. H.  W352, F552, T627, R706, R733
Farrell W. M.  T626, R705
Farris H. N.  T616, T639, R737
Farsang S.  R741
Fassett C. I.  M102, M104, T252, W302, R452*, T602, T606, T624, T627
Fastook J. L.  T252*, R731
Fatemi S.  T604, R728
Fawdon P.  R403*, T645
Fazinie S.  R715
Fazio A.  R715
Feaga L. M.  M103
Federman S. R.  T638
Fedkin A. V.  R404*
Fedo C. M.  T627
Fedorov A.  R749
Fedo C. M.  M104, T451, T607
Feldman W. C.  M104, M151, T203, R451, F502, R732
Fellows M.  R723
Fendrich K.  M102, R733
Fendrock M.  R714
Feng J. Q.  T605
Feng W.  T602
Fennema A.  M102, F552, T624, T627, R737
Fenner-Collin O.  M103
Ferri M.  M103
Ferrari S.  T602, T627, R720, R748
Ferrière L.  T251*, T631
Feuillet T.  T650
Fey J.  T608
Fiebel-Beyer S. K.  R747
Fieth B.  T631
Fiethe B.  M103, T631
Filacchione G.  M103, T631
Filiberto J.  R402*, R452*, F552, T624, T625, R737
Filip J.  F505
Filizmoser P.  T631
Fine A. M.  T627
FINESSE Team  R711
Fink W.  T643
Fischer E.  T619
Fischer H.  M103
Fischer W. W.  R402, R452, R724, R737
Fischer-Gödde M.  T202, T255*, T636, T638, R744, R745
Fisher E. A.  T602
Fisk M.  M102, R402, F552, R733
Fisk M. R.  R402, F552
Flachsbart K.  R723
Flahaut J.  T645, R732, R734
Flamia M.  T643
Flandinet L.  F502
Flannery D. T.  T627
Fleisher C.  T626
Flemming R. L.  T251, T611, R745
Flesch G.  T627
Fletcher L. N.  R716
Flilkema P.  T643
Floss C.  M153*, T632, T634, T635
Floyd M.  T640
Fluckiger L.  T626
Flynn G. J.  T624, T626, T634
Flynn L. P.  R725
Foil G.  T643
Font S.  T630
Fonti S.  T631
Ford P. G.  R748
Forest J.  R705
Forget F.  T252, W302*, R452*, R731
Forman L. V.  R454
Forni S. M.  T203*
Fornasier S.  M103, T631
Forin O. M.  M102, R402, F552, R724, R733
Fortezzo C. M.  W351, R703, R713, R734
Fortier K.  R737
Fouche T.  R724
Fougere N.  W353, T631
Fowle D. A.  R737
Fowler C.  R729
Fowler C. M.  W303, R728, R729
Fox A.  W352*
Fox J. L.  W353, R730
Fox V.  T627, T647
Foxworth S. F.  T649, T650
Fraeman A. A.  R401, T619, R726, R733, R735, R746
Fraile J. C.  T650
Franchi I. A.  M151, R454, T607, R722, R741, R746
Francis R.  T643
Francoise P.  T253, F502
Frank D. R.  T634
Frank E. A.  M104*

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

46th LPSC Program  209
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Franklin B. J.</td>
<td>R733</td>
</tr>
<tr>
<td>Franz H.</td>
<td>M102, F502, T625, T627</td>
</tr>
<tr>
<td>Franz H. B.</td>
<td>M102*, T253, R402, R452*, R733</td>
</tr>
<tr>
<td>Fraser W.</td>
<td>T633</td>
</tr>
<tr>
<td>Frey N.</td>
<td>M103</td>
</tr>
<tr>
<td>Freed A. M.</td>
<td>T205, T603</td>
</tr>
<tr>
<td>Freeman P. M.</td>
<td>R722</td>
</tr>
<tr>
<td>Freiheit C.</td>
<td>M102, T253*, F502, F552, T625, T627, T640</td>
</tr>
<tr>
<td>Freierking M.</td>
<td>T631</td>
</tr>
<tr>
<td>Freiheit C.</td>
<td>R733</td>
</tr>
<tr>
<td>Frey V.</td>
<td>T619</td>
</tr>
<tr>
<td>Friday M. E.</td>
<td>T627</td>
</tr>
<tr>
<td>Friedlander L.</td>
<td>W352, T613, T627, R737</td>
</tr>
<tr>
<td>Friedrich J.</td>
<td>T632, R742</td>
</tr>
<tr>
<td>Friges M. D.</td>
<td>F502*, T642, R722, R739</td>
</tr>
<tr>
<td>Frigeri A.</td>
<td>T203, T629</td>
</tr>
<tr>
<td>Fritz J.</td>
<td>T251, T605</td>
</tr>
<tr>
<td>Fritzler E.</td>
<td>T626</td>
</tr>
<tr>
<td>Friedenberg P.</td>
<td>R723</td>
</tr>
<tr>
<td>Frydenvang J.</td>
<td>R402</td>
</tr>
<tr>
<td>Fryer C. L.</td>
<td>T641</td>
</tr>
<tr>
<td>Fu Q.</td>
<td>T640</td>
</tr>
<tr>
<td>Fu R. R.</td>
<td>T255, W354*, R742</td>
</tr>
<tr>
<td>Fu X. H.</td>
<td>T605</td>
</tr>
<tr>
<td>Fudge C.</td>
<td>R715</td>
</tr>
<tr>
<td>Fuentes C.</td>
<td>T254, T633</td>
</tr>
<tr>
<td>Fuentes F.</td>
<td>R702, R734</td>
</tr>
<tr>
<td>Fujiwara A.</td>
<td>T640</td>
</tr>
<tr>
<td>Fukai R.</td>
<td>T636, T638</td>
</tr>
<tr>
<td>Fukuda K.</td>
<td>R742</td>
</tr>
<tr>
<td>Fukuhara T.</td>
<td>R724</td>
</tr>
<tr>
<td>Fulle M.</td>
<td>M103*</td>
</tr>
<tr>
<td>Fulsang E.</td>
<td>T644</td>
</tr>
<tr>
<td>Funderburg R. L.</td>
<td>T625</td>
</tr>
<tr>
<td>Funk R. C.</td>
<td>T624</td>
</tr>
<tr>
<td>Fuqua H. A.</td>
<td>T604</td>
</tr>
<tr>
<td>Furumura T.</td>
<td>T604</td>
</tr>
<tr>
<td>Fusco M. S.</td>
<td>T639</td>
</tr>
<tr>
<td>Fuselier S.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Fust J. S.</td>
<td>R722</td>
</tr>
<tr>
<td>Futana Y.</td>
<td>R749</td>
</tr>
<tr>
<td>Gabriel T.</td>
<td>T628</td>
</tr>
<tr>
<td>Gaddis L. R.</td>
<td>W351, R702, R703, R706, R711</td>
</tr>
<tr>
<td>Gadri K. L.</td>
<td>T607, T627</td>
</tr>
<tr>
<td>Gaetani G. A.</td>
<td>R453</td>
</tr>
<tr>
<td>Gaffney E. M.</td>
<td>R712, R747</td>
</tr>
<tr>
<td>Gaffney A. M.</td>
<td>W301*</td>
</tr>
<tr>
<td>Gainey S. R.</td>
<td>W352*, R737</td>
</tr>
<tr>
<td>Gainsforth Z.</td>
<td>W304*</td>
</tr>
<tr>
<td>Gaither T. A.</td>
<td>T609, R703, R713</td>
</tr>
<tr>
<td>Galand M.</td>
<td>M103</td>
</tr>
<tr>
<td>Gallagher C.</td>
<td>M152, T252, T622, R711</td>
</tr>
<tr>
<td>Gallardo-Carreño I.</td>
<td>T640, R722</td>
</tr>
<tr>
<td>Gallegos Z. E.</td>
<td>T611</td>
</tr>
<tr>
<td>Gallinger C.</td>
<td>R711</td>
</tr>
<tr>
<td>Gallloway M.</td>
<td>R738</td>
</tr>
<tr>
<td>Galuszka D.</td>
<td>R703</td>
</tr>
<tr>
<td>Gambhir T.</td>
<td>R720</td>
</tr>
<tr>
<td>Ganino C.</td>
<td>W354</td>
</tr>
<tr>
<td>Gannoun A.</td>
<td>R743</td>
</tr>
<tr>
<td>Ganse A.</td>
<td>R720</td>
</tr>
<tr>
<td>Gao P.</td>
<td>T616</td>
</tr>
<tr>
<td>Garcia G.</td>
<td>T626, T643</td>
</tr>
<tr>
<td>Garcia A. P.</td>
<td>R702</td>
</tr>
<tr>
<td>Garcia R.</td>
<td>T641</td>
</tr>
<tr>
<td>Garcia S.</td>
<td>R707</td>
</tr>
<tr>
<td>Garcia-Villadangos M.</td>
<td>T626</td>
</tr>
<tr>
<td>Gardner-Vandy K. G.</td>
<td>T255</td>
</tr>
<tr>
<td>Garg A. T.</td>
<td>T625</td>
</tr>
<tr>
<td>Garner B.</td>
<td>R723</td>
</tr>
<tr>
<td>Garrick-Bethell I.</td>
<td>T604, T607, T643</td>
</tr>
<tr>
<td>Garrison D. H.</td>
<td>T624</td>
</tr>
<tr>
<td>Garry W. B.</td>
<td>R403, T604, T629, R711</td>
</tr>
<tr>
<td>Garvie L. A. J.</td>
<td>R745</td>
</tr>
<tr>
<td>Garvin J. B.</td>
<td>T619</td>
</tr>
<tr>
<td>Gary B. G.</td>
<td>T630</td>
</tr>
<tr>
<td>Gasc S.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Gasda P. J.</td>
<td>R454*, F505</td>
</tr>
<tr>
<td>Gaskell R. W.</td>
<td>T623, R724</td>
</tr>
<tr>
<td>Gaskin O.</td>
<td>M102, R402, F552, T627, R724, R732, R733</td>
</tr>
<tr>
<td>Gattacceca J.</td>
<td>T744</td>
</tr>
<tr>
<td>Gauvin A. R.</td>
<td>T737</td>
</tr>
<tr>
<td>Gaudin P.</td>
<td>T631</td>
</tr>
<tr>
<td>Gavilan L.</td>
<td>T638</td>
</tr>
<tr>
<td>Ge Z. H.</td>
<td>M101</td>
</tr>
<tr>
<td>Gebreddelasse D.</td>
<td>R722</td>
</tr>
<tr>
<td>Gede M.</td>
<td>T650</td>
</tr>
<tr>
<td>Geier B.</td>
<td>T631</td>
</tr>
<tr>
<td>Geier L.</td>
<td>R714</td>
</tr>
<tr>
<td>Geiss R. H.</td>
<td>T205</td>
</tr>
<tr>
<td>Geissler P. E.</td>
<td>R717</td>
</tr>
<tr>
<td>Gellert R.</td>
<td>M102*, W352, R402, F552, T619, R733</td>
</tr>
<tr>
<td>Gendreau K.</td>
<td>T626</td>
</tr>
<tr>
<td>Genova A.</td>
<td>M104, T620, T644</td>
</tr>
<tr>
<td>Genzer M.</td>
<td>T619</td>
</tr>
<tr>
<td>Georg R. B.</td>
<td>T612</td>
</tr>
<tr>
<td>Geppert W. D.</td>
<td>T251, T612</td>
</tr>
<tr>
<td>Gerasimov M. V.</td>
<td>T253*</td>
</tr>
<tr>
<td>Gerlsetseg L.</td>
<td>T609</td>
</tr>
<tr>
<td>Ghezzi S. A.</td>
<td>R726</td>
</tr>
<tr>
<td>Geurts K.</td>
<td>T631</td>
</tr>
<tr>
<td>Ghafour N.</td>
<td>T643</td>
</tr>
<tr>
<td>Ghair R. C.</td>
<td>F504</td>
</tr>
<tr>
<td>GharibNezhad E.</td>
<td>T638</td>
</tr>
<tr>
<td>Ghent R.</td>
<td>T604, T628, R711</td>
</tr>
<tr>
<td>Ghent R. R.</td>
<td>T201, R451*, T602, R711</td>
</tr>
<tr>
<td>Gholz S.</td>
<td>T742, R746</td>
</tr>
<tr>
<td>Giacominelli</td>
<td>T631</td>
</tr>
<tr>
<td>Giardini D.</td>
<td>T641</td>
</tr>
<tr>
<td>Gibbon R. J.</td>
<td>R715</td>
</tr>
<tr>
<td>Gibson E. K.</td>
<td>F502, T626, T640, R739</td>
</tr>
<tr>
<td>Gibson R.</td>
<td>R714</td>
</tr>
<tr>
<td>Giesing P. A.</td>
<td>T624</td>
</tr>
<tr>
<td>Giguere S.</td>
<td>R725</td>
</tr>
<tr>
<td>Giguere T. A.</td>
<td>W351, R704, R706, R711, R713</td>
</tr>
<tr>
<td>Gillis-Davis J.</td>
<td>M104, W351, F505*, T627, R711, R713</td>
</tr>
<tr>
<td>Glaistock A.</td>
<td>T641</td>
</tr>
<tr>
<td>Gladstone G. R.</td>
<td>T254*, R451, T607</td>
</tr>
<tr>
<td>Glade H. A.</td>
<td>T604</td>
</tr>
<tr>
<td>Glamis B.</td>
<td>T625</td>
</tr>
<tr>
<td>Glass B. J.</td>
<td>T644</td>
</tr>
<tr>
<td>Glass B. P.</td>
<td>T612</td>
</tr>
<tr>
<td>Glassmeier K.-H.</td>
<td>M103</td>
</tr>
<tr>
<td>Glavilin D.</td>
<td>W352, F505*, T640, T644</td>
</tr>
<tr>
<td>Glavilin D. P.</td>
<td>M102, T253, F552, T625, T627, T640, R722</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Glaze L. S. R403*, F504, F553
Glazner A. F. W351, F552
Glein C. R. F503*
Glenar D. A. M101
Glines N. T618
Gloesener E. F503
Glotch T. T627, R709, R737
Glotch T. D. T251, W352,
F613, T623, T626,
T627, T640, R705,
R709, R715, R723,
R747
Go B. M. R708
Godard M. M103
Godber A. T619, R733
Goderis S. T634
Goesmann F. T644, R726
Goetz W. M102, R452, T619,
T645, R726
Goff F. W352
Goldberg T. T204
Goldman R. T. R711
Goldstein B. T647
Goldstein J. I. W304, R453
Goldstein R. M103, T631
Goldsten J. T646
Goldsten J. O. T628
Golledge B. T631
Golombek M. P. R401, F552,
T606, T619, T625,
T645, R703, R714,
R733
Golovin D. R733
Golovin D. V. R705
Gombosi T. M103, T631
Gómez-Elvira J. T619, R722
Gomi H. T641
Gondet B. M103, T631,
R702, R711
Gondo T. T634
Gong S. W354, T603
Gonzalez C. P. T601
Goodman J. F503
Goodrich C. A. R453*
Goossens S. M101*, M104,
W351, T620, T646
Gordon S. F552, R733
Goreva Y. G. T601
Goreva Y. S. T601, T640
Goswami T. K. R742
Goto K. T609
Goto Y. R451

