Thursday, July 12, 2007
POSTER SESSION: MARS POLAR SCIENCE, ASTROBIOLOGY, FUTURE MISSIONS/INSTRUMENTS, AND OTHER MARS SCIENCE
11:30 a.m. Dabney Garden

Ali M. Mazumder M. K. Reddy R. N. Milanova M. Zhang J. Biris A. S.
Computational Model for Optimizing Pulmonary Drug Delivery on the Human Missions to Mars **[#3016]**
A computational model has been developed for in-silico studies of the optimum delivery (to treat altered pulmonary functions due to microgravity) of engineered pulmonary drug aerosols in the human lungs while taking a flight to Mars.

Allen C. C. Kanner L. C.
Exposures of Water Ice in the Northern Mid-Latitudes of Mars **[#3065]**
Mid-latitude areas of the northern plains mantled by residual ice-rich layers also display evidence of present-day surface exposures of water ice. These exposures could constrain the latitudinal and temporal stability of surface ice on Mars.

Aubele J. C. Stanley J.
Advances in Mars Public Programs and K–12 Education **[#3388]**
Mars is an object of interest and fascination to adults and children, and can be used to increase general science literacy. The past decade of Mars missions has provided unprecedented personal connections by the public to the science and the scientists.

Banfield D. Richardson M. McEwan I. Dissly R. Vasavada A. R. Webster C.
MWX: The Next Generation Met Package for a Mars Network Mission **[#3344]**
We have developed a low-cost, low-mass, next-generation meteorology package (MWX) that comprehensively addresses the outstanding questions in martian planetary boundary layer science and makes an excellent foundation for a network mission.

Barker D. C.
To the Moon by Way of Mars: A Unique, Robust and Holistic Architecture for Long Duration Exploration Initiatives **[#3300]**
Permanent and sustainable habitation on Mars is afforded by mitigating space radiation and surface dust. Design and operational efficiency requires standardization and environmental synergy through the acquisition and distribution of resources.

Barlow N. G.
New Insights into Impact Crater Morphologies from the Revised Catalog of Large Martian Impact Craters **[#3347]**
Martian impact craters display a range of ejecta and interior morphologies resulting from interaction with near-surface volatiles. The revised Catalog of Large Martian Impact Craters is providing new insights into the types and distributions of these crater morphologies.

Barr A. C. Milkovich S. M.
Ice Grain Size and the Rheology of the Martian Polar Deposits **[#3215]**
We examine microphysical processes controlling grain size in terrestrial ice sheets to provide physically motivated constraints on grain size and rheology in the martian polar deposits.

Blake D. F. Sarrazin P. Bish D. L. Chipera S. J. Vaniman D. T. Ming D. Morris D. Yen A.
CheMin: A Definitive Mineralogy Instrument on the Mars Science Laboratory (MSL '09) Rover **[#3220]**
CheMin is an XRD instrument in the analytical laboratory of MSL. CheMin uses a microfocus-source Co X-ray tube, a transmission sample cell, and an energy-discriminating X-ray sensitive CCD to produce XRD patterns and X-ray fluorescence spectra from powdered samples.

Bos B. J. Farrell W. M.
Dust Flux Instrumentation for Mars Landers **[#3349]**
Field test results for a Mars lander dust flux instrument are presented. The instrument is capable of measuring particle sizes, particle size distributions and particle velocities.

Boyle R. Intravaia A. Twombly I.
Living Vertebrate Sample Return Mission from Mars Orbit **[#3196]**
Understanding the impact of long duration exposure to the space environment on the human is vital to managing the health risks. We have no biological sample return of any vertebrate species exposed to deep space upon which to analyze, evaluate, model and predict the outcome of the mission.

Davila A. F. Lim D. Fairen A. G. Uceda E. R. Zavaleta J. McKay C.
Long-Duration Orbit Exposure Experiment with Sub-Surface Microorganism from a Mars Terrestrial Analog **[#3084]**
Orbit Exposure Experiments (OEE) allow us to test the possibility of life transfer between planets and moons. Deep sub-surface microorganisms may be the best candidates to survive long-term exposure to space conditions. A long duration OEE is proposed to test our hypothesis.

Delory G. T. Grimm R. E. Nielsen T. Farrell W. M.
Prospecting for Subsurface Liquid Water Using Magnetotellurics on Mars **[#3293]**
We describe an instrument prototype for an electromagnetic sounder capable of resolving subsurface features at 1 km depths, including liquid water. This instrument package is compatible with future rover, Scout, and network missions.

