Geological Society of Nevada Southern Nevada Chapter Newsletter

September 2009

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Debris Flow Hazard Assessment through Imaging Spectroscopy

SPEAKER: **Dr. Lawrence Rudd**
DATE: *Thursday, September 24th, 2009*
LOCATION: LFG Rm. 105
University of Nevada - Las Vegas
TIME: *Social half-hour at 6:45 pm*
Meeting business at 7:15 pm
Talk at 7:30

SPONSOR: **Open**

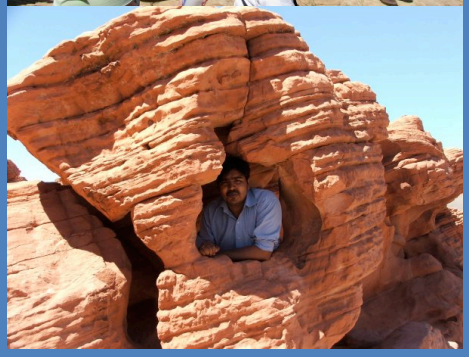
Welcome to another year of GSN, southern Nevada chapter! As the new chapter president, I hope that this year we can build on the solid foundation from past years to have another successful year. I would also like to thank past sponsors and hope to continue working together as well as to gain new sponsorship, and expand GSN SNC. As new chapter president, I hope to invite multi-disciplinary experts to extend the range of our topics, as well as foster collaboration among the geological sciences. In order to cultivate collaboration and growth of GSN SNC, I always welcome ideas and comments from members.

At our inaugural meeting of the 2009-2010 school year, GSN welcomes Dr. Lawrence Rudd from Nevada State College to discuss his research using imaging spectroscopy to do debris flow hazard assessment, specifically in Cataract Canyon in Utah.

Again, I would like to welcome to all new and returning members. I would also like to thank my preceding and current chapter members for helping me make the transition to president relatively smooth. Their help is greatly appreciated. Following in their footsteps, I hope to help GSN SNC have another successful year and I hope that we can all learn from each other's experiences and grow as a chapter. Thank you, **- Swapan Sahoo, President**

Volunteer to Share your experiences!

Share your field experiences with other GSN SNV chapter members through a story and/or photos in an upcoming newsletter.



Interested? Contact Laura Eaton at eatonl4@unlv.nevada.edu

Announcements

Calling all speakers and sponsors!

GSN is looking for sponsors and speakers for our 2009-2010 year! If you are interested or have ideas, please contact Swapan Sahoo or Josh Bonde.

Thank you!

Silent Auction Items

GSN is always looking for specimens and silent auction items for our monthly meetings. The well-being of GSN is made possible by your generous donations. If you have a specimen or silent auction item, please contact Swapan Sahoo or Josh Bonde, or just bring it to the next meeting.

Thank you!

Have an announcement you would like to share in the next newsletter? Contact Laura Eaton at eatonl4@unlv.nevada.edu

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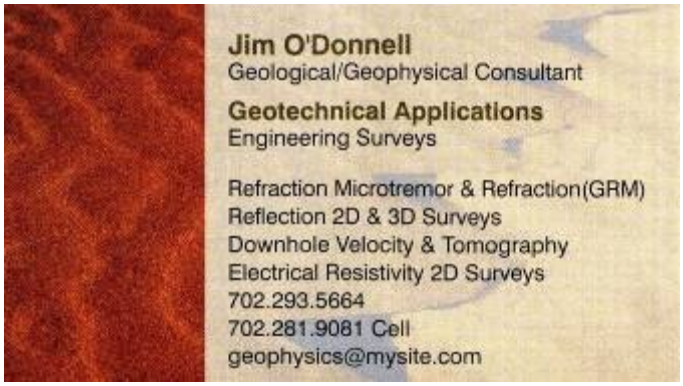