Goudge T. A. T252*, R452,
T626
Gouman J. T602
Gounelle M. R404
Gourgeot F. R747
Goyal S. K. R723
Gracia Berna A. T631
Grady M. M. T626, T643,
R741, R744, R746
Graff J. R. R748
Graff P. V. T650
Graff T. G. T625
Graham L. D. T646
Grand N. T644
Grange M. G. R708
Grant A. M. T627
Grant J. A. F552, T618, T619,
T626, T645, R733
Grant J. A. III W352
Grav T. T647
Grava C. M101, T607
Gravagne I. T616
Grayzeck E. J. R702
Grayzeck E. J. R702
Greathouse T. K. R451, T607
Grebby S. F555
Grebowsky J. M. W303
Green A. G. T649
Green R. O. T626
Green S. M. F503
Greenberg R. N. T611
Greenhagen B. M151, T626
Greenhagen B. T. R451*,
T643, R704, R709,
R723
Greenwood J. P. W301*,
T607
Greenwood R. C. W354,
R454*, R741, R746
Gregg T. K. P. F555*
Gregory D. A. T624, T741
Gregory J. T741
Gregory T. R741, R746
Grey I. E. T627
Grieger B. B613
Grier E. T650
Grier J. T650, T652
Grieve R. A. F. T251, T609,
T611
Griffiths A. D. R724
Griggs C. E. R727
Grime C. T622, T645
Grimm R. E. W302, T604,
T618, R738
Grindrod P. T618, T645

Gritshevich M. F505
Grokhovsky V. I. F505, R739
Groopman E. T635
Grosfilis E. B. T617, R711
Groskreutz T. R723
Gross C. F552, R732, R735
Gross J. R351*, R453, R454,
R707, R722
Gross N. T650, T652
Grossman L. R404, T632,
T638, R742
Grothues H. G. M103
Grott M. M154, R452, T641,
T644, R727
Grotzinger J. M102, W352,
F502, F552, R724,
R733
Grotzinger J. P. M102, W352,
R402, R452, T619,
R733, R737
Groussin O. T631
Grove T. L. W301, F501,
T602
Grubisic A. R726
Gruen E. M101, M103
Gruener J. E. T643
Grün E. M103
Grundy W. T644, R724
Grundy W. M. T254, T646
Guan Y. M151, M153, W301,
R402
Gucsek A. R740, R743
Gudmundsson M. T. R711
Guenther A. T741, R743
Guettler C. M103
Gueydan F. T641
Gulbert A. T631
Guinness E. T641
Guinness E. A. R702, R735
Güldemeister N. T614
Gulkis S. M103, T631
Gunn M. R724
Günther D. T602
Guo J. T616, R747
Gupta S. M102, T618, T619,
T645
Gurciullo A. T647
Gurman S. J. T202
Gurnett D. R729, R749
Gustafson B. M103
Gustafson J. O. R711
Gutiérrez P. M103, T631

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

INDEX

G6th LPSC Program 211
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gutiérrez Marqués P.</td>
<td>T203, T630</td>
</tr>
<tr>
<td>Gutruf S.</td>
<td>R724</td>
</tr>
<tr>
<td>Güttler C.</td>
<td>T631</td>
</tr>
<tr>
<td>Guzzetti F.</td>
<td>R704</td>
</tr>
<tr>
<td>Gwyn S.</td>
<td>T633</td>
</tr>
<tr>
<td>Gyalay S. Jr.</td>
<td>R727</td>
</tr>
<tr>
<td>Gyngard F.</td>
<td>W304, T635</td>
</tr>
<tr>
<td>Gyollai I.</td>
<td>R737, R743</td>
</tr>
<tr>
<td>Gyuk G.</td>
<td>R712</td>
</tr>
<tr>
<td>Gwyn S.</td>
<td>T254</td>
</tr>
<tr>
<td>Ha B. M.</td>
<td>T627</td>
</tr>
<tr>
<td>Haberle C.</td>
<td>R711</td>
</tr>
<tr>
<td>Haberle R. M.</td>
<td>M102, R452*</td>
</tr>
<tr>
<td>Haenecour P.</td>
<td>T632, T635</td>
</tr>
<tr>
<td>Haerendel G.</td>
<td>R713</td>
</tr>
<tr>
<td>Haessig M.</td>
<td>T631</td>
</tr>
<tr>
<td>Hainge J.</td>
<td>W351*, T609, T648, R713</td>
</tr>
<tr>
<td>Haingy I.</td>
<td>R452</td>
</tr>
<tr>
<td>Hall C.</td>
<td>T626, T650</td>
</tr>
<tr>
<td>Hall I.</td>
<td>T203, T630</td>
</tr>
<tr>
<td>Haloda J.</td>
<td>F505</td>
</tr>
<tr>
<td>Halodova P.</td>
<td>F505</td>
</tr>
<tr>
<td>Halginin T. W.</td>
<td>T644</td>
</tr>
<tr>
<td>Hama T.</td>
<td>R750</td>
</tr>
<tr>
<td>Hamann C.</td>
<td>T613, R715</td>
</tr>
<tr>
<td>Hamara D.</td>
<td>M151, R726</td>
</tr>
<tr>
<td>Hamilton C. W.</td>
<td>R403*, T622, T626, T643, R711, R735</td>
</tr>
<tr>
<td>Hamilton D.</td>
<td>T623, T633, T644</td>
</tr>
<tr>
<td>Hamilton V. E.</td>
<td>T624, R701, R732</td>
</tr>
<tr>
<td>Hamm M.</td>
<td>M103</td>
</tr>
<tr>
<td>Hammer J. E.</td>
<td>T627, R743</td>
</tr>
<tr>
<td>Hammegren M.</td>
<td>R712</td>
</tr>
<tr>
<td>Hammond N. P.</td>
<td>M154*</td>
</tr>
<tr>
<td>Hammouda T.</td>
<td>R743</td>
</tr>
<tr>
<td>Han J.</td>
<td>T255, R404*, T632, R742</td>
</tr>
<tr>
<td>Han S.-C.</td>
<td>R727</td>
</tr>
<tr>
<td>Hanada H.</td>
<td>M101</td>
</tr>
<tr>
<td>Hancock B.</td>
<td>R724</td>
</tr>
<tr>
<td>Hand K.</td>
<td>R747</td>
</tr>
<tr>
<td>Hanger C. D.</td>
<td>R702</td>
</tr>
<tr>
<td>Hanley J.</td>
<td>T617</td>
</tr>
<tr>
<td>Hanna R. D.</td>
<td>T642, R732</td>
</tr>
<tr>
<td>Hansen C. J.</td>
<td>R719</td>
</tr>
<tr>
<td>Hansen K. C.</td>
<td>T631</td>
</tr>
<tr>
<td>Hansen V. L.</td>
<td>R748</td>
</tr>
<tr>
<td>Hansford G. M.</td>
<td>R726</td>
</tr>
<tr>
<td>Hapke B.</td>
<td>W351, R705, R747</td>
</tr>
<tr>
<td>Hara T.</td>
<td>W303, W353, R728, R729</td>
</tr>
<tr>
<td>Harada Y.</td>
<td>W303, W353, R728</td>
</tr>
<tr>
<td>Hardersen P. S.</td>
<td>R712, R747</td>
</tr>
<tr>
<td>Hardgrove C.</td>
<td>R402, R733</td>
</tr>
<tr>
<td>Hardy K. R.</td>
<td>R402</td>
</tr>
<tr>
<td>Hare T.</td>
<td>R703</td>
</tr>
<tr>
<td>Hare T. H.</td>
<td>R702</td>
</tr>
<tr>
<td>Hare T. M.</td>
<td>T252, R702, R703</td>
</tr>
<tr>
<td>Hareyama M.</td>
<td>R710</td>
</tr>
<tr>
<td>Hargiati H.</td>
<td>T650, T651, R717</td>
</tr>
<tr>
<td>Harju E. R.</td>
<td>R742</td>
</tr>
<tr>
<td>Harker D.</td>
<td>T619</td>
</tr>
<tr>
<td>Harri A-M.</td>
<td>T619</td>
</tr>
<tr>
<td>Harries D.</td>
<td>T613</td>
</tr>
<tr>
<td>Harrington E.</td>
<td>F504*</td>
</tr>
<tr>
<td>Harrington R.</td>
<td>R739</td>
</tr>
<tr>
<td>Harris J. W.</td>
<td>R722</td>
</tr>
<tr>
<td>Harris R. S.</td>
<td>M104*, T626, R706</td>
</tr>
<tr>
<td>Harris W.</td>
<td>T644</td>
</tr>
<tr>
<td>Harrison J. A.</td>
<td>R738</td>
</tr>
<tr>
<td>Harrison K. P.</td>
<td>T618</td>
</tr>
<tr>
<td>Harrison T. M.</td>
<td>F551</td>
</tr>
<tr>
<td>Harrison T. N.</td>
<td>T650, R731</td>
</tr>
<tr>
<td>Harshman K.</td>
<td>M151, R705, R726, R733</td>
</tr>
<tr>
<td>Hart R. A.</td>
<td>F504*</td>
</tr>
<tr>
<td>Hartlpe T.</td>
<td>R750</td>
</tr>
<tr>
<td>Hartogh P.</td>
<td>M103, R452, T631</td>
</tr>
<tr>
<td>Hartzell C. M.</td>
<td>T628</td>
</tr>
<tr>
<td>Haruyama J.</td>
<td>T201*, R451, F501, T603, T608</td>
</tr>
<tr>
<td>Harvey R. P.</td>
<td>R748</td>
</tr>
<tr>
<td>Hasch M.</td>
<td>T251</td>
</tr>
<tr>
<td>Hasebe N.</td>
<td>R726</td>
</tr>
<tr>
<td>Hasegawa H.</td>
<td>R453</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
INDEX

Horgan B. W352*, F552, R706, R732
Horgan B. H. N. R403
Hori A. R708
Horiguchi K. T630
Horikawa Y. R724
Home A. T251
Hornung K. M103
Horowitz S. S. R401
Hörst S. M. T647
Horton J. W. Jr. T612
Horváth A. F. T644
Horváth D. R708
Horváth I. T644
Horz F. T628
Hoshino T. T643
Hösökuldsson A. R711
Hosoda S. T649
Housen K. R. T205*
Hovmand L. R726
Howard A. D. F502*, T624
Howard K. T. M101, T603
Howie R. M. R738
Howington-Kraus E. R702, R703
Hughes K. H. G. T629
Hugho R. M151*
Humayun M. T202, T204, W304*, R404, T601
Humeau O. T644
Hunt A. C. T638
Hunt D. T626, T643
Hurd D. T650
Hurford T. A. M154, T633, T641, R727
Hurlay D. M. M101*, R451, T607, R705, R719
Hurlay J. T641
Hurowitz J. A. M102, W352, R402, R452*, T627, T737
Hurtado J. M. T603
Hurowitz D. T608
Huss G. R. M153, T601, T635, T636, R743
Hutheon I. D. T256, R742
Hutson M. T632, T648
Huyskens M. T636
Huyskens M. H. T637
Hviid S. F. T631
Hwang S. L. T643
Hyde B. C. T624, R741
Hyde T. W. T604, T613, T625, T626, R723, R750
Hynek B. M. T205, W352, R452*, F502*, T617, T626, T627, R711, R714
Hyung E. T641
Ibourichene A. F503
Icebreaker Proposal team T651
Ichimura K. T637
Iess L. F503
Ieva S. T629
Iijima Y. R724
Iizuka Y. R745
Ikeda H. R727
Ikenaga T. R727
Ikenaga T. R727
Ineke S. T629
Inutsuka S. T630
Inoue S. T629
Ip W. M103, T631
Ip W.-H. T605, T631
Irwin P. G. J. R716
Irwin R. P. R403, T617
Isa J. R453, R744
Isaacs J. P. W351
Ishihara M. T601
Ishii H. A. F505, T634
Ishikawa S. T. T622
Ishikawa Y. T640
Ishihara T. T640
Ishiyama K. R451, R711
Ismail S. R725
Isobe H. T630, T632, T634
ISSI Team: Mars Induced Magnetosphere R749
Jäckel A. R708
Jack S. J. T626
Jackson M. R. M. T624, T627, T640, R741, R743, R745
Izenberg N. R. M104*, T602
Jack S. J. R726
Jäckel A. M103*
Jackowatz C. V. R702
Jackson C. R. M. R709, R750

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

214 46th LPSC Program
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

Katsuragi H. W354
Kattenhorn S. A. F553, T641, R703
Kauff H. U. R452
Kaufmann D. E. R451, T607
Kaur J. T607
Kaur P. T644
Kavelaars J. J. T254, T633
Kawahara K. R727
Kawakatsu Y. R727
Kawakita H. R738
Kawamura T. T603, T606, T641
Kayama M. R740, R743
Kayzar T. M. R739
Kdyr S. R739
Keane J. M101, R738
Keane J. T. M101*, T607, T647, R705, R712
Kearsley A. T. T634
Kebukawa Y. W354, T640
Kedar S. T641
Keele C. L. T640
Keihm S. M103, T631
Keika K. R727
Keiser S. A. T638
Keller H.-U. T631
Keller H. U. T203, T631
Keller J. W. T626, R706
Keller L. P. W304, R404, F505*, T632, R721, R739, R740, R742, R746
Keller M. R. M104
Kelley M. R722
Kelley S. P. R402, T612, R737
Kempf S. M101, T644, R719
Kempinnen O. T619
Kendall J. D. F501*, F551
Kenkmann T. T205, T608, T609, T613
Kennedy J. D. T619
Kennington D. R737
Kent J. J. R709
Kent J. K. T649
Kerber L. T252*, W302, R452*, T617
Kerekgyarto A. G. T256*, R742
Kereszturi A. M152, T622, R737, R740
Kerrigan M. T251, T611
Kersten E. T203
Kestay L. R702
Kesztzehelyi L. T252*, R702, R711
Kesztzehelyi L. P. T641
Ketcham R. A. T642
Ketley M. N. T627
Khan R. T741
Kharel P. R722
Kharianoiva G. A. R716
Kharytonov A. R747
Khayat A. R452
Kiellman R. B. T624
Kiely C. J. R709
Kierein-Young K. S. T642
Kilgallon A. R702, R735
Kim H. R. T604
Kim J. T627, R727
Kim K.-H. T604, T643
Kim K. H. T604
Kim K. J. R711, R726
Kimberley J. T613
Kimura H. T201
Kimura J. R727
Kimura M. R741, R742, R744
Kimura T. R749
Kimura Y. R750
Kinch K. R733
King D. T. Jr. T251, T610
King P. L. F552
Kinnear T. M. T625, R737
Kipp D. R703
Kiran Kumar A. S. T615, T644
Kirchoff M. R. T201*
Kirk R. R703, R718, R719
Kirk R. D. F553
Kirk R. L. T641, R702, R703
Kirschwink J. L. T624
Kishi A. T649
Kissel J. M103
Kita N. T. M153, T256, R404*, T632, T634, R742
Kitagawa H. R739
Kitazato K. T640, R724, R726, R747
Kite E. S. R403*, R452*, R735
Klaus K. R727
Klein F. R732
Kleine T. T202, T255, T256, T636, T638, R744
Kleinheinz J. T643
Kleinschneider A. M. T647
Klemme S. T627
Klesh A. T. T646
Kletetschka G. T641, R739
Kleyna J. R738
Klima R. L. M104, W351, R723
Klimczak C. M104, M154*, T602, T620
Kling C. L. T620
Klingelhoefe G. T644
Klingenberger A. J. R724
Klöck W. W304
Klug Boonstra S. T650
Knapmeyer-Endrun B. T641
Kneissl T. T201, T606, T629, T630, R713, R735
Knezeck N. R. T641
Knibbe J. S. T602
Knight M. M. R738
Knoll A. H. T625
Knollenberg J. T631
Kobayashi H. R738
Kobayashi K. T640, R739
Kobayashi M. R723, R727
Kobayashi N. T641, R727
Kobayashi S. T603
Kobayashi T. T201
Kobs Nawotniak S. E. R711
Koch A. M103
Kocurek G. A. R401
Kodama S. T643
Kodolányi J. T635
Koerberl C. T251*, T612, T626, T631
Koefoed P. T636
Koenders C. M103
Kofman W. M103, T631, R729
Koga S. C. R724
Kohl I. E. T204, W301*, T624, R742
Kohler E. F504*, T639
Köhler J. T616, R747
Kohout T. F505*, R743
Kohr M. T251
Komatsu G. T609, T640, R704, R720
Komatsu M. M153, R740
INDEX