Diez B. Feldman W. C. Maurice S. Gasnault O. Prettyman T. H.
Determination of the Layering of Hydrogen in the Top Meter of Mars **[#3129]**
We propose a method to infer depth distribution of the water rich layer in the top meter of Mars from the neutron fluxes measured by Mars Odyssey Neutron Spectrometer. We quantify the influence of the chemical composition on our results.

Domeneghetti M. C. Fioretti A. M. Cámara F. Carraro A. McCammon C. Tazzoli V.
Constraints on the Thermal History of Martian Meteorites ALH84001 and MIL03346 by Single Crystal XRD, Electron Microprobe and Mössbauer Analyses of Ortho- and Clinopyroxene **[#3024]**
Constraints on the thermal history of meteorites can be established by estimating the Fe^{2+}-Mg order degree in their pyroxene using single-crystal XRD. We present here the data obtained on martian meteorites ALH84001 and MIL03346.

Dreyer C. Zacny K. Skok J. Steele J. Nakagawa M. Schwendeman J. Carroll E. Paulsen G. Hedland M.
Thin Sections in Planetary Applications **[#3023]**
We are developing a device for automated production of rock thin sections in a space environment. A rock thin section is a rock ground to 30 µm thickness and a polished surface finish. Analysis of rocks in thin section is a powerful tool for understanding the origin and evolution of rocks.

Dreyer C. B. Mungas G. S.
Obscuration of Optical Transmission Due to Laser Deposited Material During Micro-LIBS Interrogation of a Rock Surface **[#3382]**
We present analysis and plans for experimental measurements to determine the risk of obscuration of optical transmission due to material deposited on the fore-optical element in a breadboard micro-LIBS device.

Dundas C. M. Mellon M. T. Lefort A. Thomas N. Keszthelyi L. P. McEwen A. S. HiRISE Team
HiRISE Observations of Fractured Mounds: Possible Martian Pingos **[#3214]**
HiRISE has observed fractured circular mounds in the martian midlatitudes, resembling terrestrial pingos. The distribution of these features appears latitudinally controlled.

Durham W. B. Pathare A. V. Stern L. A.
The Brittle-Ductile Transition in Mixtures of Rock and Ice: Experiments at Planetary Conditions **[#3056]**
We will present the results of experimental runs conducted at martian environmental conditions that constrain the brittle-ductile transition in mixtures of rock and ice.

Edwards C. D. Jr. Ao C. O. Asmar S. W. Callas J. L. Hajj G. Kahan D. S. Mannucci A. J. Pi X. Romans L. J. Safaeinili A. Schofield J. T.
An Assessment of the Scientific Potential and Operational Feasibility of Mars Crosslink Radio Science Observations **[#3259]**
The current ensemble of Mars science orbiters opens up the possibility of crosslink radio science observations using existing UHF relay payloads. We assess the technical viability and scientific potential of such measurements.

Elphic R. C. Levine J. S. Feldman W. C. Prettyman T. H.
High Spatial Resolution Mapping of Ground Ice and Hydrous Minerals in the Southern Highlands: A Proposed Mars Scout Airborne Regional Survey Mission **[#3323]**
An aerial survey mission carrying a neutron spectrometer can locate and characterize near-surface ground ice and hydrous minerals with more than a factor of 100 improvement in spatial resolution over an orbital system.

Espley J. R. Knez C. Hamilton D. P.
The Rings of Mars: Awaiting Discovery? **[#3361]**
Phobos and Deimos have long been suspected of creating rings of dusty debris around Mars. We describe proposals to directly observe these rings using the Spitzer Space Telescope and indirectly detect them using data from the magnetometer (MAG/ER) onboard Mars Global Surveyor (MGS).

Farahaninia A. Lange C. F.
Effective Mass Transfer Coefficient from the Martian Regolith **[#3362]**
Three dimensional simulation of water vapour diffusion through the martian regolith at Phoenix landing site is performed. The results for different atmospheric conditions on the surface are summarized by means of the Sherwood number.

Farrell W. M. Delory G. T. Atreya S. K. Jackson T. L.
The Harsh Electro-Chemical Environment in Martian Dust Storms **[#3122]**
We describe a set of extremes in the area of atmospheric chemistry. While solar photons in fair weather are a known and well-studied driver of martian chemistry, there is increasing evidence that electro-chemistry unique to dust storms may be a second new driver of chemical reactions.

