



Arizona Geological Society Newsletter

DECEMBER 2015

December 1, 2015 DINNER MEETING

Who: Peter Smith will speak about “The Latest News from Mars”

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the *PIMA BALLROOM* (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members \$27, Guests \$30, Students Members free with on-line reservation (\$10 without).

RESERVATIONS ARE REQUIRED: Reserve on the AGS website (www.arizonageologicalsoc.org) by **11 a.m. Friday, November 27th**. Please indicate regular (Pork Loin with tomatillo sauce and ancho-honey glaze), Vegetarian, or Cobb Salad meal preference. Please cancel by Friday, November 27th at 11 a.m. if you are unable to attend - no shows and late cancellations will be invoiced.

The December Dinner Meeting is Sponsored by Ruen Drilling, Inc.



**The AGS is Grateful for Ruen Drilling’s Sponsorship, which helps us
to offset Dinner Meeting Costs**

The Latest News from Mars

by Dr. Peter H. Smith, Professor Emeritus, University of Arizona

With the release of the hugely popular movie, “The Martian,” there has been a renewed interest in Mars for its promise as a destination for astronauts and for the possibility that it hosted a second genesis. This talk will review our current knowledge about its geology and hydrology with emphasis on potential habitability both for humans and for microbes. I will discuss the new missions that are being prepared for launch next year and beyond to follow up on the exciting discoveries made over the last few years. NASA is already planning for a human mission in 2035 and potential landing sites are being considered.

About the December Dinner Speaker



In 1995 my team at the UA delivered the Pathfinder camera called IMP to the Jet Propulsion Lab little knowing that 20 years late it would be starring in a Hollywood movie. My career started shortly after the first astronauts walked on the Moon and continued throughout NASA's incredible exploration of the solar system. Having been closely involved with a multitude of missions to various planets, my Mars experience started with Pathfinder (1997) and led to my becoming the Principal Investigator of the Phoenix Mission that landed on the northern plains of Mars in 2008. I am currently retired, but still a co-investigator of two Mars missions as well as an imaging scientist on OSIRIS-REx, a sample return mission to an asteroid named Bennu.

Up-coming Arizona Geological Society Dinner Meetings

Date	Speaker	Title of Presentation
1/5/2016	Sarah Baxter	Calc-silicate Alteration and Ore Characterization, ASARCO Mission Complex: Implications for the Optimization of Molybdenum Recovery
2/2/2016	Karen Wenrich	The Ga-Ge Rich Apex Mine, Utah - A Tsumeb, Namibia Analogue
3/1/2016	Peter Johnson	Tectonics and Ore Deposits of the Arabian-Nubian Shield

Future Event

The Arizona Conference of the Society of Mining, Metallurgy & Exploration will hold its annual meeting at the JW Marriot Tucson Starr Pass Resort & Spa on December 6-7, 2015. For more information go to the [Arizona Conference 2015 Website](#).



Arizona Geological Society Membership Stats (11/20/2015)

Total Membership	Professional Members	Student Members	Organizational Members
513	405	101	7

2015 Scholarship Winners

The Arizona Geological Society Scholarship Committee has chosen these students to receive the 2015 scholarships. The awards will be presented at the December AGS dinner meeting.

AGS Scholarship and Executive committees would like to thank all the students, who applied for the scholarships. We would also like to thank everyone, who donated to the scholarship funds; your donations help make these scholarships possible. To learn more about the Arizona Geological Society's scholarship program and how to make a tax-deductible contribution, please visit the [AGS website's student outreach page](#).

2015 Courtright Scholarship - Alexandra Savard Macho : Alexandra (Allie) received her B.S. in Geology and Geophysics from the University of Wisconsin at Madison in 2012 and currently is pursuing a Professional Science Masters (PSM) degree in Economic Geology at the University of Arizona. She has taught geologic mapping at the Wasatch-Unita Field Camp and on extended university field trips and at the UA she is a teaching assistant for the Introduction to Ore Deposits class and for a Short Course on Ore Deposits Mapping. For her PSM, Allie is studying processes of pluton emplacement and associated metallogenesis in a highly extended region of the Basin and Range Province. Specifically, she has undertaken field work in a complex bedrock terrain in the Egan Range, Nevada, where she is mapping plutonic phases, porphyry dikes, structures, and alteration types in the Eocene Granite Pluton in an effort to integrate its igneous-tectonic-hydrothermal evolution. The Granite Pluton is one of many tilted Eocene intrusions in northeastern Nevada associated with high-temperature hydrothermal mineralization. She anticipates that her work there, followed by future work on other intrusions in Nevada will lead to a 4-D time-space model of synextensional pluton emplacement and hydrothermal alteration in the eastern Great Basin. Allie expects to graduate from the PSM program in August 2016, after which she will continue on for a PhD from the UA in the Lowell Program in Economic Geology. She is passionate about geology, geologic mapping, ore deposits, and teaching. After earning her PhD, Allie hopes to gain mineral-industry exploration experience before seeking an academic position in field-based economic geology.