INDEX

Knoch A. R724
Kondo T. R750
Konopliv A. S. M101, T203, T603, T629
Kööp L. R404*
Koopmans R.-J. T647
Korman K. T610
Korn L. K. R732
Korochantsev A. V. R707
Korochantsaeva E. V. R707
Koroleva O. N. R739
Korotev R. L. W301, F501, R707
Korth H. M104
Koszeghy Cs. T650
Kouchi A. R750
Kounaves S. F502, R733
Korochantsev A. V. R707
Korochantseva E. V. R707
Korolev R. M. R722
Kukko A. T251, T610
Kukkonen S. T641, R734
Kulichitsky A. V. R705
Kulkov A. R712
Kumagi K. R740
Kumamoto A. T201, R451*, R711
Kumar A. R723
Kumar P. R740
Kumar P. S. R734
Kumar S. N. T625
Kunihiro T. R739
Kuramoto K. T641
Kurilla B. T651
Kuritani T. R745
Kurokawa H. R452, T639, R749
Kurosawa K. T205, T614, R738, R749
Kusano H. R726
Kuwano S. R724
Kuzmin R. O. R732, R733
Kuzmanki T. R740
Labenne L. T613
Labidi J. T638, R744
Lacerda P. M103
Lacombe G. R702
LaConte K. T648
Lacy C. F504, T639
Lacy J. R716
Ladewig J. V. R722
Lagage F. T631
Lagain A. R713
Lai B. W304
Lai H. R. T628
Lai I.-L. T631
Lalich D. T622
Lalinde B. R720
Lamb M. P. T606
Lambert J. L. R726
Lambert P. T251, T609, T611, R712
Lambrigt S. R703
Lamsal N. R725
Lamy P. M103, T631, R747
Landis G. T647
Landis M. E. M152*, R722
Lansing R. R712
Lang A. T651
Lanenhorst F. T613
Langer A. S. R451
Langbein Y. M103, T631, R711
Lanza N. R402, F552, R733
Lanza N. L. R402*, R717, R733
Lanzorotti A. T602, R711, R721
Lapen T. J. T202, T256*, W301, R402, R453, T624, T638, R742
Lapotre M. G. A. R401*, T619
LaRara L. M103, T631
Larson D. W303, W353, T643, R728, R729
Larson D. E. W303*, R728
Larson D. L. W353
Lasue J. M103, R402, F552, T645, R724, R733
Lasuer J. R733
Letos T. R717
Laude P. T641
Lauf R. T604, T613, T626, R723
Laura J. R702, R703, R706
Lauretta D. S. R454, R722
Lauteslager D. R743
Lavelle C. M. R451
Lawler G. R729
Lawrence D. J. M104*, M151, W351, R403, R451, R453, F551, T607, T628, T643, T646, R726, R727
Lawrence S. J. W351*, F551, T643, R704, R706, R709
Lay T. T641
Lazechko S. R722
LaZiarrin M. T631
Le K. R735
Le L. M153, W351, W352, T625, R741