Fastook J. L. Head J. W. III Marchant D. R.
A Model of Deuteronilus-Protonilus Mensae Valley Glaciation During Amazonian Mid-Latitude Regional Glaciation **[#3073]**
We use input from GCMs to model snow and ice accumulation and flow at the dichotomy boundary; we find patterns very similar to observed lineated valley fill, strengthening the interpretation of LVF as representing former glacial valley landsystems.

Feldman W. C. Diez B. Maurice S. Elphic R. C. Lawrence D. J.
Intercomparison of Hydrogen Distributions at High Latitudes on Mars **[#3315]**
The north-south symmetry of near-surface hydrogen at high latitudes is explored using a two-layered model of thermal and epithermal neutron currents measured using the Mars Odyssey Neutron Spectrometer.

Fishbaugh K. E. Herkenhoff K. Byrne S. Russell P. McEwen A. Hansen C. HiRISE Team
HiRISE Observations of North Polar Stratigraphy and Implications for Geologic History **[#3194]**
We present high resolution imaging observations of north polar geology from HiRISE and suggest a geologic history of the region.

Foing B. H. Orsi A. Cord A. Zegers T. Rossi A. HRSC Co-I Team
Search for Climatic Signal in Pavonis Mons Fan Deposits **[#3273]**
We analysed Mars Express HRSC images of the west fan deposits at Pavonis Mons. We use the deposit ridges, interpreted as drop debris from cold glaciar slow retreat, to search for climatic signal induced by the variations of obliquity beyond 15 Myr ago.

Garcia P. A. Gaddis L. R. Lavoie S. K. Isbell C. E. Sword B. J. Eliason E. M.
Mars Image Data Available Through the Planetary Data System **[#3356]**
This abstract and the associated poster will provide readers with information on the Mars image data currently available through the Planetary Data System and methods for accessing and obtaining these data. We will also briefly cover the archiving duties of the PDS Imaging Node.

Gilmore M. S. Castaño R. Bornstein B. Greenwood J. P.
Autonomous Mineral Detectors for Visible/Near-Infrared Spectrometers at Mars **[#3160]**
We have developed innovate supervised classifiers to detect calcite and gypsum in AVIRIS and OMEGA data, respectively.

Grunthaner F. J. Bada J. L. Skelley A. M. Mathies R. A. Quinn R. Zent A. Willis P. Amashukeli X. Farrington A. Aubrey A. Ehrenfreund P.
The Urey Instrument: An Integrated End-to-End In Situ Analytical System Designed for the Ultra-Sensitive Chemical Detection of Extant or Extinct Life on Mars **[#3379]**
This paper describes the Urey instrument that has been selected by ESA for the upcoming ExoMars mission. The abstract describes the instrumental implementation of this Life Detection Suit which addresses both state of the art organic compound detection and measurement of the martian surface reactivity.

Head J. W. Marchant D. R.
Northern Mid-Latitude Glaciation in the Amazonian Period of Mars: Global-Scale Debris-covered Glacier and Valley Glacier Deposits in the 30°–50°N Latitude Band **[#3117]**
Widespread Late Amazonian northern mid-latitude lineated valley fill and lobate debris aprons are interpreted as integrated glacial valley landsystem remnants that were active following the formation of tropical mountain glaciers at high obliquity.

Hegyi S. Drommer B. Hegyi A. Biró T. Kókány A. Hudoba Gy. Rudas G. Kovács Zs. Földi T. Bérczi Sz.
Several Husar Rovers Around the Hunveyor Lander: Specific Research Strategy and Educational Model System of Universities in Hungary **[#3026]**
We are developing a strategy: a family of various Husar-2 rovers — smaller and larger, supported by onboard computer, camera and specific tools — to work around the Hunveyor-2 university lander robot, similar to the arrangement of Sojourner around Pathfinder.

Holt J. W. Phillips R. J. Seu R. Plaut J. J. Safaeinili A. Biccari D. Campbell B. A. Carter L. M. Leuschen C. J. Orosei R. Picardi G. Smrekar S. E. Putzig N. E. Egan A. F. Bernardini F. SHARAD Team
Initial SHARAD Observations of Internal Layers in the Uppermost North Pole Layered Deposits of Mars **[#3372]**
Initial SHARAD observations of the uppermost north pole layered deposits show many layers and evidence of both large-scale continuity and disruptive structures.

