



**FIFTH JOINT MEETING OF THE
SPACE RESOURCES ROUNDTABLE
and the
PLANETARY & TERRESTRIAL MINING
SCIENCES SYMPOSIUM**

**Colorado School of Mines
Golden, Colorado
June 10-11, 2014**



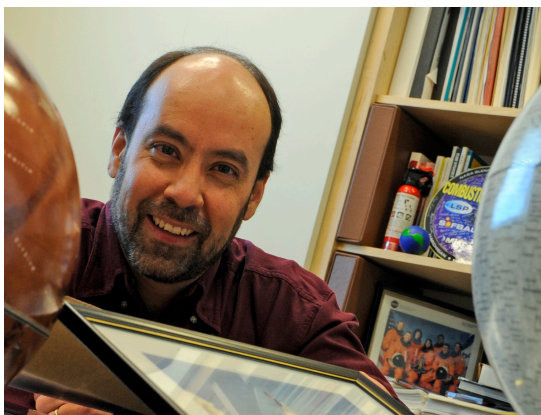
Message

Welcome to the Fifth Joint Meeting of the Space Resources Roundtable (SRR) and the Planetary and Terrestrial Mining Sciences Symposium (PTMSS).

The Global Exploration Roadmap, released last year by the International Space Exploration Coordination Group (ISECG), clearly identifies In-situ Resource Utilization (ISRU) as a critical-path activity for the Moon, Mars, and asteroids. Consequently, ISRU has now been included in a variety of research projects and spaceflight missions. At the same time, many of the space agencies around the world are in the process of redefining their roles and directions. Their visions and budgets are equally in flux as they try to settle on paths forward. In the middle of all this, it has become clear that ISRU is an enabling capability. It is also becoming commonplace for mission planners to begin thinking of space resources as commercially available commodities for mission support, such as refueling depots at an Earth-Moon Lagrange point. This suggests that the commercialization of space resources and space mining is closer to becoming reality. The question facing our community, we think, is: how can we, as a group, continue moving forward towards realizing ISRU, given the political and financial turmoil in space agencies at this time?

We look forward to a productive meeting and to a very exciting year ahead.

Sincerely,



Angel Abbud-Madrid
President & Chair, SRR XV



Dale Boucher
Chair, PTMSS XI

Program Schedule

TUESDAY, JUNE 10, 2014

7:30 AM		Continental Breakfast (Petroleum Hall, CSM Green Center)	
8:00 - 8:30	Opening remarks SRR scholarships	Angel Abbud-Madrid Dale Boucher	
Technical Session 1			
Session Chair: Angel Abbud-Madrid			
8:30	Thermite Reactions in the Mixtures of Magnesium with Lunar and Martian Regolith Simulants Armando Delgado, The University of Texas at El Paso		
9:00	Preliminary Commercial Mining of Lunar Surface Resources Thomas C. Taylor, Lunar Transportation Systems, Inc.		
9:30	ICESIP: Internal Combustion Engine Solar Independent Propulsion for Lunar Polar Exploration Rovers Warren J. Platts, Groundhog Geoscience, LLC and W. Corey Dyess, American Performance Technologies Group, Inc.		
10:00	Lunar Organic Waste Reformer Mark Berggren, Pioneer Astronautics		
10:30		Coffee Break	
Technical Session 2			
Session Chair: Leslie Gertsch			
11:00	Development of Regolith Reference Surfaces for Laboratory Studies Andrew Collette, IMPACT SSERVI, University of Colorado		
11:30	Regolith Characterization in Small-Scale Laboratory Experiments Christopher B. Dreyer, Colorado School of Mines		
12:00	Resource Production on the Moon Geoffrey A. Landis, NASA John Glenn Research Center		
12:30	Penetrometry in Microgravity Paul Sánchez, CCAR, University of Colorado		

Program Schedule

1:00	Lunch (Friedhoff Hall, CSM Green Center)
Technical Session 3	
Session Chair: Sherry Schmidt	
2:00	Lunar Polar Volatile Strategy – Resource Prospector Mission and Beyond Gerald Sanders, NASA Johnson Space Center
2:30	Moon Express Lunar Exploration Plans Bob Richards, Moon Express
3:00 - 5:00	Initial presentation by Chris Lewicki (Planetary Resources) followed by: Roundtable Discussion
5:00	Dinner (Friedhoff Hall, CSM Green Center)
7:00	AIAA Space Resources Technical Committee Meeting (Petroleum Hall, CSM Green Center)

WEDNESDAY, JUNE 11, 2014

8:00 AM	Continental Breakfast (Petroleum Hall, CSM Green Center)
Technical Session 4	
Session Chair: Jim Richard	
8:30	Asteroid Mining and Space Simulations with Citizen Science and Gaming Michelle M. Cadieux, Community Safety Programs
9:00	NASA 5th Annual Robotic Mining Competition for Universities: Robot Configurations and Results Robert P. Mueller, NASA Kennedy Space Center
9:30	PRISM: PISCES Robotic International Space Mining Competition/PISCES Planetary Analog Site Current & Future Uses John Hamilton, Pacific International Space Center for Exploration Systems (PISCES)
10:00	PISCES Robotic Village: Developing a World Class Test Site for In-Situ Resource Utilization System and Technology Integration Rodrigo Romo, Pacific International Space Center for Exploration Systems (PISCES)

Program Schedule

10:30 Coffee Break	
Technical Session 5	
Session Chair: Larry Clark	
11:00	Proposed Method for Locating and Identifying Terrestrial Pyroducts Ian Seeley, University of Hawaii at Hilo
11:30	In-Situ Resource Utilization (ISRU) Concepts for a Retrieved Asteroid in a Lunar Distant Retrograde Orbit Robert P. Mueller, NASA Kennedy Space Center
12:00	Lunar Drill Development Kris Zacny, Honeybee Robotics
12:30	PlanetVac: Regolith Sample Capture and Return Using Pneumatics/ Drilling and Caching for the Mars 2020 mission Kris Zacny, Honeybee Robotics
1:00 Lunch (Friedhoff Hall, CSM Green Center)	
Technical Session 6	
Session Chair: Dale Boucher	
2:00	Moon-Grown Plants as a Resource Jim Burke, The Planetary Society
2:30	Compressive Strength of Ice and Rock at Low Temperatures Jared Atkinson, Massachusetts Institute of Technology
3:00	Deep Space Industries Asteroid Resource Extraction Plans Daniel Faber, Deep Space Industries, Inc.
3:30- 5:00	Initial presentation by Jim Keravala (Shackleton Energy Company) followed by: Roundtable Discussion

Credits

Joint Technical Steering Committee

Angel Abbud-Madrid, Colorado School of Mines
Dale Boucher, Deltion Innovations, Ltd.
Leslie Gertsch, Missouri University of Science
and Technology
Stephen Mackwell, Lunar and Planetary Institute
Sherry Schmidt, Deltion Innovations, Ltd.
G. Jeffrey Taylor, University of Hawai'i

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Deltion Innovations, Ltd.
Colorado School of Mines
Lunar and Planetary Institute