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
<table>
<thead>
<tr>
<th>Name</th>
<th>Code(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leask E. K.</td>
<td>T627</td>
</tr>
<tr>
<td>Leblanc F.</td>
<td>W353*, R749</td>
</tr>
<tr>
<td>Lebreton J.-P.</td>
<td>M103</td>
</tr>
<tr>
<td>Le Corre L.</td>
<td>T629, T630, R712, R724, R746</td>
</tr>
<tr>
<td>Le Corvec N.</td>
<td>R403*</td>
</tr>
<tr>
<td>Le Deit L.</td>
<td>R402, R733</td>
</tr>
<tr>
<td>Ledvina S. A.</td>
<td>R749</td>
</tr>
<tr>
<td>Lee E.</td>
<td>R703</td>
</tr>
<tr>
<td>Lee E. N.</td>
<td>T627</td>
</tr>
<tr>
<td>Lee G.</td>
<td>T647</td>
</tr>
<tr>
<td>Lee H.-J.</td>
<td>T604</td>
</tr>
<tr>
<td>Lee J. A.</td>
<td>T623, T632, T636, R715</td>
</tr>
<tr>
<td>Lee P.</td>
<td>T611, T623, T644, R722</td>
</tr>
<tr>
<td>Lee S.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Lee T. J.</td>
<td>R712</td>
</tr>
<tr>
<td>Lee Y.</td>
<td>W353, T626, R730</td>
</tr>
<tr>
<td>Lees D.</td>
<td>T626, R742</td>
</tr>
<tr>
<td>Leff C. E.</td>
<td>R724</td>
</tr>
<tr>
<td>Lefevre F.</td>
<td>W303, R702, R730</td>
</tr>
<tr>
<td>Lefkowitz H.</td>
<td>T603, T615, T619</td>
</tr>
<tr>
<td>Lemoine L.</td>
<td>R727</td>
</tr>
<tr>
<td>Lemaire J. L.</td>
<td>T638</td>
</tr>
<tr>
<td>Lemaître M.</td>
<td>M151*, W351, R711</td>
</tr>
<tr>
<td>Lemke L. G.</td>
<td>R722</td>
</tr>
<tr>
<td>Lemmon M.</td>
<td>T615, T619</td>
</tr>
<tr>
<td>Lemmon F. G.</td>
<td>M101, M104, T620, R727</td>
</tr>
<tr>
<td>Le Mouël S.</td>
<td>M102, M103, R402, F552, T631, R716, R724, R733</td>
</tr>
<tr>
<td>Lenardic A.</td>
<td>R748</td>
</tr>
<tr>
<td>Leonard E. J.</td>
<td>R720</td>
</tr>
<tr>
<td>Lepore K. H.</td>
<td>T627, T626, R727</td>
</tr>
<tr>
<td>Leroux H.</td>
<td>T202*, T251, W304, T624, R742</td>
</tr>
<tr>
<td>LeRoy L.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Less J.</td>
<td>R727</td>
</tr>
<tr>
<td>Lester M.</td>
<td>R749</td>
</tr>
<tr>
<td>Lesur V.</td>
<td>T641</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsset M.</td>
<td>R747</td>
</tr>
<tr>
<td>Martellato E.</td>
<td>R731</td>
</tr>
<tr>
<td>Martin A. M.</td>
<td>T602</td>
</tr>
<tr>
<td>Martin C.</td>
<td>R747</td>
</tr>
<tr>
<td>Martin E. S.</td>
<td>R720</td>
</tr>
<tr>
<td>Martin M.</td>
<td>F502</td>
</tr>
<tr>
<td>Martin P.</td>
<td>M103</td>
</tr>
<tr>
<td>Martinez G. M.</td>
<td>T619</td>
</tr>
<tr>
<td>Martinez J.</td>
<td>R454</td>
</tr>
<tr>
<td>Martinez M. H.</td>
<td>R453</td>
</tr>
<tr>
<td>Martinez-Frias J.</td>
<td>T619</td>
</tr>
<tr>
<td>Martinot M.</td>
<td>R452</td>
</tr>
<tr>
<td>Martinsen B.</td>
<td>R723</td>
</tr>
<tr>
<td>Martin-Torres F. J.</td>
<td>M102,</td>
</tr>
<tr>
<td>Martin-Torres J.</td>
<td>M102, T253,</td>
</tr>
<tr>
<td>Martin-Torres J.</td>
<td>R705, T253,</td>
</tr>
<tr>
<td>Marty B.</td>
<td>T204,</td>
</tr>
<tr>
<td>Marty L.</td>
<td>R401</td>
</tr>
<tr>
<td>Maruyama S.</td>
<td>T252</td>
</tr>
<tr>
<td>Maruyama Y.</td>
<td>R725</td>
</tr>
<tr>
<td>Mary N.</td>
<td>T626</td>
</tr>
<tr>
<td>Marzari F.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Masanao M.</td>
<td>R747</td>
</tr>
<tr>
<td>Masiero J. R.</td>
<td>R738</td>
</tr>
<tr>
<td>Mason E. L.</td>
<td>B615</td>
</tr>
<tr>
<td>Massey R. J.</td>
<td>B403, F502</td>
</tr>
<tr>
<td>Massironi M.</td>
<td>T602, T614,</td>
</tr>
<tr>
<td>Mastrodemos N.</td>
<td>T203, T630</td>
</tr>
<tr>
<td>Mastrogiuseppe M.</td>
<td>F553</td>
</tr>
<tr>
<td>Masuda K.</td>
<td>R643</td>
</tr>
<tr>
<td>Masunaga K.</td>
<td>R749</td>
</tr>
<tr>
<td>Mateo-Velez J.-C.</td>
<td>R705</td>
</tr>
<tr>
<td>Materese C. K.</td>
<td>T640</td>
</tr>
<tr>
<td>Mather T. A.</td>
<td>F504</td>
</tr>
<tr>
<td>Mathies R. A.</td>
<td>R727</td>
</tr>
<tr>
<td>Mathur S.</td>
<td>T607, T627</td>
</tr>
<tr>
<td>Matiella Novak M. A.</td>
<td>R704</td>
</tr>
<tr>
<td>Matlock S.</td>
<td>R727</td>
</tr>
<tr>
<td>Matson D. L.</td>
<td>R403</td>
</tr>
<tr>
<td>Matsuda J.</td>
<td>R743</td>
</tr>
<tr>
<td>Matsu T.</td>
<td>T205, T609, T640,</td>
</tr>
<tr>
<td>Matsunaga T.</td>
<td>F501, T608,</td>
</tr>
<tr>
<td>Matsuura S.</td>
<td>R726</td>
</tr>
<tr>
<td>Matsuyama I.</td>
<td>M101, T252,</td>
</tr>
<tr>
<td>Matsu T.</td>
<td>T607, R712, R720</td>
</tr>
<tr>
<td>Matta M.</td>
<td>W303, W353, R730</td>
</tr>
<tr>
<td>Matthias M.</td>
<td>T638, R744</td>
</tr>
<tr>
<td>Matthews L. S.</td>
<td>T604, R723,</td>
</tr>
<tr>
<td>Mattingly R.</td>
<td>T644</td>
</tr>
<tr>
<td>Mattson S. W.</td>
<td>T620, T627, R720</td>
</tr>
<tr>
<td>Maturilli A.</td>
<td>T602, T627,</td>
</tr>
<tr>
<td>Matz K.-D.</td>
<td>T203</td>
</tr>
<tr>
<td>Maurice S. M.</td>
<td>T102, T151, R402, R451, F552,</td>
</tr>
<tr>
<td>Mazanec M.</td>
<td>R739</td>
</tr>
<tr>
<td>Mazarro E.</td>
<td>T101, T104*, M101, T620, R710</td>
</tr>
<tr>
<td>Mazelle C.</td>
<td>W303, R729</td>
</tr>
<tr>
<td>Mazrouei S.</td>
<td>T201*, T650, R711</td>
</tr>
<tr>
<td>Mazur J. E.</td>
<td>R451, R705</td>
</tr>
<tr>
<td>Mazzotta Epifani E.</td>
<td>M103</td>
</tr>
<tr>
<td>McAdam A.</td>
<td>M102, T253, R402, F502, T640,</td>
</tr>
<tr>
<td>McAdam A. C.</td>
<td>M102*, T625, T627, R733</td>
</tr>
<tr>
<td>McAdam M. M.</td>
<td>T632</td>
</tr>
<tr>
<td>McAdams J. S.</td>
<td>R401</td>
</tr>
<tr>
<td>McBride M.</td>
<td>R452</td>
</tr>
<tr>
<td>McBride M. J.</td>
<td>M102, R402, R619</td>
</tr>
<tr>
<td>McCabe K.</td>
<td>R724</td>
</tr>
<tr>
<td>McCain K. A.</td>
<td>T632, R742</td>
</tr>
<tr>
<td>McCammon C.</td>
<td>T602</td>
</tr>
<tr>
<td>McCanta M. C.</td>
<td>T627, R711, T721</td>
</tr>
<tr>
<td>McCausland P. J. A.</td>
<td>R745</td>
</tr>
<tr>
<td>McClanahan T. P.</td>
<td>M151*, R705, R710, R726</td>
</tr>
<tr>
<td>McClintock B.</td>
<td>R730</td>
</tr>
<tr>
<td>McClintock W.</td>
<td>W353</td>
</tr>
<tr>
<td>McClintock W. E.</td>
<td>W303, W353, R730</td>
</tr>
<tr>
<td>McCollom T. M.</td>
<td>F552*</td>
</tr>
<tr>
<td>McComas D. J.</td>
<td>T254</td>
</tr>
<tr>
<td>McConnell H.</td>
<td>R722</td>
</tr>
<tr>
<td>McCord T. B.</td>
<td>T203, T629, T631, R718</td>
</tr>
<tr>
<td>McCoy T. J.</td>
<td>T255*, R404, T632, T640, R739</td>
</tr>
<tr>
<td>McCubbin F. M.</td>
<td>M104, T102, W301, R452*, R453, T602, T607, T624, R711</td>
</tr>
<tr>
<td>McElwaine J. N.</td>
<td>R403</td>
</tr>
<tr>
<td>McNulty T. W303</td>
<td>R728, R729</td>
</tr>
<tr>
<td>McEwen A.</td>
<td>T201*</td>
</tr>
<tr>
<td>McEwen A. S.</td>
<td>W302, R401, F555, T606, T616, T647, R714, R735, R736</td>
</tr>
<tr>
<td>McFadden J. P.</td>
<td>W303*, W353, R728, R729</td>
</tr>
<tr>
<td>McFadden L. A.</td>
<td>T203, T629, T630, T646</td>
</tr>
<tr>
<td>McGovern P. J.</td>
<td>M101, W351, R403, T641, R706, R720</td>
</tr>
<tr>
<td>McGuiere P. C.</td>
<td>R735</td>
</tr>
<tr>
<td>McInturff B. Mc.</td>
<td>T650</td>
</tr>
<tr>
<td>Mckay C. P. M102, F552, T655, T625, T627, T651, R722</td>
<td></td>
</tr>
<tr>
<td>McKeegan K. D. T256, F554, T634, T638, R742, R744</td>
<td></td>
</tr>
<tr>
<td>McKinnon E. A.</td>
<td>T621</td>
</tr>
<tr>
<td>McKinnon W. B.</td>
<td>T254, F503, F553</td>
</tr>
<tr>
<td>McLain H. L.</td>
<td>T640</td>
</tr>
<tr>
<td>McLean B. T630</td>
<td></td>
</tr>
<tr>
<td>McLennan S. F552, R724</td>
<td></td>
</tr>
<tr>
<td>Mclennan S. M. W352*, R402, R732, R733, R737</td>
<td></td>
</tr>
<tr>
<td>McMahon Z. F503, T639</td>
<td></td>
</tr>
<tr>
<td>McMichael S. R702</td>
<td></td>
</tr>
<tr>
<td>McNerny A. L. R724</td>
<td></td>
</tr>
<tr>
<td>McNutt R. L. T254</td>
<td></td>
</tr>
<tr>
<td>McSween H. Y.</td>
<td>M153, T202, T203, R453, T624, T627, T629</td>
</tr>
<tr>
<td>Méard E.</td>
<td>T602</td>
</tr>
<tr>
<td>Medina J.</td>
<td>T626</td>
</tr>
<tr>
<td>Meech K.</td>
<td>R738</td>
</tr>
<tr>
<td>Meech K. J.</td>
<td>R738</td>
</tr>
<tr>
<td>Mege D.</td>
<td>T253</td>
</tr>
<tr>
<td>Megna R.</td>
<td>T630</td>
</tr>
<tr>
<td>Meier M. M. M.</td>
<td>T204*, R740, R741, R745</td>
</tr>
<tr>
<td>Meinke B.</td>
<td>T650, T652</td>
</tr>
<tr>
<td>Mellorowicz B.</td>
<td>T643, R722</td>
</tr>
<tr>
<td>Mellon M. T.</td>
<td>R452, T617, T627</td>
</tr>
<tr>
<td>Melwani Daswani M.</td>
<td>T626</td>
</tr>
<tr>
<td>Menard J. M.</td>
<td>T641</td>
</tr>
<tr>
<td>Méndez Harper J. S.</td>
<td>R401*</td>
</tr>
<tr>
<td>Mendillo M.</td>
<td>R729</td>
</tr>
<tr>
<td>Mendillo M.</td>
<td>R729</td>
</tr>
<tr>
<td>Mendillo M.</td>
<td>R729</td>
</tr>
<tr>
<td>Mendillo M.</td>
<td>R729</td>
</tr>
<tr>
<td>Mendillo M.</td>
<td>R729</td>
</tr>
<tr>
<td>Mencel K.</td>
<td>W304*, R404, T632, T634</td>
</tr>
<tr>
<td>Mersenn J.</td>
<td>R401</td>
</tr>
<tr>
<td>Mercer C. M.</td>
<td>T204*</td>
</tr>
<tr>
<td>Merle R. E.</td>
<td>F551, R708</td>
</tr>
<tr>
<td>Merouane S.</td>
<td>T631</td>
</tr>
<tr>
<td>Mertens V.</td>
<td>T203</td>
</tr>
<tr>
<td>Meshik A. P.</td>
<td>T601, T635, T636</td>
</tr>
<tr>
<td>Meslin P.-Y.</td>
<td>T616, T619, R724, R733</td>
</tr>
<tr>
<td>Meslin P. Y.</td>
<td>R402, F552, R733</td>
</tr>
<tr>
<td>Messenger S.</td>
<td>W304*, R404, T632, T636</td>
</tr>
<tr>
<td>Messenger S. M.</td>
<td>R453</td>
</tr>
<tr>
<td>Messenger S. R.</td>
<td>R722</td>
</tr>
<tr>
<td>Mest S. C.</td>
<td>T629, R706, R734</td>
</tr>
<tr>
<td>Metzler K.</td>
<td>T256</td>
</tr>
<tr>
<td>Meyer B. S.</td>
<td>T635, T638</td>
</tr>
<tr>
<td>Meyer E. E.</td>
<td>T611</td>
</tr>
<tr>
<td>Meyer H. M.</td>
<td>R403, R713</td>
</tr>
<tr>
<td>Michael G.</td>
<td>T201, R403, T630, R735</td>
</tr>
<tr>
<td>Michael G. G.</td>
<td>T606</td>
</tr>
<tr>
<td>Michaelides R. J.</td>
<td>F553*</td>
</tr>
<tr>
<td>Michaelis H.</td>
<td>M103, R724</td>
</tr>
<tr>
<td>Michaels T. I.</td>
<td>W302</td>
</tr>
<tr>
<td>Michalski C.</td>
<td>T205</td>
</tr>
<tr>
<td>Michalski J.</td>
<td>R734</td>
</tr>
<tr>
<td>Michalski J. R.</td>
<td>R452, F552*, T613, T627, T717, R737</td>
</tr>
<tr>
<td>Michel P.</td>
<td>W354, T628, T644, R712</td>
</tr>
<tr>
<td>Mickol R. L.</td>
<td>W302, T639, R736</td>
</tr>
<tr>
<td>Middlebrook W. M.</td>
<td>R717</td>
</tr>
<tr>
<td>Mikouchi T.</td>
<td>M153, R453*, F554, R740, R741, R743</td>
</tr>
<tr>
<td>Milam K. A.</td>
<td>T609</td>
</tr>
<tr>
<td>Milam S. N.</td>
<td>R738, R750</td>
</tr>
<tr>
<td>Milazzo M.</td>
<td>R711</td>
</tr>
<tr>
<td>Milazzo M. P.</td>
<td>T643, R735</td>
</tr>
<tr>
<td>Milbury C.</td>
<td>M101*, F551, T603</td>
</tr>
<tr>
<td>Miley H. M.</td>
<td>R453</td>
</tr>
<tr>
<td>Miljkovic K.</td>
<td>T616</td>
</tr>
<tr>
<td>Miller C. E.</td>
<td>T205</td>
</tr>
<tr>
<td>Miller J. M.</td>
<td>R737</td>
</tr>
<tr>
<td>Miller K.</td>
<td>T253, F502</td>
</tr>
<tr>
<td>Miller K. E.</td>
<td>R454*</td>
</tr>
<tr>
<td>Miller L.</td>
<td>T624</td>
</tr>
<tr>
<td>Miller M.</td>
<td>R737</td>
</tr>
<tr>
<td>Miller P. L.</td>
<td>R712</td>
</tr>
<tr>
<td>Miller R. S.</td>
<td>T607, R726, R727</td>
</tr>
<tr>
<td>Milliken R. E.</td>
<td>M102*, R452*, R454, F502, F552, T607, T625, T629, T640, R732, R733</td>
</tr>
<tr>
<td>Mills H. J.</td>
<td>T253*</td>
</tr>
<tr>
<td>Mills R. D.</td>
<td>R708</td>
</tr>
<tr>
<td>Mimoun D.</td>
<td>T641</td>
</tr>
<tr>
<td>Ming D. W.</td>
<td>M102, W352*, R402, R452*, F502, F552, T625, R733</td>
</tr>
<tr>
<td>Minin M.</td>
<td>R702</td>
</tr>
<tr>
<td>Mini-RF Team</td>
<td>T607, R451</td>
</tr>
<tr>
<td>Minitti M.</td>
<td>T102, R733</td>
</tr>
<tr>
<td>Minitti M. E.</td>
<td>T102, R452, T619, R733</td>
</tr>
<tr>
<td>Mink R. G.</td>
<td>R722</td>
</tr>
<tr>
<td>Minson S. E.</td>
<td>R401</td>
</tr>
<tr>
<td>Mironenko M. V.</td>
<td>T203</td>
</tr>
<tr>
<td>Misawa K.</td>
<td>T624, T638</td>
</tr>
<tr>
<td>Mischner M.</td>
<td>T102, R733</td>
</tr>
<tr>
<td>Misener R.</td>
<td>T251</td>
</tr>
<tr>
<td>Mishra M. K.</td>
<td>T615</td>
</tr>
<tr>
<td>Mishra R. K.</td>
<td>R404, T632</td>
</tr>
<tr>
<td>Misra A. K.</td>
<td>T204, R725</td>
</tr>
<tr>
<td>Misra S.</td>
<td>T610, T612</td>
</tr>
<tr>
<td>Mita M.</td>
<td>R727</td>
</tr>
<tr>
<td>Mitchell D. L.</td>
<td>R729</td>
</tr>
<tr>
<td>Mitchell B. K.</td>
<td>T651</td>
</tr>
<tr>
<td>Mitchell D. L.</td>
<td>W303*, W353, R728, R729</td>
</tr>
<tr>
<td>Mitchell J. F.</td>
<td>T632</td>
</tr>
<tr>
<td>Mitchell J. L.</td>
<td>R736</td>
</tr>
<tr>
<td>Mitchell K. L.</td>
<td>R403, F553, R718, R719</td>
</tr>
<tr>
<td>Mitri G.</td>
<td>R720</td>
</tr>
<tr>
<td>Mitrofanov I. G.</td>
<td>M151, R705, R732, R733</td>
</tr>
<tr>
<td>Mittlefeldt D. W.</td>
<td>W352, R453*, F552, T619, T644, R708, R733, R741, R746</td>
</tr>
<tr>
<td>Miura H.</td>
<td>R750</td>
</tr>
<tr>
<td>Miyake A.</td>
<td>T634, R747, R750</td>
</tr>
<tr>
<td>Miyake N.</td>
<td>T640</td>
</tr>
<tr>
<td>Miyake W.</td>
<td>T201</td>
</tr>
<tr>
<td>Miyamoto H.</td>
<td>T252, T624, R720, R727, R745</td>
</tr>
<tr>
<td>Mizuno T.</td>
<td>R723, R727</td>
</tr>
<tr>
<td>Mizzon H.</td>
<td>T629</td>
</tr>
<tr>
<td>Mok T. D.</td>
<td>T638</td>
</tr>
<tr>
<td>Mocquet A.</td>
<td>T641</td>
</tr>
<tr>
<td>Modolo R.</td>
<td>W303, W353</td>
</tr>
<tr>
<td>Moersch J.</td>
<td>R733</td>
</tr>
<tr>
<td>Moersch J. E.</td>
<td>R726</td>
</tr>
<tr>
<td>Mohrig D.</td>
<td>T618</td>
</tr>
<tr>
<td>Mohr-Westheide T.</td>
<td>T251*</td>
</tr>
<tr>
<td>Moissl R.</td>
<td>T631</td>
</tr>
<tr>
<td>Mokashi P.</td>
<td>M103, T607</td>
</tr>
<tr>
<td>Mokrousov M.</td>
<td>R733</td>
</tr>
<tr>
<td>Mokrousov M. I.</td>
<td>R705</td>
</tr>
<tr>
<td>Molinaro R.</td>
<td>R401</td>
</tr>
<tr>
<td>Molina A.</td>
<td>M103</td>
</tr>
<tr>
<td>Molinaro R.</td>
<td>R401</td>
</tr>
<tr>
<td>Molter E. M.</td>
<td>T602</td>
</tr>
<tr>
<td>MOMA Science Team</td>
<td>R726</td>
</tr>
<tr>
<td>Monnereau M.</td>
<td>T629</td>
</tr>
<tr>
<td>Monson N. N.</td>
<td>T204*</td>
</tr>
<tr>
<td>Montag C.</td>
<td>T613, R723</td>
</tr>
<tr>
<td>Montalvo P. E.</td>
<td>R715</td>
</tr>
<tr>
<td>Montalvo S.</td>
<td>T610, R715</td>
</tr>
<tr>
<td>Montealeone B. D.</td>
<td>R453</td>
</tr>
<tr>
<td>Montealeone B. M.</td>
<td>T255</td>
</tr>
<tr>
<td>Montesi L.</td>
<td>T641</td>
</tr>
<tr>
<td>Montesi L. G.</td>
<td>F503, T641</td>
</tr>
<tr>
<td>Montesi R. C.</td>
<td>R711</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

Monteux J. T614
Montez S. T644
Montmessin F. W303, W353, R702, R724, R730
Moody M. V. R727
Moody S. R743
Moore J. R722
Moore J. M. T254, F553*, R737
Moore J. R. T611
Moore W. B. R708
Mooroka M. W. R728, R729
Morales N. R720
Moraless R. M103
Morrato Z. M. R702
Morbidelli A. T205, T641
Moreland W. M. R711
Moreno F. M103
Moreno-Paz M. T640
Morgan D. R729, R749
Morgan G. A. M152, W302, R706, R734
Morgan G. H. M103
Morgan J. V. T251, T609, T614
Moriarty D. P. III W351*, R706
Morimoto H. T643
Morishita K. R743
Moriwaki R. T624
Morooka M. W. W303, R728, R729
Morookian J. M. W301, T602, T644, T646, R733, R739
Morgan S. M. M102, R733
Morita R. W354, F501
Moroz L. V. T631
Morris D. K. R718
Morris M. R. T204
Morris R. V. M102, W352, R402, R452, F502, F552, T625, T627, R733, R739
Morrison S. M. M102, R733
Morschhauser A. T641
Morse A. T626
Morse A. D. M103
Morse Z. R. F551*
Mosebach H. R724
Moser D. E. F554, T624
Moses J. L. R716
Mosie A. M. T649
Moskovitz N. A. R712
Mottola S. M103*, T203, T630, T631, T646, R724
Mouginis-Mark P. T606, R711, R713
Mouginot J. R729
Mouroulis P. R726
Mousis O. T631, R718, R749
Moussis-Soffys A. T631
Movshovitz N. T205*
MOXIE Team R727
Moynier F. T251
MSL Science Team M102, W352, F552, R717, R733, R747
MSL Team M102, R733
Mubarak O. W304
Mueller T. G. R724
Mueting J. R702
Muinonen K. F505, R743
Muhib M. Z. T640
Mukherjee J. T607
Mukhopadhyay S. T205
Munenos N. R723
Muller J.-P. T645
Muller M. T635
Muller N. R748
Muller-Mellin R. T647
Mumma M. J. R452
Munoz Elorza I. T647
Murakami G. R727, R749
Murchie S. T618, R726
Murchie S. L. M104*, T602, T644, T646, R732
Murdoch N. W354, T641
Murl J. N. F551, R706
Murray J. M151, R710
Murty S. V. S. T616, T621, R710
Musilova M. T626
Mustard J. F. T252, T253, R452*, T611, T626, T627, R734
Mutrich N. T630
Mutchler M. J. T630
Muttik N. T624
Nabelek L. R739
Nabili A. R723
Nagahara H. R708, R750
Nagao K. T609, R739
Nagashima K. M153, T256, T635, R404*, R454, T601, T635, R736, R743
Nagihara S. R702
Nagihara S. T638, R749
Nair H. M104
Nakagawa K. T253, F502, F552, T625
Nakamura E. R739
Nakamura N. R711
Nakamura R. F501, T608, T643, R724
Nakamura T. R454, R724, R740
Nakamura Y. R702
Nakamura-Y. Nakamura-Messener K. W304, T634, R722, R739
Nakashima D. T256, R404, T632, T634
Nakata M. R750
Nakata A. R740
Nakauchi Y. R726, R747
Naeato G. T631
Namiki N. R723, R727
Napier O. F501, T602
Nara M. R743
Narvaez C. R729
Nash J. R403
Nasir S. W301, R707
Nathues A. T203*, T629, T630, R743
Nault K. A. R712
Navarro R. T626
Navarro-Gonzalez R. M102, T253, F502, F552, T625
Navarro-Gonzalez R. F552
Nayak M. T643
Neal C. R. M151, W301*, W351*, T605, T607, R708
Needham A. W. R404*, T632
Neely E. M. R401
Neeleman A. T630, R713
Nefian A. R703
Neish C. D. R451, F553*, R711
Nekvasil H. F501*, T625, T627, R709, R737