Horgan B. H. N. Bell J. F. III Noe Dobrea E. Z. Thomas P. C.
Remote Sensing Observations and Implications of Martian North Polar Sulfate Deposits **[#3241]**
We investigate the relationship of the observed hydrated sulfate deposits within Olympia Planitia to the morphology and mineralogy of the dunes and the interdune exposures, to determine what role liquid water has played in the evolution of the north polar region.

Huntsberger T. Stroupe A. Aghazarian H. Garrett M. Younse P. Powell M.
Robotic Exploration and Sample Acquisition on Cliff Faces **[#3151]**
TRESSA, a three-robot team developed at JPL, has demonstrated in the field the ability to drive on slopes of up to 85 degrees and to perform sample acquisition on cliff faces as an enabling mission concept for gully exploration on Mars.

James P. B. Calvin W. M. Lee S. W. Thomas P. C.
MARCI Observations of Spring Recession of Martian South Polar Cap **[#3247]**
Initial results of MARCI observations of the spring recession of the martian south polar cap in Mars Year 28.

Josset J.-L. Hofmann B.
Close-Up Imager CLUPI On Board the Rover of the European Mars Mission ExoMars **[#3398]**
CLUPI is a powerful highly integrated miniaturized low-power robust imaging system. It is capable of providing important information contributing to the understanding of the geological environment and could identify outstanding potential biofabrics (stromatolites, etc.) of past life on Mars.

Kalchgruber R. McKeever S. W. S. Blair M. W. Benton E. R. Reust D. K.
A Prototype Instrument for In Situ Luminescence Dating of Sediments on Mars **[#3074]**
We discuss efforts and challenges to adapt OSL dating for in situ dating of martian sediments and describe the prototype for a robotic luminescence reader.

Kessler J. D. Onstott T. C. Lehmann K.
Isotopic Characterization of Martian Methane by CRDS **[#3233]**
To use stable isotopes to quantify CH_4 cycling, $\delta^{13}C$- and $\delta^{2}H$-CH_4 measurements must be precise to <2‰ and <15‰, respectively. We are developing a portable Cavity-Ringdown Spectrometer capable of measuring CH4 stable isotopes with high precision.

Kounaves S. P. Brown I. I. Galindo C. Hoehn A. Kapit J. Lynch K. L. McKay D.
Sarkisova S. A. Young S. M. M.
Detection of Microbial Life in Soil Based on Minimal Assumptions Using Measurements of Physical and Chemical Changes Induced by Growth **[#3328]**
We describe an instrument and methodology for definitive detection of microbial life via metabolic growth activity, with minimal assumptions using an array of metabolism-sensitive sensors and an advanced sample handling system.

Koutnik M. R. Waddington E. D. Neumann T. A.
Response Time-Scales for Martian Ice Masses **[#3189]**
Ice masses respond to climate changes by adjusting their length and thickness as they approach a new equilibrium. For a range of ice temperatures, we calculate a range of possible mass balance rates and volume-response time-scales.

Kozyrev A. S. Litvak M. L. Mitrofanov I. G. Rogozhin A. A. Sanin A. B. Schulz R. Schvetsov V. N.
Tretyakov V. I. D'Uston C.
Gamma-Ray and Neutron Spectrometer for Studying of Phobos Regolith Onboard "Phobos-Grunt" Mission **[#3103]**
The NS HEND instrument, as the part of the "Phobos-Grunt" mission, will be able to provide observational data for composition of Phobos' regolith and content of natural radioactive elements, and also content of hydrogen or water in the Phobos subsurface.

Kuzmin R. O. Zabalueva E. V. Christensen P. R.
Analysis of the Seasonal Variations of TES Thermal Inertia Values in the Middle and High Latitudes of Mars **[#3022]**
In the abstract we show that observing wintertime increases in the TI values in the middle and high latitudes of Mars may be the result of a seasonal appearance of water ice in the surficial layer of the soil in the amount 1–5 vol.%.

Landis G. A. Cunio P. Ishimatsu T. Keller J. Khan Z. Odegard R.
Mars Sample Return with ISRU **[#3369]**
The benefits of Mars propellant production are analyzed for use in a sample return mission. In the mission cases shown, Mars propellant production could reduce the landed mass for a sample return mission, or return more samples at the same landed mass.