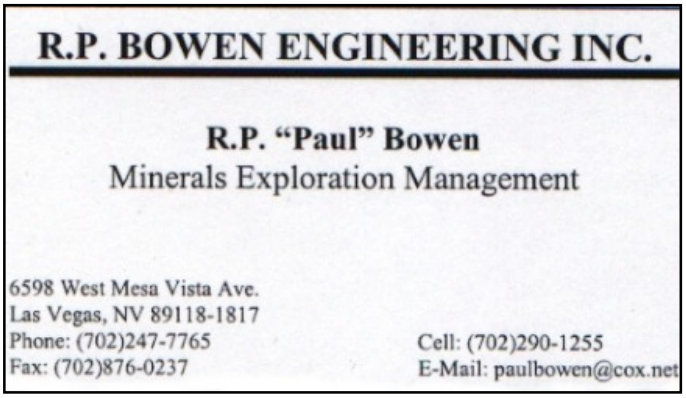

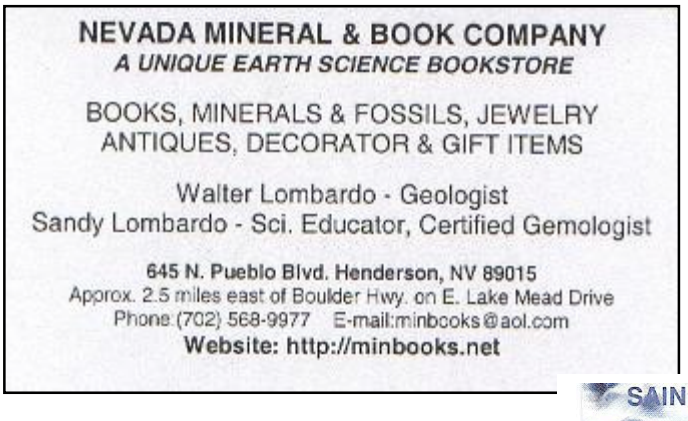

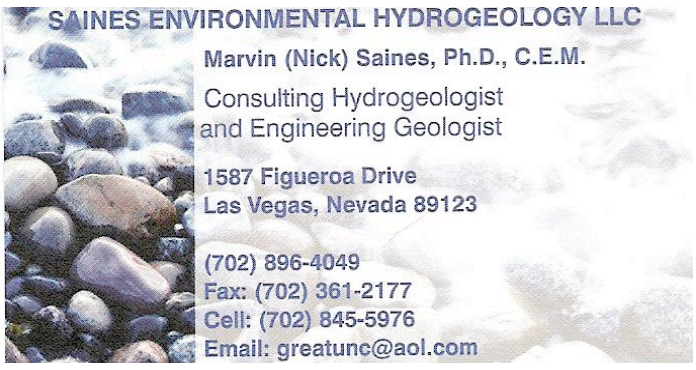

The Application of Imaging Spectroscopy to Debris Flow Hazard Assessment on the Colorado Plateau; Developing a Spectral Stratigraphy of Cataract Canyon,Utah.

Speaker: **Dr. Lawrence Rudd**

Abstract

Spectroscopic analysis of data from hyperspectral scanners can be used to create a unique spectral signature for earth surface materials based on the material's reflectance spectrum. Analysis of AVIRIS hyperspectral data and field-based imaging spectroscopy data reveals that debris-flow deposits, colluvium, and some shale units in Cataract Canyon, Utah display the double-absorption feature characteristic of kaolinite at 2.2 µm. Lab-based reflection spectra and semi-quantitative x-ray diffraction results show that Cataract Canyon debris-flow matrix clays are dominated by kaolinite and illite and lacking in montmorillonite. A surface material map showing the spectral stratigraphy of part of Cataract Canyon was created from AVIRIS data classified using an artificial neural network (ANN) and compares favorably to existing geologic data for Cataract Canyon. A debris-flow initiation potential map created from a GIS-based analysis of surface materials, slope steepness, slope aspect, and fault maps shows the greatest debris-flow initiation potential in the study area to coincide with outcrops of the Moenkopi Formation on steep (>20%), southwest-facing slopes. The results of this study provides evidence that hyperspectral imagery classified using an ANN can be successfully used to map the spectral stratigraphy of a sparsely vegetated area such as Cataract Canyon.

Speaker's Background

Cataract Canyon, Utah. Photo courtesy Google Images

Dr. Rudd's professional interests are in the areas of science education and geomorphology, and is active in both teaching and his scientific research. Dr. Rudd's received a Bachelor's Degree from Wittenberg University, a Master's Degree from the University of Denver, and a Ph.D. from the University of Arizona. He has wide-ranging experience in education, including 20 years of teaching high school earth science, physics, and geology. Dr. Rudd is currently involved in a state-wide EPSCoR project to educate science teachers about climate change integration of climate change education into their teaching. Dr. Rudd has received funding for three consecutive one-year grants to teach in-service CCSD science teachers about the geology of so[illegible] interest in the study of landslides and other Earth surface processes and enjoys being able to do field work in Southern Nevada and the nearby Colorado Plateau.