INDEX
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

INDEX
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osinsky G. R.</td>
<td>R711</td>
</tr>
<tr>
<td>OSIRIS Team</td>
<td>T631</td>
</tr>
<tr>
<td>Óskarsson B. V.</td>
<td>R711</td>
</tr>
<tr>
<td>Osterloo M. K.</td>
<td>F502</td>
</tr>
<tr>
<td>Osterloo M. M.</td>
<td>W352*, R710</td>
</tr>
<tr>
<td>Ostrach L. R.</td>
<td>M104, W351,</td>
</tr>
<tr>
<td></td>
<td>R451*, R704, R713</td>
</tr>
<tr>
<td>O’Sullivan J. A.</td>
<td>R735</td>
</tr>
<tr>
<td>O’Sullivan K. M.</td>
<td>R708</td>
</tr>
<tr>
<td>Ota T.</td>
<td>R739</td>
</tr>
<tr>
<td>Otake H.</td>
<td>T643</td>
</tr>
<tr>
<td>Otero R. E.</td>
<td>R703</td>
</tr>
<tr>
<td>Otsuki M.</td>
<td>T643</td>
</tr>
<tr>
<td>Ott M.</td>
<td>T626</td>
</tr>
<tr>
<td>Ott U.</td>
<td>R707, R740, R743</td>
</tr>
<tr>
<td>Otto K.</td>
<td>T203</td>
</tr>
<tr>
<td>Oulton J.</td>
<td>R404*</td>
</tr>
<tr>
<td>Owen J. M.</td>
<td>R712</td>
</tr>
<tr>
<td>Owens B.</td>
<td>T644</td>
</tr>
<tr>
<td>Owens J. D.</td>
<td>T638</td>
</tr>
<tr>
<td>Oyama A.</td>
<td>T643</td>
</tr>
<tr>
<td>Oyama K. A.</td>
<td>R703</td>
</tr>
<tr>
<td>Oyen D. A.</td>
<td>R733</td>
</tr>
<tr>
<td>Ozawa K.</td>
<td>R750</td>
</tr>
<tr>
<td>Özdemir S.</td>
<td>T251</td>
</tr>
<tr>
<td>Paar G.</td>
<td>R724</td>
</tr>
<tr>
<td>Paavel K.</td>
<td>T251, T612</td>
</tr>
<tr>
<td>Pabari J. P.</td>
<td>R723</td>
</tr>
<tr>
<td>Pack A.</td>
<td>R745, R749</td>
</tr>
<tr>
<td>Paczkowski B.</td>
<td>T647</td>
</tr>
<tr>
<td>Paige D. A.</td>
<td>M151, R451,</td>
</tr>
<tr>
<td></td>
<td>F555, T607, T616,</td>
</tr>
<tr>
<td></td>
<td>T643, R704</td>
</tr>
<tr>
<td>Paik H. J.</td>
<td>R727</td>
</tr>
<tr>
<td>Paillou P.</td>
<td>R401, F553</td>
</tr>
<tr>
<td>Paine C. G.</td>
<td>T643</td>
</tr>
<tr>
<td>Pajola M.</td>
<td>T614, T631, T644</td>
</tr>
<tr>
<td>Palafax L. F.</td>
<td>R735</td>
</tr>
<tr>
<td>Palk C. S.</td>
<td>T204*</td>
</tr>
<tr>
<td>Palma R. L.</td>
<td>W304, T634</td>
</tr>
<tr>
<td>Palmer E. E.</td>
<td>R703</td>
</tr>
<tr>
<td>Palomba E.</td>
<td>M103, T203,</td>
</tr>
<tr>
<td></td>
<td>T629, T630, T631</td>
</tr>
<tr>
<td>Palucis M. C.</td>
<td>M102</td>
</tr>
<tr>
<td>Palumbo P.</td>
<td>M103</td>
</tr>
<tr>
<td>Pan C.</td>
<td>R717</td>
</tr>
<tr>
<td>Pan L.</td>
<td>F555*</td>
</tr>
<tr>
<td>Pando K. M.</td>
<td>T602, R708,</td>
</tr>
<tr>
<td></td>
<td>R750</td>
</tr>
<tr>
<td>Pankine A.</td>
<td>T616</td>
</tr>
<tr>
<td>Panning M. P.</td>
<td>T641</td>
</tr>
<tr>
<td>Papanastassiou D. A.</td>
<td>T256*, F501,</td>
</tr>
<tr>
<td></td>
<td>R745</td>
</tr>
<tr>
<td>Papike J. J.</td>
<td>T202, T624</td>
</tr>
<tr>
<td>Pappalardo R. T.</td>
<td>T641, T647,</td>
</tr>
<tr>
<td></td>
<td>R703, R720</td>
</tr>
<tr>
<td>Paque J. M.</td>
<td>T638</td>
</tr>
<tr>
<td>Paquette J.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Parcheta C.</td>
<td>R403*</td>
</tr>
<tr>
<td>Parente M.</td>
<td>R721, R725</td>
</tr>
<tr>
<td>Parisi M.</td>
<td>F503</td>
</tr>
<tr>
<td>Park C.</td>
<td>R404</td>
</tr>
<tr>
<td>Park J.</td>
<td>R453, F551*, T624,</td>
</tr>
<tr>
<td></td>
<td>T636, R739</td>
</tr>
<tr>
<td>Park R.</td>
<td>T203, T644, T646</td>
</tr>
<tr>
<td>Park R. S.</td>
<td>M101, T603, T629</td>
</tr>
<tr>
<td>Parker E. H.</td>
<td>T254, T633</td>
</tr>
<tr>
<td>Parker E. T.</td>
<td>T640</td>
</tr>
<tr>
<td>Parker J. W.</td>
<td>M103</td>
</tr>
<tr>
<td>Parker J. Wm.</td>
<td>T607</td>
</tr>
<tr>
<td>Parker T. J.</td>
<td>M102*, W352,</td>
</tr>
<tr>
<td></td>
<td>F552, T619</td>
</tr>
<tr>
<td>Parman S. W.</td>
<td>M104*, R709, R711</td>
</tr>
<tr>
<td>Parmentier E. M.</td>
<td>M104, M154</td>
</tr>
<tr>
<td>Parness A.</td>
<td>R403</td>
</tr>
<tr>
<td>Parrish C. H. II</td>
<td>R723</td>
</tr>
<tr>
<td>Parrish J.</td>
<td>T644</td>
</tr>
<tr>
<td>Parrish N.</td>
<td>T647</td>
</tr>
<tr>
<td>Parro V.</td>
<td>T626, T640, R722</td>
</tr>
<tr>
<td>Parsons A.</td>
<td>M151, T646, R726</td>
</tr>
<tr>
<td>Parsons R. A.</td>
<td>T621</td>
</tr>
<tr>
<td>Parvez S.</td>
<td>T640</td>
</tr>
<tr>
<td>Pasckert J. H.</td>
<td>T201, R711</td>
</tr>
<tr>
<td>Pascuzzo A.</td>
<td>T619</td>
</tr>
<tr>
<td>Pasini J. L. S.</td>
<td>T253*</td>
</tr>
<tr>
<td>Pasquero P.</td>
<td>T631</td>
</tr>
<tr>
<td>Patel D.</td>
<td>R726</td>
</tr>
<tr>
<td>Patel M.</td>
<td>T626</td>
</tr>
<tr>
<td>Patel M. R.</td>
<td>W302, T616</td>
</tr>
<tr>
<td>Patel S.</td>
<td>T626</td>
</tr>
<tr>
<td>Patel S. N.</td>
<td>T626</td>
</tr>
<tr>
<td>Paterson G. W.</td>
<td>R702</td>
</tr>
<tr>
<td>Pathak S.</td>
<td>T607, R706</td>
</tr>
<tr>
<td>Pather A. V.</td>
<td>R713, R732</td>
</tr>
<tr>
<td>Patmore E. B.</td>
<td>T626</td>
</tr>
<tr>
<td>Patratiy V. D.</td>
<td>W302</td>
</tr>
<tr>
<td>Patricia R. C.</td>
<td>T643</td>
</tr>
<tr>
<td>Patterson G. W.</td>
<td>R451, T607, R703</td>
</tr>
<tr>
<td>Patthoff D. A.</td>
<td>R720</td>
</tr>
<tr>
<td>Paul M.</td>
<td>T647</td>
</tr>
<tr>
<td>Paulsen G.</td>
<td>T643, T644</td>
</tr>
<tr>
<td>Pavlov A.</td>
<td>F502</td>
</tr>
<tr>
<td>Pavlov S. G.</td>
<td>T602, T627, R740</td>
</tr>
<tr>
<td>Pavri B.</td>
<td>M102</td>
</tr>
<tr>
<td>Paxman J.</td>
<td>R738</td>
</tr>
<tr>
<td>Paxman J. P.</td>
<td>R738</td>
</tr>
<tr>
<td>Payre V.</td>
<td>R402, R733</td>
</tr>
<tr>
<td>Paz-Zorano M.</td>
<td>T625</td>
</tr>
<tr>
<td>Peale E. R.</td>
<td>T640</td>
</tr>
<tr>
<td>Pearson V.</td>
<td>T626, T640</td>
</tr>
<tr>
<td>Pedersen G. B. M.</td>
<td>R711</td>
</tr>
<tr>
<td>Pedrosa M. M.</td>
<td>R713</td>
</tr>
<tr>
<td>Pelivan I.</td>
<td>M103</td>
</tr>
<tr>
<td>Pelka M.</td>
<td>R743</td>
</tr>
<tr>
<td>Pelletier J. D.</td>
<td>M152</td>
</tr>
<tr>
<td>Pellin M.</td>
<td>T632, T635</td>
</tr>
<tr>
<td>Pendleton M. W.</td>
<td>T641</td>
</tr>
<tr>
<td>Pendleton Y. J.</td>
<td>R701</td>
</tr>
<tr>
<td>Peng W. X.</td>
<td>W351, T605</td>
</tr>
<tr>
<td>Peng Y.</td>
<td>T626</td>
</tr>
<tr>
<td>Peng Z. X.</td>
<td>R453, R708, R739, R741</td>
</tr>
<tr>
<td>Penshorn D.</td>
<td>T723</td>
</tr>
<tr>
<td>Pentek A.</td>
<td>T612</td>
</tr>
<tr>
<td>Penttilä A.</td>
<td>F505, R743</td>
</tr>
<tr>
<td>Pepin R. O.</td>
<td>W304, T634</td>
</tr>
<tr>
<td>Peplowski P. N.</td>
<td>M104, W351*, R453, T628,</td>
</tr>
<tr>
<td></td>
<td>T644, T646, R726</td>
</tr>
<tr>
<td>Peralta J.</td>
<td>R734</td>
</tr>
<tr>
<td>Pereira M. R.</td>
<td>R712</td>
</tr>
<tr>
<td>Peretyazhko T. S.</td>
<td>W352*</td>
</tr>
<tr>
<td>Perez-Cruz L.</td>
<td>T609</td>
</tr>
<tr>
<td>Perez-Prieto L.</td>
<td>R724</td>
</tr>
<tr>
<td>Pernet-Fisher J. F.</td>
<td>F502, T624</td>
</tr>
<tr>
<td>Perrett G. M.</td>
<td>M102, M154, F552</td>
</tr>
<tr>
<td>Perrin J.</td>
<td>M103</td>
</tr>
<tr>
<td>Perry M. E.</td>
<td>F503, T602, R719</td>
</tr>
<tr>
<td>Perryman R.</td>
<td>R719</td>
</tr>
<tr>
<td>Perryman R. S.</td>
<td>R719</td>
</tr>
<tr>
<td>Person M.</td>
<td>R712</td>
</tr>
<tr>
<td>Peruccacci S.</td>
<td>R704</td>
</tr>
<tr>
<td>Peslier A. H.</td>
<td>M151, T624, R746</td>
</tr>
<tr>
<td>Pestana S. J.</td>
<td>R738</td>
</tr>
<tr>
<td>Petaev M. I.</td>
<td>T256, F501*</td>
</tr>
<tr>
<td>Peters S. I.</td>
<td>R711</td>
</tr>
<tr>
<td>Petersen E. I.</td>
<td>T621</td>
</tr>
<tr>
<td>Peterson C. A.</td>
<td>R704, R706</td>
</tr>
<tr>
<td>Peticolas L.</td>
<td>T652</td>
</tr>
<tr>
<td>Petit J.-M.</td>
<td>T254</td>
</tr>
<tr>
<td>Petit J.-M.</td>
<td>T633</td>
</tr>
</tbody>
</table>
Petro N. E.     W351*, R451, F551, T626, R705, R706, R726
Petruny L. W.     T610
Petty B. M.     T651
Pforte B.     T724
Philippe S.     M152*, T627
Phillips B. L.     T251
Phillips C.     T644, R719
Phillips R. J.     M101, M104, M152, R452, F551*, T602, R734
Phillips-Lander C. M.     R737
Philpott L. C.     M104
Piani L.     R742
Piatek J. L.     T606
Piccioni G.     M103, T627, T631
Pickersgill A. E.     T613, R715
Pierrehumbert R. T.     T252
Pierson D.     T626
Pieters C. M.     T203, W351, R451, R454, T607, T629, T643, R706, R709
Pietrek A.     T609
Pike W. T.     T641
Piller A.     R733
Pilles E.     T650
Pillinger J. M.     T626
Pilorget C.     M103, W302, T631
Pin K.     R723
Pina P.     R713, R717
Pincus M. R.     R715
Pinet P.     R402, R733
Ping J. S.     R723
Pinnick V.     T644, R726
Piqueux S.     M103, W302, T644
Pirkovic I.     T612
Pitman K. M.     T625
Pitt D.     R744
Pivarusas A.     T645
Pizzi A.     R720
Plado J.     T251, T612
Plane J.     W353
Plattnser A.     T641
Platz T.     M152, T606, T618, T622, R711, R734
Plaut J.     R731, R734
Plesa A. C.     M154*, R727
Plescia J. B.     T201*, T613, T704, R727
Plesko C. S.     R712
Plettemeier D.     M103, T631
Plice L.     T644
Poelchau M. H.     T205*, T614, R715
Poggiali V.     F553
Pohl L.     T646
Poitras F.     T204
Polanskey C. A.     T203, T630, T646
Polidan R.     T647
Polishook D.     R712
Politi R.     T631
Pollock C. M.     T203, T630, T646
Ponente M.     T644, T728
Porte M.     R711
Porter J. N.     R725
Porter S. B.     T254*, T633
Portwal A.     F555, T620
Posner A.     R747
Postberg F.     T647, R723
Poston M. J.     T607, R747
Potter R. W. K.     T205*, T602, R705
Potter S. A.     T624
Potter-McIntyre S.     R711
Potts N. J.     T607
Prout F.     M103, M154, R452*, F502, T631, T645, R711, R724, R731, R732, R735
Povilaitis R. Z.     T201, R713
Powell K. E.     T619
Pozzobon R.     T620, R717
Prats B.     T253, T627
Pratt L. M.     T626
Pravdivtseva O. V.     T601, T635, T636
Poulet F.     M103, M154, R452*, F502, T631, T645, R711, R724, R731, R732, R735
Pruhl M.     T610
Preusker F.     T203, T602, T631, T646
Pribil M. J.     W352
Price M. C.     T253, T613, T625, T634, R737
Pringel T. C.     M104, R711
Pritchett B. R.     F502, R737
Prum B. L.     T633
Prockter L. M.     T647, R720
Proff G.     M103
Propp T.     R727
Provencio P.     W301, R708
Pryor W. R.     R451, T607
Przyblski O.     T613
Puchtel I. S.     T255
Pugh R. N.     T648
Puig-Suari J.     T643
Purucker M. E.     M104
Putzig N. E.     M152, R452*, R731
Pyle D. M.     F504
Qiao L.     T605
Qin L.     T638, R745
Quintin C.     T645, R731, R732
Quintin-Nataf C.     T201*, R452*, R702
Quick L. C.     F553*
Quintana S. N.     R401*, T614
Quirico E.     T631
Raaen E.     T627
Race M.     T626
Radebaugh J.     R401*, F553, T641, R711, R717, R718
Radoman-Shaw B. G.     R748
Rae A. S. P.     T251, T609
Rafkin S.     T616, R701
Raggio D.     R719
Rahman Z.     F505, R742, R746
Rahmati A.     W303, W353, T631, R728, R729
Rai N.     F501, T629
Rai Vinai K.     R710
Raitala J.     R734
Rajesh V. J.     T625
Ramadswamy A.     R702
Ramesh K. T.     W354, T613
Ramos M.     T619
Rampe E.     F552, T650
Rampe E. B.     M102, W352*, F502, T625, R733