Levine A. S.
Bringing Mars Science and Exploration to Underrepresented and Underutilized Student Populations **[#3021]**
NASA's New Vision for Space Exploration (VSE) requires the best talent and brainpower that the country has to offer, including females, African-Americans and Native Americans, all of whom have been largely underutilized and underrepresented in space activities in the past.

Litvak M. L. Boynton W. V. Golovin D. Kozyrev A. S. Mitrofanov I. G. Sanin A. B. Saunders R. S. Tretyakov V. I. Varenikov A.
Global Mapping of Martian Seasonal Caps with HEND Instrument During 2002–2007 Years **[#3102]**
We present a summary of continuous observations of martian seasonal caps with the High Energy Neutron Detector (HEND) during five years of orbital operations onboard Mars Odyssey.

Litvak M. L. Kozyrev A. S. Malakhov A. V. Mitrofanov I. G. Mokrousov M. I. Sanin A. B. Tretyakov V. Vostrukhin A.
Monitoring of Abundance and Depth Distribution of Water Along the Path of MSL Rover with DAN Instrument **[#3101]**
We present a summary of the Dynamic Albedo of Neutrons (DAN) instrument onboard NASA's 2009 Mars Science Laboratory mission. This instrument will study the abundance and depth distribution of water in the martian subsurface along the path of the MSL rover.

Mazumder M. K. Calle C. I. Srirama P. I. Wilson J. D. Zhang J. Buhler C. H. Ali M.
In-situ and Simultaneous Measurements of Size and Charge Distributions of Dust on Mars: Instrumentation and Analysis **[#3391]**
The paper presents particle size and charge distribution of various particles which have been charged using contact or corona charging. Mars dust simulant, JSC Mars-1, was tested extensively to show the capabilities of the DPA.

McConnell B. S. Newsom H. E. Lanza N.
Recent Climate Change and Presence of Near-Surface Ice Deposits: Evidence from Inverted Impact Craters Located on Lineated Valley Fill, Ismenius Lacus Region, Mars **[#3261]**
Inverted impact craters (IICs), located in the western Ismenius Lacus region, are evidence of episodes of near-surface ice within the past 5–10 Ma, and are results of surface-deflation due to subsequent climate change.

McMenamin D. S. McGill G. E.
Methane Hydrate in Martian Glacial and Cryospheric Ice **[#3038]**
We investigate the chemical and physical properties of methane hydrate in mid-latitude martian ice in order to better understand its contribution to atmospheric methane, glacial features and behavior, geomorphology, and astrobiological possibilities.

Milkovich S. M. Plaut J. J. Picardi G. Seu R. Phillips R. J.
Stratigraphic Analysis of the South Polar Layered Deposits Using Radar and Imagery **[#3197]**
Multiple subsurface reflections are observed in the SPLD by both the MARSIS and SHARAD radar sounders. We examine the stratigraphy of the SPLD in the radar data and attempt to correlate reflectors with the layers observed in images.

Mimoun D. Gagnepain-Beyneix J. Lognonne Ph. Nébut T. Giardini D. Pike W. T. Christensen U. van den Berg A. Schibler P. SEIS Team
The SEIS Experiment: Instrument Signal to Noise Study **[#3279]**
The SEIS seismometer is a martian "tailored" very broad band seismometer. In this paper we make a preliminary signal to noise analysis for the instrument showing that its performances should be sufficient to fulfill its scientific objectives.

Mitrofanov I. G. Garvin J. B. Sanin A. B.
Mars Exploration Neutron Detector MEND: Instrument for Mapping Water on Mars with High Spatial Resolution **[#3106]**
The concept of Mars Exploration Neutron Detector is presented for orbital mapping of martian neutron emission with high spatial resolution. The instrument allows detection of water-rich spots on the surface with a size of about 30 km, provided the orbit altitude is 300 km.

Mitrofanov I. G. Zuber M. T. Litvak M. L. Demidov N. E. Sanin A. B. Boynton W. V. Gilichinsky D. A. Hamara D. Kozyrev A. S. Saunders R. S. Smith D. E. Tretyakov V. I.
Burial Depth of Water Ice in Mars Permafrost Subsurface **[#3108]**
Analysis of the burial depth of water ice in Mars permafrost subsurface is presented based on joint consideration of neutron data from HEND (Mars Odyssey) and radiometry data from MOLA (Mars Global Surveyor).

Nehéz I. Varga T. Darányi I. Szilágyi I. Bérczi Sz.
Airborne, Bound Roof Structures for Martian Application, for the Protection of Living Spaces Suitable for Human Beings, or Setting up Industrial Activities **[#3164]**
Shading, protecting airborne, bound roof surfaces of large size are made in the martian environment, to give protection from cosmic and UV radiation, dust or other effects with the application of Nil-Diffusion (ND) technology.

Noe Dobrea E. Z. Asphaug E. Grant J. A. Kessler M. A. Mellon M. T.
Patterned Ground as an Alternative Explanation for the Formation of Brain Coral Textures in the Mid Latitudes of Mars: HiRISE Observations of Lineated Valley Fill Textures **[#3358]**
We have used HiRISE images to identify a formation process for the brain coral textures pervasive throughout the fretted terrain of Mars.

Nunes D. Byrne S. Okubo C.
Recent Deformation in the Residual Northern Polar Cap of Mars: A Breaking Story **[#3264]**
We present observations of possibly recent faults in the northern residual ice cap of Mars along with some preliminary modeling.

Parsons R. A. Nimmo F. Ellehoj M. D.
North-South Asymmetry in Martian Crater Slopes **[#3359]**
Analyses of crater topography using MOLA suggests there is no significant asymmetry in crater slopes at a range of latitudes. When compared to theoretical results, this provides us with an upper limit on the thickness of an ice-rich layer of 1 km.

Piatek J. L. Hardgrove C. Moersch J. E.
Potential Rock Glaciers on Mars: Comparison with Terrestrial Analogs **[#3353]**
Thermal inertia and surface morphology images of debris aprons in the Reull Vallis region are compared to similar images of terrestrial rock debris-covered glaciers. Results suggest the martian features may have similar origins to the terrestrial features.

Piqueux S. Christensen P. R.
Basal Sublimation of the Seasonal Caps and Sub-Ice Gas Flow: A Major Geomorphological Agent in the Martian Polar Regions **[#3069]**
Spots, fans and polygonal features on the seasonal cap are formed by the deposition of dust entrained by CO_2 gas. The basal sublimation of the seasonal cap has numerous effects on the polar landforms and is a prevalent process in both polar regions.

Plescia J. B. Swindle T. D.
In-Situ Radiometric Age Determination: A Critical Component of Mars Exploration **[#3278]**
In situ radiometric age determination of material is critical to establishing the absolute timing of events. The precision (15–50%) is not that obtained on Earth, but is far better than the current uncertainties based on extrapolated cratering rates.

Pocock J. M. Calvin W. M.
Factors Influencing the Location of Sustained Cold, Bright Spots in the North Residual Cap of Mars **[#3210]**
On the northern polar ice cap of Mars, two areas are observed that seem to persist as cool and bright throughout the summer season and between martian years. This study explores different process thought to contribute to these anomalous areas.

Putzig N. E. Phillips R. J. Seu R. Safaeinili A. Plaut J. J. Biccari D. Campbell B. A. Carter L. M. Holt J. W. Leuschen C. J. Byrne S. Orosei R. Picardi G. Smrekar S. E. Fois F. Egan A. F. Bernardini F. Nunes D. C. SHARAD Team
Internal Structure of the North Polar Layered Deposits from Radar Sounding **[#3295]**
Detailed subsurface structure and stratigraphy of the North Polar Layered Deposits in Planum Boreum as revealed by sounding radars at Mars will be presented.

Race M. S. Randolph R
Reconsidering Planetary Protection and the Outer Space Treaty: Protecting Science and Protecting the Planet? **[#3395]**
Ethical and policy implications about protection of Mars and other celestial bodies are not currently addressed by the Outer Space Treaty or COSPAR policies. This paper provides an analysis of the issues and builds a framework that may contribute to future discussions of space ethical concerns.

Roush T. L. Brown A. J. Byrne S. Tornabene L. Seelos K. D.
Modeling Water Ice Surface Deposits at Louth Crater Using Mars Reconnaissance Orbiter (MRO) Observations **[#3260]**
Modeling of the ice deposits around Louth crater in Mars northern polar region indicate grain size and relative abundance variation of water ice and palagonite within a floor deposit and differences of these relative to a rim ice deposit.

Russell P. S. Byrne S. Herkenhoff K. Fishbaugh K. Hansen C. Thomas N. McEwen A. HiRISE Team
North Polar Basal Stratigraphy and Active Mass-wasting Processes from HiRISE with Implications for Polar Scarp Evolution **[#3377]**
HiRISE clarifies many confusing stratigraphic relationships key to understanding the nature and formation of the basal unit. Polar scarps may be currently dynamic places where discrete mass-wasting events play a significant role in scarp retreat.