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
INDEX

Ramsdale J.    T622
Ramsdale J. D. M152*, T252*, T622
Ramsey M. S. R711
Ramsley K. T628
Ramsley K. R. T623, T644
Raney R. K. F551
Rannou P. R716
Rao M. N. T624
Rapin W. M102, R402, T627, R733
Raponi A. M103, T203, T630, T644
Rapp J. F. W301*
Rasbury E. T. T626
Raschke U. T251
Rasmdale J. D. T622
Ratcliff J. T. T604
Rathbun J. R720, R724
Rathbun K. T610
Raulin F. M103, T644
Ray D. R453, T612, T626, R742, R746
Rayman M. D. T203, T630
Raymond C. A. T203, T629, T644, T646, R713
Re C. T620
Rebolledo-Vieyra M. T609
Redding B. R703
Reddy S. M. M153
Reddy V. T203, F505, T629, T630, R712, R724, R727, R746, R747
Reed C. R712
Reedy R. C. R710, R714
Reese B. K. T253
Reess J.-M. R724
Rehkämper M. T204
Reigle C. A. R722
Reimold W. U. T251*, T613, R715
Reiss D. M152, T252, T617, T618, T622, T645, R711, R717, R734
Reitsema H. J. T254, T646
Reitz G. R747
Reme H. M103, T631
Remember W. R711
Ren X. R703
Render J. R743
Renne P. R. T251
Renno N. O. T619
Retherford K. D. M101, R451, T607
Reuter D. R726
Reuter D. C. T646, R724
Revillet C. M103
Rezac L. M103, T631
Rhoden A. R. M154*, T633, T641, T646
Rhodes J. M. T627
Rhodes N. T610
Rice K. P. T205
Rice M. T619, R733
Rice M. S. R402, T619, R732
Richard M. S. R749
Richardson D. C. T628
Richardson J. A. R711
Richardson J. E. Jr. W354*
Richardson M. I. M102
Richie J. R703
Richter F. M. R402*
Richter G. R723
Richter I. M103
Richter M. R716
Rickman D. T607
Rickman H. T631
Riebe M. R741
Riedel J. E. T644
Rigter K. R453, T602, R708, R722, R739, R750
Rigter M. T202*, T256, R742
Riishuus M. S. R711
Ringer S. P. R743
Rios A. C. T253
Ripken J. T203, T630
RIS4E Team T626
Riu L. R711
Rivera-Hernandez F. T626
Rivera-Valentin E. G. T616, R737
Rivers M. L. R742
Rivkin A. S. F553, R723, R727
Rivoldini A. T644
Rizk B. R722
Roatsch T. T203, R703
Robbins S. J. T201*, T205, T252, T606, T617, R720
Roberts A. L. T627
Roberts G. T641
Roberts J. A. R737
Roberts J. H. F503*, T623, T641, R720
Roberts R. R747
Roberts S. E. W301
Robertson I. P. T631
Robertson K. T617, R732
Robinson K. L. M151, R711
Robinson M. W303, R703
Robinson M. S. T201, W351, R403, R451, T602, T643, R702, R703, R704, R705, R706, R713
Rochette P. R744
Rockefeller G. T641
Rodgers A. D. R737
Rodgers D. J. T646
Rodovská Z. T251*, T612
Rodrigo R. M103, T631
Rodriguez J. M103
Rodriguez J. A. P. T618, T621
Rodriguez M. T634
Rodriguez S. R716, R718
Rodriguez-Ford L. A. T651
Rodriguez-Hidalgo P. T650
Rogers A. D. M154, F502, T625, T626, R717, R732
Rogers J. H. R716
Rogez Y. T631
Roher W. D. T722
Romani P. N. R716
Romaniello S. J. T204, T638
Romeral J. R722
Rose T. T627
Rosenblatt P. T644
Röser H.-P. T626
Rosetta IES Team T631
Rosetta Science Team T631
Rosetta VIRTIS Team T631
Rosiek M. R. R702
ROSINA Team M103
Roskosz M. R742
Ross D. K. T256, R453, T624, T632, R708, R742, R746
Rossi A. P. R403, T621, R711, R731, R732
Rossman G. R. M151, R402, T624, T625
Rost D. T635
Rothyer D. A. R403, T602, T649, R711
Rotundi A. M103

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schmoke J.</td>
<td>R723</td>
</tr>
<tr>
<td>Schmude R. W. Jr.</td>
<td>T639</td>
</tr>
<tr>
<td>Schneider N. M.</td>
<td>W303, W353*, R730</td>
</tr>
<tr>
<td>Schofield R. E.</td>
<td>R737</td>
</tr>
<tr>
<td>Scholes D.</td>
<td>R702</td>
</tr>
<tr>
<td>Scholten F.</td>
<td>T203, T631</td>
</tr>
<tr>
<td>Schönächler M.</td>
<td>T204, T638</td>
</tr>
<tr>
<td>Schoonen M. A.</td>
<td>T607</td>
</tr>
<tr>
<td>Schoonen M. A. A.</td>
<td>T626</td>
</tr>
<tr>
<td>Schoffoer N.</td>
<td>M151, T203*</td>
</tr>
<tr>
<td>Schrader D. L.</td>
<td>R404*, R741, R742</td>
</tr>
<tr>
<td>Schreiner B.</td>
<td>T650, R735</td>
</tr>
<tr>
<td>Schröder C.</td>
<td>W352, R733</td>
</tr>
<tr>
<td>Schröder S.</td>
<td>M103, R402, T619, R733</td>
</tr>
<tr>
<td>Schröder S.</td>
<td>M102, T203, R724</td>
</tr>
<tr>
<td>Schubert K. E.</td>
<td>R723</td>
</tr>
<tr>
<td>Schultz G.</td>
<td>T650</td>
</tr>
<tr>
<td>Schultz P. H.</td>
<td>M104, T205, R401, F501*, T614, T630, R704</td>
</tr>
<tr>
<td>Schulz D.</td>
<td>R715</td>
</tr>
<tr>
<td>Schulz J.</td>
<td>T621</td>
</tr>
<tr>
<td>Schulz R.</td>
<td>M103</td>
</tr>
<tr>
<td>Schulz T.</td>
<td>T251</td>
</tr>
<tr>
<td>Schulzeg F.</td>
<td>T203</td>
</tr>
<tr>
<td>Schuhan M.</td>
<td>R720</td>
</tr>
<tr>
<td>Schurmeier L. R.</td>
<td>R714</td>
</tr>
<tr>
<td>Schwadron N. A.</td>
<td>R451*, R705, R723</td>
</tr>
<tr>
<td>Schwegman R. D.</td>
<td>R714</td>
</tr>
<tr>
<td>Schweitz J. S.</td>
<td>R726</td>
</tr>
<tr>
<td>Schwenzer S. P.</td>
<td>R402, R452, T612, T626, R737, R741, R744</td>
</tr>
<tr>
<td>Schwerin T.</td>
<td>T652</td>
</tr>
<tr>
<td>Science Team MSL.</td>
<td>T253</td>
</tr>
<tr>
<td>Scipioni F.</td>
<td>R720</td>
</tr>
<tr>
<td>Scott B. R.</td>
<td>R720</td>
</tr>
<tr>
<td>Scott E. R. D.</td>
<td>R453*</td>
</tr>
<tr>
<td>Scully J.</td>
<td>T629</td>
</tr>
<tr>
<td>Scully J. E. C.</td>
<td>M154*, T629</td>
</tr>
<tr>
<td>Seabrook J.</td>
<td>R727</td>
</tr>
<tr>
<td>Sears D. W. G.</td>
<td>R711, R712</td>
</tr>
<tr>
<td>Sears H.</td>
<td>R711</td>
</tr>
<tr>
<td>Sebastián E.</td>
<td>R722</td>
</tr>
<tr>
<td>Sedaghatpour F.</td>
<td>F501</td>
</tr>
<tr>
<td>Seddio S. M.</td>
<td>W301</td>
</tr>
<tr>
<td>Sedlmair J.</td>
<td>T640</td>
</tr>
<tr>
<td>Seelos F. P.</td>
<td>F552, T626, R732</td>
</tr>
<tr>
<td>Seelos K. D.</td>
<td>M102, T618, R732</td>
</tr>
<tr>
<td>Sefton-Nash E.</td>
<td>T645, R704</td>
</tr>
<tr>
<td>Seidman D. N.</td>
<td>T635, R744</td>
</tr>
<tr>
<td>Seifert C. J.</td>
<td>T607</td>
</tr>
<tr>
<td>Seifert C. M.</td>
<td>T607</td>
</tr>
<tr>
<td>Seifert F.</td>
<td>T641</td>
</tr>
<tr>
<td>Séjourné A.</td>
<td>M152, T252, T622</td>
</tr>
<tr>
<td>Sekhar P.</td>
<td>R737</td>
</tr>
<tr>
<td>Seki K.</td>
<td>W303, R729, R749</td>
</tr>
<tr>
<td>Sekiguchi T.</td>
<td>R724</td>
</tr>
<tr>
<td>Selvans M. M.</td>
<td>T602</td>
</tr>
<tr>
<td>Semenov B. V.</td>
<td>R702</td>
</tr>
<tr>
<td>Semon T.</td>
<td>T631</td>
</tr>
<tr>
<td>Senshu H.</td>
<td>T614, R723, R724, R726, R727, R738</td>
</tr>
<tr>
<td>Senske D. A.</td>
<td>T647, R748</td>
</tr>
<tr>
<td>Sephton M. A.</td>
<td>T643</td>
</tr>
<tr>
<td>Sera K.</td>
<td>T638</td>
</tr>
<tr>
<td>Shalygin E. V.</td>
<td>R748</td>
</tr>
<tr>
<td>Shaner A.</td>
<td>T649</td>
</tr>
<tr>
<td>Shankar B.</td>
<td>T610</td>
</tr>
<tr>
<td>Sharma M.</td>
<td>T611, T638</td>
</tr>
<tr>
<td>Sharma S. R.</td>
<td>R724</td>
</tr>
<tr>
<td>Sharp T. G.</td>
<td>F554, T613, T624, T627, R715</td>
</tr>
<tr>
<td>Sharp Z. D.</td>
<td>F502, T624</td>
</tr>
<tr>
<td>Sharpton V. L.</td>
<td>R714</td>
</tr>
<tr>
<td>Shotoff E. A.</td>
<td>T635</td>
</tr>
<tr>
<td>Shearer C. K.</td>
<td>T202*, W301*, T607, T624, R708</td>
</tr>
<tr>
<td>Shebby S. M.</td>
<td>T649</td>
</tr>
<tr>
<td>Shedd L.</td>
<td>R723</td>
</tr>
<tr>
<td>Shen P.</td>
<td>R745</td>
</tr>
<tr>
<td>Shепард D.</td>
<td>W303</td>
</tr>
<tr>
<td>Sheridan S.</td>
<td>M103, T626</td>
</tr>
<tr>
<td>Sherlock S. C.</td>
<td>T626</td>
</tr>
<tr>
<td>Shibamura E.</td>
<td>R726</td>
</tr>
<tr>
<td>Shibasaceki K.</td>
<td>R724</td>
</tr>
<tr>
<td>Shigemori K.</td>
<td>T205</td>
</tr>
<tr>
<td>Shih C.-Y.</td>
<td>F551, T624, T638, R708, R739</td>
</tr>
<tr>
<td>Shim S. H.</td>
<td>T639</td>
</tr>
<tr>
<td>Shimaki Y.</td>
<td>R739</td>
</tr>
<tr>
<td>Shimizu N. S.</td>
<td>T255</td>
</tr>
<tr>
<td>Shinnaka Y.</td>
<td>R738</td>
</tr>
<tr>
<td>Shiota D.</td>
<td>R749</td>
</tr>
<tr>
<td>Shipp S.</td>
<td>T648, T649, T652</td>
</tr>
<tr>
<td>Shirai K.</td>
<td>R724</td>
</tr>
<tr>
<td>Shirai N.</td>
<td>T609, R741</td>
</tr>
<tr>
<td>Shirley K. A.</td>
<td>R709, R723</td>
</tr>
<tr>
<td>Shirley M.</td>
<td>M101</td>
</tr>
<tr>
<td>Shirron P. J.</td>
<td>R727</td>
</tr>
<tr>
<td>Shirzaei M.</td>
<td>R714</td>
</tr>
<tr>
<td>Shizugami M.</td>
<td>R727</td>
</tr>
<tr>
<td>Shollenberger Q. R.</td>
<td>T638</td>
</tr>
<tr>
<td>Shotwell R.</td>
<td>T644</td>
</tr>
<tr>
<td>Shou Y.</td>
<td>T631</td>
</tr>
<tr>
<td>Showalter M.</td>
<td>T254, T633, T644</td>
</tr>
<tr>
<td>Shprits Y. Y.</td>
<td>T608</td>
</tr>
<tr>
<td>Shu A.</td>
<td>T205</td>
</tr>
<tr>
<td>Shukla A. D.</td>
<td>R453*, T626</td>
</tr>
<tr>
<td>Shupla C.</td>
<td>T648, T652</td>
</tr>
<tr>
<td>Shuster D. L.</td>
<td>T251</td>
</tr>
<tr>
<td>Shuvalov V.</td>
<td>T614, R739</td>
</tr>
<tr>
<td>Sides S.</td>
<td>R702, R703</td>
</tr>
<tr>
<td>Sidiropoulos P.</td>
<td>T645</td>
</tr>
<tr>
<td>Siebach K.</td>
<td>W352*, R733</td>
</tr>
<tr>
<td>Siegler M. A.</td>
<td>M104, M151, R451, T607, T644, R704</td>
</tr>
<tr>
<td>Sierks H.</td>
<td>M103*, T203, T629, T630, T631</td>
</tr>
<tr>
<td>Sigmundsson F.</td>
<td>R711</td>
</tr>
<tr>
<td>Silen J.</td>
<td>M103</td>
</tr>
<tr>
<td>Siljestrom S.</td>
<td>M103</td>
</tr>
<tr>
<td>Silva E. A.</td>
<td>R713, R717</td>
</tr>
<tr>
<td>Silver E.</td>
<td>W304</td>
</tr>
<tr>
<td>Silvestro S.</td>
<td>R401*, R732</td>
</tr>
<tr>
<td>Simicevic A.</td>
<td>R715</td>
</tr>
<tr>
<td>Simioni E.</td>
<td>T614</td>
</tr>
<tr>
<td>Simkus D. N.</td>
<td>T640</td>
</tr>
<tr>
<td>Simon A. A.</td>
<td>T646, T716, R724</td>
</tr>
<tr>
<td>Simon I.</td>
<td>T201</td>
</tr>
<tr>
<td>Simon J.</td>
<td>T202</td>
</tr>
<tr>
<td>Simon J. I.</td>
<td>T204, T256, R404, R452, T624, T632, T637, T638, R708, R739, R742</td>
</tr>
<tr>
<td>Simon B. S.</td>
<td>R404, T632, R742</td>
</tr>
<tr>
<td>Simonetti A.</td>
<td>T607, T624</td>
</tr>
<tr>
<td>Simons F. J.</td>
<td>T641</td>
</tr>
<tr>
<td>Simpson S. L.</td>
<td>T251*, T611</td>
</tr>
<tr>
<td>Sims M. R.</td>
<td>T643</td>
</tr>
<tr>
<td>Simurda C. M.</td>
<td>R711</td>
</tr>
<tr>
<td>Sinclair A.</td>
<td>T627, R709</td>
</tr>
<tr>
<td>Singer J. A.</td>
<td>W301, T607</td>
</tr>
<tr>
<td>Singer K. N.</td>
<td>T254, T633, R704</td>
</tr>
<tr>
<td>Singerling S. A.</td>
<td>R743</td>
</tr>
<tr>
<td>Singh M.</td>
<td>T625</td>
</tr>
</tbody>
</table>
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Stevens M. H.     W303, W353, R730
Stewart A. I. F.     W303, W353, R730
Stewart S. T.     T205*, W354, T614
Stickel A. M.     R451*, F503, F551, T607
Stiepen A.     W303, W353, R730
Stiles B. W.     F553, T641, R718
Stillman D. E.     W302*
Stockton A. M.     R727
Stojic A.     T602, T627
Stoker C. R.     F555, T640, R722
Stolper E. M.     M102, R402, R733
Stone J.     R723
Stone T.     T643
Stooke P. J.     T628
Stopar J. D.     W351, T643, R704, R706
Strait M. M.     T626
Strekopytov S.     R707, R746
Strobel D. F.     T254
Strobel R. M.     W304*, R454, T627, T632, T635, R721
Strubbe L.     T650
Stubs J. E.     T601
Stubbs T. J.     M101*, R451, R705
Sturkell E.     T251
Su C.-C.     T631
Su J. J.     M151, R710
Su Y.     M101, T605
Suavet C. R.     T255
Subia T.     W352
Sucharski T. L.     R703
Suda R.     R724
Suet sugu R.     T628
Sugita S.     T205, R724, R738, R740, R745
Sugiura N.     T637, R744
Sullivan M.     T616
Sullivan R.     T619, R717
Summers S.     T626
Summons R.     T253, F502
Sumner D.     F502, R733
Sumner D. Y.     M102, T619, T626
Sun N.     T602
Sun V. Z.     F552*, T625
Sun X.     R710, R727
Sun Y. S.     F501*
Sunshine J. M.     T632, R711
SuperCam Science
Team R724
SuperCam Team R724
Sur K.     T617
Susorney H.     T602, T610
Sutter B.     M102, W352, F502, F552, T625
Sutton S.     M152, T252, W302, T624, R702, R703, R706, R711, R721, R731, R735, R736
Sutton S. R.     W304, T632
Suzuki H.     R724
Suzuki N. H.     T643
Suzuki T.     T601
Suzuki Y.     R740
Swann J. L.     T650
Swanson-Hysell N. L.     T251
Swayze G. A.     R732
Swenson J. B.     R748
Swift D. C.     R712
Swindle T. D.     T637, R737
Swindle T. R.     R451
Swirad Z.     M152, T622
Swirad Z. M.     T622
Swisher C. C. III     F551, T636, R739
Sykes M. V.     T203, T630
Sylvest M. E.     W302*, R736
Sylvestre P.     R744
Szkács A.     T650
Szalay J.     M101, T651
Szegö K.     M103
Szilágyi I.     R727
Szopa C.     T253, F502, T644
Szynkiewicz A.     W352*
Tachibana S.     T640, R742, R750
Taguchi M.     R724
Tague T. J. Jr.     R725
Tait K. T.     T202*, T624, R741, R745
Taj Eddine K.     R401
Tajeddine R.     M154
Takahashi H.     T636
Takahata N.     R742
Takei A.     R724
Takenouchi A.     R453, F554*, R741
Takeuchi A.     R740
Takigawa A.     R454, R742
Takir D.     T630
Takita J.     R724
Talwani M.     T604
Tamucci K. A.     R742
Tan H.     T643
Tan X.     T626
Tanaka R.     R739
Tanaka S.     T643, R742
Tang G. Q.     R707
Tang H.     T256*, R745
Tang X.     R403
Tang Z. S.     R704
Tangari A.     R717
Tao C.     R749
Tappa M.     R708, R739
Tappa M. J.     T637, T638
Tarbell M. A.     T643
Tardivel S.     T646
Tarduno J. A.     R744, R746
Tartese R.     T607
Tartese R.     M151, T607
Tate C.     R733
Tate C. G.     R733
Tatsukawa T.     T643
Tatsumi E.     R740
Taylor G. J.     M101, M151*, W351, R454, R711, R726
Taylor J.     T641
Taylor L. A.     R453, F502, F551, T624
Taylor M. G. G. T.     T631
Taylor P. A.     W354, R712
Taylor P. T.     R702
Taylor S.     T634
Taylor S. M.     T640
Tazawa S.     R727
TDSS Team     T614
Teamby N.     T641
Teinturier S.     T253, T627
Tejfel V. G.     R716
Telus M.     T636
Temple J.     T641
Temishev V.     T631, R730
Tenner T. J.     M153, T256, R404, T632, T634, R742
Teodor L. F. A.     M151*, R403, R451, F502, T641
Terada K.     R729
Terada N.     R729, R749