Schibler P. Heggy E. Lognonne P. Anglade A. Gabsi T. Godet P.-E. Striebig N.
Mars Environmental and Soil Simulating Facility for Geophysical and Exobiological Studies **[#3100]**
Our team is involved in the development of geophysical instruments for martian missions. To achieve the optimal performance tests for the seismic experiment and to study the variation in the soil acoustic and electromagnetic properties, we developed a Mars Environmental and Soil Simulating Facility.

Searls M. L. Mellon M. T. Mustard J. F. Milliken R. E. Martinez-Alonso S. HiRISE Team
Mid-Latitude Dissected Mantle Terrain as Viewed from HiRISE **[#3351]**
Using HiRISE, we examine the morphology of the mid-latitude dissected mantle terrain to test the plausibility of the hypothesis that this global terrain results from desiccation of an ice-rich mantle deposited at times of high obliquity.

Sellar R. G. Farmer J. D. Gardner P. Staten P. Kieta A. Huang J.
Improved Spectrometric Capabilities for In-Situ Microscopic Imagers **[#3017]**
Microscopic imaging, when combined with spectroscopic methods, can enable assessments of habitability based on observations of mineralogy at a scale relevant to microbial life. The Multispectral Microscopic Imager (MMI) is being developed to provide this capability.

Senft L. E. Stewart S. T.
Diagnostic Features from Modeling Impact Cratering in Icy Layered Terrains on Mars **[#3309]**
Impact cratering simulations into layered icy terrains are presented to aid in the interpretation of martian crater forms. We find that the effects of a near surface or surface ice layer can be significant and may explain many of the features seen around martian impact craters.

Seu R. Picardi G. Masdea A. Biccari D. Provenziani M. Cutigni M. Giacomoni E. Fuga O. Marinangeli L. Pettinelli E. Orosei R. Frigeri A. Flamini E. Phillips R. J. Carter L. M. Plaut J. J. Safaeinili A. Holt J. W. Leuschen C. J. Smrekar S. E. Campbell B. Kofman W.
SHARAD Performance and Science Results **[#3253]**
This presentation will be about the overall science performance and results of the shallow radar SHARAD on the MRO mission.

Shrivastava M. K.
Possibilities of Terraforming Mars **[#3265]**
Diminished internally produced energy of early Mars would have resulted in cold mantle, causing gradual submersion of surface water with dissolved gases. Therefore, to terraform or revive Mars, it is necessary to reactivate its diminished internally produced energy.

Sizemore H. G. Mellon M. T.
Laboratory Measurements of Tortuosity and Permeability in Mars Analog Soils **[#3055]**
We describe a laboratory technique for measuring tortuosity in Mars analog soils and compare our empirical values of tortuosity with values commonly chosen in theoretical studies relevant to Mars.

Starke V. Monaco L. Flores G. Steele A.
The Use of Resequencing Microarrays for Microbial Monitoring for Human Space Exploration **[#3401]**
We developed a high-density oligonucleotide resequencing microarray for the identification of microorganisms relevant to human space exploration for effective microbial monitoring.

Stepinski T. F. Urbach E. R.
Mapping Craters Depths in Terra Cimmeria, Mars: Implications for Spatial Distribution of Ground Ice **[#3054]**
Spatial distribution of ground ice is derived from maps of depth/diameter ratio obtained using 7845 craters in the T. Cimmeria region. The result supports models predictions, and indicates spatial variability of depth to ice in the equatorial zone.

Stillman D. E. Grimm R. E.
Laboratory Measurements of the Electrical Properties of Water Ice-Silicate Mixtures and Implications for Dielectric Spectroscopy and Radar on Mars **[#3311]**
Low frequency lab measurements of pure ice, doped ice, and regolith-ice mixtures were made at martian temps to constrain the electrical properties of ice and to optimize future EM geophysical instrument designs to search for subsurface ice on Mars.

Stoker C. R.
Searching for Life in the Martian Subsurface: Results from the MARTE Astrobiological Drilling Experiment and Implications for Future Missions **[#3135]**
Drilling for subsurface life should be a goal of future Mars missions. The approach is illustrated by MARTE: A search for subsurface life in Rio Tinto, Spain explored a biosphere using reduced iron and sulfur minerals and demonstrated automated drilling, sample handling, and life detection.

Tanaka K. L. Kolb E. J. Fortezzo C.
Recent Advances in the Stratigraphy of the Polar Regions of Mars **[#3276]**
We report on new results for the geologic mapping of the polar plateaus of Mars based on recent data, including increased complexity in the stratigraphic record.

Thueson M. A. Xie H.
Water Ice and Carbon Dioxide Ice Interactions: Crater Investigations in Residual North Polar Ice Cap **[#3075]**
We are looking at the high albedo deposits that occur within the residual north polar cap and mapping the CO_2/H_2O interactions seasonally.

Titus T. N. Langevin Y. Murchie S. L. Seelos F. Kieffer H. H. CRISM ScienceTeam
MRO CRISM Observations of the South Polar Cryptic Region **[#3275]**
CRISM is monitoring several localized areas within the martian south polar seasonal cap in an area called the Cryptic region. Results from this monitoring campaign are presented.

Vasavada A. R. MSL Science Team
NASA's 2009 Mars Science Laboratory: An Update **[#3031]**
The Mars Science Laboratory, NASA's next rover mission to Mars, will launch in fall 2009 and begin science operations in summer 2010. Its overall scientific goal is to explore and quantitatively assess a local region on Mars' surface as a potential habitat for life, past or present.

Warner N. H. Farmer J. D.
Long-Term Aeolian Modification of the North Polar Cap and Formation of the North Polar Chasmata, Mars **[#3178]**
In this report we re-examine the debate over the origin of the north polar chasmata on Mars. We conclude that a model for chasmata formation that emphasizes long-term aeolian erosion and retreat of the polar layered material best explains the observations and available imagery.

Wiens R. C. Sharma S. K. Clegg S. M. Misra A. K. Lucey P. G.
Combined Remote Raman Spectroscopy and LIBS Instrumentation for Mars Astrobiology Exploration **[#3092]**
Remote Raman spectroscopy and laser-induced breakdown spectroscopy (LIBS) are complementary techniques, easily combinable into a single instrument package, and which can be used in multiple ways to search for and identify biological samples.

Wilson E. W. Jr. Tunstel E. W. Anderson G. T.
Sniffing for Life on Mars **[#3360]**
A versatile, tunable diode laser absorption spectrometer is being designed and tested to be used for detection and location of biogenic gases while mounted on a mobile rover operating on the surface of Mars.

Wilson L. Head J. W.
Tropical Mountain Glaciers on Mars: Volcano-Ice Interactions and Influences on Glacial Evolution **[#3123]**
We examine Tharsis tropical mountain glacier volcano-ice interactions and find a variety of volcanic interactions producing phreatomagmatic eruptions, subglacial flows, and local meltwater and tephra, potentially influencing glacial flow.

Winebrenner D. P. Koutnik M. Waddington E. D. Pathare A. V. Murray B. C. Byrne S. Bamber J. L.
Evidence for Ice Flow and Subsequent, Rapid Trough Formation on the Martian North Polar Layered Deposits **[#3329]**
A wide swath of NPLD topography between troughs matches what would be expected for flowing ice. We infer that troughs post-date inter-trough topography and that trough formation was rapid relative to the time-scale of flow during trough formation.

Winfree K. N. Titus T. N.
Trends in the South Polar Cap of Mars **[#3373]**
It has been proposed that the south polar cap of Mars is diminishing. With this study, however, it appears that the CO_2 ice edges may actually be expanding in areal coverage.

Xie H. Ackley S. F. Zeng Z. Qiu F.
Permafrost and Its Implication in 'Louth' Crater (70.5N, 103.2E) of Mars **[#3200]**
We examined the polygonal and ice-wedge system in a high albdeo crater based on HiRISE imagery. This permafrost system supports the CO_2/H_2O frost deposition and sublimation model previously proposed.

Zacny K. Mungas G. Parrington L. Mungas C. Fisher D.
Pneumatic Drill and Excavator for Planetary Exploration **[#3010]**
We have been investigating a method for penetrating into the regolith and mining of the regolith using a gas powered (pneumatic) drill and "jet-lift" method respectively.

Zeng Z. Xie H. Birnbaum S. Liu L. Yang W.
New Insight on the Origin of Spiral Troughs in Martian Polar Ice Caps **[#3368]**
We present a vortex fractures model for the origin of the formation of spiral troughs in the polar ice caps. It is believed to be resulted from the differential rotation between the inner permeated frozen inner core and its outer part of the ice caps.