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

230  46th LPSC Program
<table>
<thead>
<tr>
<th>Name</th>
<th>Session Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terasaki H.</td>
<td>R750</td>
</tr>
<tr>
<td>Terazono J.</td>
<td>T643</td>
</tr>
<tr>
<td>Terzer R.</td>
<td>R724</td>
</tr>
<tr>
<td>Thaiseen K. G.</td>
<td>R716, R727</td>
</tr>
<tr>
<td>Thaiseen K. T.</td>
<td>T643</td>
</tr>
<tr>
<td>Thangjam G.</td>
<td>T203</td>
</tr>
<tr>
<td>Thangjam G. S.</td>
<td>T629, T630</td>
</tr>
<tr>
<td>Theobald M.</td>
<td>R703</td>
</tr>
<tr>
<td>Thiebault B.</td>
<td>R705</td>
</tr>
<tr>
<td>Thiemann E. M. B.</td>
<td>W303, R730</td>
</tr>
<tr>
<td>Thiemens M. H.</td>
<td>M151, T638</td>
</tr>
<tr>
<td>Thiersen F.</td>
<td>F502*</td>
</tr>
<tr>
<td>Thirkell L.</td>
<td>M103</td>
</tr>
<tr>
<td>Thiessen F.</td>
<td>F504</td>
</tr>
<tr>
<td>Tholen D.</td>
<td>T254, T633</td>
</tr>
<tr>
<td>Thollot P.</td>
<td>R702</td>
</tr>
<tr>
<td>Thoma K.</td>
<td>T205</td>
</tr>
<tr>
<td>Thomas C. A.</td>
<td>T646, R712</td>
</tr>
<tr>
<td>Thomas I.</td>
<td>T626</td>
</tr>
<tr>
<td>Thomas N.</td>
<td>T602, T631</td>
</tr>
<tr>
<td>Thomas O. H.</td>
<td>R703</td>
</tr>
<tr>
<td>Thomas P.</td>
<td>F503, T644</td>
</tr>
<tr>
<td>Thomas P. T.</td>
<td>R720</td>
</tr>
<tr>
<td>Thomas R.</td>
<td>M103</td>
</tr>
<tr>
<td>Thomas R. J.</td>
<td>M104, R403*, R711</td>
</tr>
<tr>
<td>Thomas-Keprta K. L.</td>
<td>F502*</td>
</tr>
<tr>
<td>Thomason C. J.</td>
<td>R452, F551, T633</td>
</tr>
<tr>
<td>Thomen A.</td>
<td>R454</td>
</tr>
<tr>
<td>Thompson C.</td>
<td>R404</td>
</tr>
<tr>
<td>Thompson D.</td>
<td>T643</td>
</tr>
<tr>
<td>Thompson D. R.</td>
<td>T627</td>
</tr>
<tr>
<td>Thompson L. M.</td>
<td>M102*, W352, R402, F552, R733</td>
</tr>
<tr>
<td>Thompson M. S.</td>
<td>R705, R741</td>
</tr>
<tr>
<td>Thomson B. J.</td>
<td>M102*, T606, T626</td>
</tr>
<tr>
<td>Thornto J. P.</td>
<td>T643</td>
</tr>
<tr>
<td>Thorpe M. T.</td>
<td>T625</td>
</tr>
<tr>
<td>Thoth I.</td>
<td>T631</td>
</tr>
<tr>
<td>Throop H. B.</td>
<td>T205*</td>
</tr>
<tr>
<td>Tian Z.</td>
<td>T602</td>
</tr>
<tr>
<td>Tikoo S. M.</td>
<td>T251*</td>
</tr>
<tr>
<td>Tilley C.</td>
<td>R723</td>
</tr>
<tr>
<td>Timms N. E.</td>
<td>F554</td>
</tr>
<tr>
<td>Timoney R.</td>
<td>T647</td>
</tr>
<tr>
<td>Tingay S. J.</td>
<td>R738</td>
</tr>
<tr>
<td>Tirsch D.</td>
<td>T618, R724, R732</td>
</tr>
<tr>
<td>Tissot F. L. H.</td>
<td>T637, T638</td>
</tr>
<tr>
<td>Titus T. N.</td>
<td>M152*, T203*, T648</td>
</tr>
<tr>
<td>Tiu C.</td>
<td>W303</td>
</tr>
<tr>
<td>Tokar R.</td>
<td>T627</td>
</tr>
<tr>
<td>Tokar R. L.</td>
<td>R733</td>
</tr>
<tr>
<td>Tomkusitsu A.</td>
<td>T640</td>
</tr>
<tr>
<td>Tomkunaga A. T.</td>
<td>R452</td>
</tr>
<tr>
<td>Tomkunaga M.</td>
<td>T632</td>
</tr>
<tr>
<td>Tolson R. H.</td>
<td>W303, W353</td>
</tr>
<tr>
<td>Tomkinson T.</td>
<td>T624</td>
</tr>
<tr>
<td>Tompkins B.</td>
<td>T205</td>
</tr>
<tr>
<td>Toner J. D.</td>
<td>T625</td>
</tr>
<tr>
<td>Topleis M. J.</td>
<td>R402, T629, R733</td>
</tr>
<tr>
<td>Torkar K.</td>
<td>M103</td>
</tr>
<tr>
<td>Tornabene L. L.</td>
<td>T251, F551, T606, T611, T618, T650, R711, R713, R714, R731, R732</td>
</tr>
<tr>
<td>Torrano Z. A.</td>
<td>R741</td>
</tr>
<tr>
<td>Torres J. A.</td>
<td>T650</td>
</tr>
<tr>
<td>Tortora P.</td>
<td>F503</td>
</tr>
<tr>
<td>Tosca N. A.</td>
<td>R452, R737</td>
</tr>
<tr>
<td>Tosi F.</td>
<td>M103, T203, T627, T629, T630, T631, R720</td>
</tr>
<tr>
<td>Tosi N.</td>
<td>M154</td>
</tr>
<tr>
<td>Toth G.</td>
<td>W353</td>
</tr>
<tr>
<td>Touboul M.</td>
<td>T256</td>
</tr>
<tr>
<td>Toubul M.</td>
<td>R725</td>
</tr>
<tr>
<td>Tovar D.</td>
<td>T617, T650, R748</td>
</tr>
<tr>
<td>Towbin W. H.</td>
<td>R742</td>
</tr>
<tr>
<td>Towellies N. J.</td>
<td>T641</td>
</tr>
<tr>
<td>Towner M. C.</td>
<td>R738</td>
</tr>
<tr>
<td>Townsend L. W.</td>
<td>R451, R705</td>
</tr>
<tr>
<td>Trainer M. G.</td>
<td>F552</td>
</tr>
<tr>
<td>Tran L. T.</td>
<td>T641</td>
</tr>
<tr>
<td>Trang D.</td>
<td>T627, R711</td>
</tr>
<tr>
<td>Trappitsch R.</td>
<td>T635</td>
</tr>
<tr>
<td>Trauthan F.</td>
<td>R724</td>
</tr>
<tr>
<td>Travis B. J.</td>
<td>T203*</td>
</tr>
<tr>
<td>Trebi-Olenu A.</td>
<td>T644</td>
</tr>
<tr>
<td>Treiman A. H.</td>
<td>M102, W351*, R402, F504, F552*, R708, R733, R737</td>
</tr>
<tr>
<td>Trey B.</td>
<td>T201</td>
</tr>
<tr>
<td>Trielloff M.</td>
<td>R707</td>
</tr>
<tr>
<td>Trieman A.</td>
<td>R741</td>
</tr>
<tr>
<td>Trilling D. E.</td>
<td>F553, R712</td>
</tr>
<tr>
<td>Trimpy P. W.</td>
<td>R743</td>
</tr>
<tr>
<td>Trippella O.</td>
<td>T204</td>
</tr>
<tr>
<td>Tromp J.</td>
<td>T641</td>
</tr>
<tr>
<td>Trubač J.</td>
<td>T612</td>
</tr>
<tr>
<td>Truxillo J.</td>
<td>T648</td>
</tr>
<tr>
<td>Tsai C.-A.</td>
<td>T628</td>
</tr>
<tr>
<td>Tsang C. C. C.</td>
<td>R716, R727</td>
</tr>
<tr>
<td>Tschauner O.</td>
<td>F502, T624</td>
</tr>
<tr>
<td>Tschentscher M.</td>
<td>R724</td>
</tr>
<tr>
<td>Tserendug S.</td>
<td>T609</td>
</tr>
<tr>
<td>Tsuchiya F.</td>
<td>T749</td>
</tr>
<tr>
<td>Tsuchiyama A.</td>
<td>T634, R740, R747, R750</td>
</tr>
<tr>
<td>Tsuda Y.</td>
<td>T649</td>
</tr>
<tr>
<td>Tsujimori T.</td>
<td>T739</td>
</tr>
<tr>
<td>Tsumura K.</td>
<td>R726</td>
</tr>
<tr>
<td>Tsuno K. T.</td>
<td>T255</td>
</tr>
<tr>
<td>Tsuruta S.</td>
<td>R727</td>
</tr>
<tr>
<td>Tsyganenko N. A.</td>
<td>M104</td>
</tr>
<tr>
<td>Tubiana C.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Tucker K.</td>
<td>T202, T624</td>
</tr>
<tr>
<td>Tucker O. J.</td>
<td>T254, R749</td>
</tr>
<tr>
<td>Turbet M.</td>
<td>R731</td>
</tr>
<tr>
<td>Turnin P.</td>
<td>R727</td>
</tr>
<tr>
<td>Turner F. S.</td>
<td>T607</td>
</tr>
<tr>
<td>Turner M. W.</td>
<td>T651</td>
</tr>
<tr>
<td>Turner N. J.</td>
<td>R750</td>
</tr>
<tr>
<td>Turner S.</td>
<td>R702</td>
</tr>
<tr>
<td>Turner S. M. R.</td>
<td>F555*, R726</td>
</tr>
<tr>
<td>Turrin B. D.</td>
<td>R453, F551, T636, R739</td>
</tr>
<tr>
<td>Turtle E. P.</td>
<td>R401, F553, T647, R718</td>
</tr>
<tr>
<td>Tyler G. L.</td>
<td>T254</td>
</tr>
<tr>
<td>Tyler L.</td>
<td>R724</td>
</tr>
<tr>
<td>Tyra M. A.</td>
<td>T637</td>
</tr>
<tr>
<td>Tzou C.</td>
<td>T631</td>
</tr>
<tr>
<td>Tzou C.-Y.</td>
<td>M103, T631</td>
</tr>
<tr>
<td>Uceda E. R.</td>
<td>T621</td>
</tr>
<tr>
<td>Uchino K.</td>
<td>T601</td>
</tr>
<tr>
<td>Uekert K.</td>
<td>R726</td>
</tr>
<tr>
<td>Udry A.</td>
<td>F502, T624</td>
</tr>
<tr>
<td>Uemoto K.</td>
<td>T608</td>
</tr>
<tr>
<td>Ueshima M.</td>
<td>R737</td>
</tr>
<tr>
<td>Uesugi K.</td>
<td>R740</td>
</tr>
<tr>
<td>Uesugi M.</td>
<td>R740</td>
</tr>
<tr>
<td>Uktstins Peate I.</td>
<td>T610</td>
</tr>
<tr>
<td>Ulamec S.</td>
<td>T631, R712, R724</td>
</tr>
<tr>
<td>Umoh J. U.</td>
<td>R745</td>
</tr>
<tr>
<td>Umurhan O. M.</td>
<td>F555*</td>
</tr>
<tr>
<td>Upadhay D.</td>
<td>T612</td>
</tr>
<tr>
<td>Upadhay R. B.</td>
<td>R723</td>
</tr>
<tr>
<td>Urbancic N.</td>
<td>T604</td>
</tr>
<tr>
<td>Uribe D. D.</td>
<td>R745</td>
</tr>
<tr>
<td>Urquhart M. L.</td>
<td>T640, T648</td>
</tr>
<tr>
<td>Urrutia-Fucugach J.</td>
<td>T609</td>
</tr>
<tr>
<td>Ushikubo T.</td>
<td>R404</td>
</tr>
<tr>
<td>Ustunisik G.</td>
<td>R742</td>
</tr>
</tbody>
</table>

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.
Wartho J-A. T251, T612
Warwick S. T643
Wasserburg G. J. T204*
Wasson J. T. T251*, T256, R742, R744
Watanabe N. R750
Watanabe S. R726
Watanabe T. T643
Watkins J. A. T617
Watkins M. M. M101, T603
Watters T. R. T602, R720, R734
Watters W. A. R714
Weaver H. T254, T633
Weaver H. A. M103, T254
Weaver R. P. R712
Weber I. T627, R740
Weber R. C. T641
Weber T. W303, R728, R729
Webster C. T627
Wegner M. T649
Wei J. R725, R737
Weider S. Z. M104
Weiland M. T203
Weins R. C. W352
Weirich J. R. T612
Weitzenkampl R. W354*
Weiss B. P. T255, T608, T643, T646, R742
Weiss D. R714, R731
Weisse S. R724
Weissman P. M103
Weitz C. M. F552, T618, R706, R732
Weller L. A. R703
Weller M. B. T618, T641, R748
Wellington D. T619, R733
Welten K. C. R740, R741
Welzenbach L. C. R743
Wen W. B. M101
Wendt L. R735
Wenkert D. T646
Wentworth S. J. F502
West R. R718
Westall F. R737
Westphal A. J. W304*
Wetteland C. T624
Wheaton E. J. T627
Wheeler P. R403, R711
Whetsel C. T644
Whitaker T. J. R726
White B. R. R401, R717
White M. R723
White O. L. F553*
Whitehouse M. J. W301, F551, T624, R708
Whitely R. R701
Whitton E. S. R711
Whitten J. L. M104, M152, T602, R711
Whitten J. W. F504*
Whitmer A. D. R750
Wicks J. K. T641
Wieczorek M. T603, T641, T646
Wiederhold J. G. T638
Wiener R. W304, T601, R741, R745
Wiens R. C. M102*, R402, F552, T627, R717, R724, R725, R733, R737
Wieser G. S. M103
Wilcomb K. K. T623
Wild E. M. T612
Wiley C. R723
Wilgus J. T. R717
Wilkins M. B. M102, R401
Wilkinson J. W. F534*
Wilks R. T251, T609
Williams A. J. T627, T640, R733
Williams C. D. T204, T256, T638
Williams D. T203
Williams D. A. R403, T629, T641, R703, R711, R717, R718
Williams D. R. R702
Williams J. G. T603, T604
Williams J. M. R733
Williams J. P. T252, F555*, T644, R704, R713
Williams J. T. T624
Williams K. B. M104
Williams M. T650
Williams R. W352, T618
Williams R. M. E. M102, T619, T645
Williamson H. N. R749
Williamson M.-C. T604
Willis P. R727
Willman M. R712
Willson D. R722
Wilson C. F. F504
Wilson J. A. R711
Wilson J. H. T611
Wilson J. K. R451, R705
Wilson J. T. R403*, F502*
Wilson L. M101, R403, R711, R713
Wilson M. A. M102, R733
Wilson R. J. T602, R749
Wilson S. A. T618, T619
Wiltse N. R403
Wimmer-Schweingruber R. T616, R747
Winslow R. R451, R705
Winslow R. M. R705
Winterhalter D. M103
Wirick S. T624, T634
Wirstrom E. R750
Wirth R. R715
Wiseman S. M. R732
WISE Team R738
Wisniowski T. T251, T612
Witek P. P. R718
Withers P. R701
Wittmann A. W301*, R707
Woan G. T643
Wolf A. R723
Wolfe C. A. T615
Wolfe S. R. T626
Wolff M. T627
Wolff M. J. T625
Wolk S. J. T254
Wong M. H. R716
Wong M. L. T254
Wood B. J. T204
Wood C. F553, R718
Wood J. R723
Wood S. E. W354*, R452
Wooden D. H. M101
Woods T. N. W303
Woodworth-Lynas C. T621
Wooley J. T641
Woolman D. T601
Wordsworth R. T252, R452, R731
Wordsworth R. D. T252*
Worsham E. A. T204*
Woytach J. T647
Wray J. R401, R402, F552, T647, R732
Wright E. D. R702
Wright I. P. M103*, R741, R744

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

46th LPSC Program 233
INDEX

Wright S. P.     T251, T253*, T609, T627
Wrobel J. S.     T647
Wu F. Y.     R707
Wu J.-S.     T631
Wu Y. Z.     W351, R403, T605
Wu Z. C.     T625, T627, R703
Wu Z. H.     R702
Wucher M. J.     T201, T608, T614, R739
Wünnewann K.     T201, T609, T614, R739
Wurz P.     M103
Wyrick D. Y.     M154*
Xia J.     T638
Xiao L.     T605, T624, T626, T641, R732, R746
Xiao X.     R726
Xiao Y.     T605
Xiao Z.     T605
Xie M. G.     T605
Xie Z.     T609
Xing S. G.     T605
Xu A. A.     T605, R704
Xu B.     T605
Xu Y.     T635
Xue B.     T605
Yada T.     R740
Yaggi B.     T643
Yakovlev G. A.     F505
Yamad T. M.     W354*
Yamada M.     R724
Yamada R.     M101, R723, R727
Yamaguchi A.     R454, F551, R554, R708, R741
Yamaguchi T.     T256
Yamamoto D.     R750
Yamamoto K.     T603
Yamamoto N.     T643
Yamamoto S.     F501*, T608, T643, R706
Yamamoto T.     R750
Yamamoto Y.     R741, R743
Yamanaka M.     R739
Yamashita H.     T624
Yamashita N.     T629, R710, R726
Yamazaki A.     R749
Yamazaki H.     T204
Yan W.     R703
Yang H. W.     R702
Yang L.     R743
Yang Y. Z.     T605

Yanga V.     R723
Yano H.     T644
Yant M. H.     T625
Yao M. J.     T605
Yao N.     M153
Yasuda S.     R727
Yasuda T.     R724
Yasui Y.     T720
Yazzie C. A.     R750
Yelle R.     W303, R730
Yelle R. V.     W353, R728
Yen A.     F552, R733
Yen A. S.     M102, W352*, F552, R733
Yener A.     T613
Yeomans P. E. L.     R451
Yershev V.     T645
Yesilta M.     T640
Yin A.     M154, T252, T617, T641, R720
Yin Q.-Z.     R453, R454, T636, T637, T638, R707, R745
Yin S.     R711
Yingst A.     R733
Yingst R. A.     M102, R452*, T619, T626, T629, R701, R706
Yocky D. A.     T607, R702
Yokochi R.     T637
Yokota Y.     F501, T608, T643
Yokoyama T.     T204*, T624, T636, T638
Yokoyama Tatsunori.     T638
Yoneda S.     T638
Yoshida F.     R727
Yoshikawa I.     R749
Yoshikawa M.     T649
Yoshioka K.     R749
Young E.     T203, R711, R727
Young E. D.     T204*, W301, W354, R404, T624, T637, R742
Young E. F.     R738
Young K.     T251, T626
Young L. A.     T254
Young P.     R723
Young Y. H.     T647
Yu G.     F501
Yu H.     R727
Yu T.     T255, T602, T635
Yu Y.     T628
Yuan D.-N.     M101, T603
Yuan Y.     T605
Yui T. F.     R745
Yung Y. L.     T254, T616
Yurimoto H.     M153, W301, T601, T607
Zaag P. T.     T251
Zabalueva E. V.     R732
Zacny K.     T643, T644, R722
Zahnle K. J.     T614, T641, R749
Zaitsev M. A.     T253
Žák K.     T251, T612
Zakharov V.     M103
Zambon F.     T203*, T629, T630
Zambrano-Marín L. F.     T651
Zanda B.     T202, R404
Zanetti M.     T201*, T251*, F551, T606, T610, T612, T619, R711, R722
Zangari A. M.     T254*, T633
Zannoni M.     F503
Zaprudin B.     M103
Zarnecki J. C.     M103, T643
Zbofil R.     F505
Zebker H. A.     F553
Zega T. J.     T632, T635, R705
Zeigler R.     T642, R707
Zeilhofer M. F.     R713
Zeitlin C.     R451, T616, R705, R723, R747
Zellner N. E. B.     F551*
Zeng L.     R708
Zeng X. Y.     T628
Zent A. P.     T616
Zhai K.     T628
Zhang A. C.     M153*
Zhang G. H.     R703
Zhang G. L.     M101, T605
Zhang H.     M101, T605
Zhang J.     T605, T625, T627, R703
Zhang Q.     T638
Zhang T. L.     F504
Zhang X. M.     R403
Zhang X. W.     R403
Zhang Y.     M151
Zhao J.     R711
Zhao J. N.     T605
Zhao W. J.     R702
Zheng Y.     T641
Zheng Y. C.     R704, R726
Zhou F.     R702, R735
Zhou Q.     M101, T605, R707

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.

234  46th LPSC Program
Zhu M. H.     T605, T608, R704
Zhu X.     T254
Ziegler K.     R453, F502, T624, R741, R745
Zimbelman J.     T650, R717
Zimbelman J. R.     R401, R711, R717
Zimmerman M.     T628, R705
Zimmermann L.     R745
Zine S.     T631
Zinner E.     W304, T635
Zinner E. K.     T645
Zipfel J.     M153

Zippay J. A.     T650
Zolensky M. E.     M153*, R454, F554, T644, T646, R726, R740, R741, R742
Zolotov M. Yu.     T203*, T632
Zorzano M.     M102, R733
Zorzano M. M.     T645
Zorzano M.-P.     T253, R402, F552, R717, R733, R737
Zou Y. L.     R726
Zubarev A. E.     W302

Zuber M. T.     M101*, M104, M151, T201, T203, T205, W351, F551, T602, T603, T620, T629, T646, R710, R727
Zucolotto M. E.     T255, R744
Zuo S.     T609
Zuo W.     M101
Zurek R. W.     W303*, R711, R735
Zylik D. K.     R731

Codes correspond to session codes used in the program, where the first letter indicates the day (M for Monday, T for Tuesday, etc.). The three-digit number indicates the assigned session code and DOES NOT reference a poster location.