2015 Arizona Geological Society Scholarship - Enrique Rodolfo Chon: Born and raised in southeastern Arizona, Enrique is a senior at the University of Arizona where he is majoring in Geosciences with an emphasis in Geophysics and a minor in Mathematics. In recognition of his high level of academic achievement, Enrique received and has maintained a full-tuition Regents High Honors Scholarship to attend the University. While at the UA, he successfully competed for a Research Experiences in Solid Earth Science for Students (RESESS) Internship and spent this last summer in Boulder, Colorado conducting hydrological research at the National Oceanic and Atmospheric Administration (NOAA). At the UA, he has participated in research efforts at the Laboratory of Tree Ring Research and the Tectonic Geodesy Laboratory. Currently, he is serving at the UA as a College of Science Student Ambassador, has served as an undergraduate representative on the hiring committee for a geophysical faculty position, and is a Geoscience Undergraduate Preceptor for the introductory geology course. In the larger community, Enrique has taught Tucson high school and middle school STEM teachers in methods of sharing Earth Science in their classrooms. He also volunteers at Biosphere 2, the Tucson Gem and Mineral Show Youth Exhibit, and the Tucson Festival of Books Science City. Enrique expects to receive a B.S. in Spring of 2016 and plans to pursue a graduate degree in Geological Engineering and the Peace Corps Masters International Program at Michigan Technological University. En route to graduate school he will take time to study data processing and analysis and to travel to Latin America to learn to speak Spanish.

Fall 2015 Arizona Geological Society Field Trip Northern Plomosa Mountains | Bouse Formation

On 14-15 November, Jon Spencer, Phil Pearthree and Jordan Bright (Univ of AZ Ph.D. candidate) guided 30 AGS members and guests on an excursion in the northern Plomosa Mountains and to view the Bouse Formation in the Blythe Basin. The weather splendid, the rocks and Bouse outcrops brilliant, the audience engaged and argumentative (in a positive way), and the trip a smashing success.

A final draft of the field guide is available here, http://repository.azgs.az.gov/uri_gin/azgs/dlio/1656.

On the following Tuesday, we canvassed trip participants for their experience. Over 75% completed and submitted an online survey published at SurveyMonkey.com. We hope these data will inform future field trips. [See web site link for the survey results and comments of those surveyed.](#)



Barite veins & manganese mineralization in Miocene conglomerate in the Plomosa Mtns (Photo by Nyal Niemuth).



Dan Laux, Stan Keith and Drago enjoy a sunny Saturday morning in the Plomosa Mtns (Photo by Nyal Niemuth)



Field trip participants examine interbedded marls and claystones in the Bouse Formation (Photo by Mike Conway).



Jimmy the Wonder Dog poses in front of soft sediment deformation - truncated beds - in the Bouse Formation (Photo by Mike Conway)

[Additional Photos of the 2015 Fall Field Trip can be found on the AGS web site.](#)

Senior Geologist Jon Spencer Retires

Jon Spencer, AZGS Senior Geologist, retired on Friday, 20 Nov. 2015, after 33 years of service to Arizona and the AZGS. Among Jon's many accomplishments was managing or co-managing the AZGS STATEMAP program since its inception in 1993. Federal funds for STATEMAP totaled \$3.7 million, and were matched dollar for dollar by State funds. To date, the STATEMAP program has published nearly 150 geologic maps, with Jon as an author or co-author on more than 50 maps.

Jon's research interests ranged widely from the origin of Arizona's metamorphic core complexes to the timing of formation of Grand Canyon and the geologic history of the Colorado River. With Jonathon Patchett (Univ of Arizona) and Phil Pearthree (AZGS) he reinterpreted the sedimentological origin of the Bouse Formation of western Arizona and pioneered the lake spillover model of Colorado River formation that contrasts strongly with earlier models that superposed the river on rapid uplift along the present-day Colorado River Extensional Corridor or attributed river genesis to headward erosion.

Among his many duties, Jon served as supervisor for Oil and Gas Program administration providing occasional oversight for ongoing regulatory and investigative activities. In the 1980s and 1990s, Jon, John Duncan, and Ray Harris investigated radon in Arizona, resulting in a number of publications that added considerably to our understanding of the distribution and hazards of radon in the state.

AZGS Director Lee Allison awarded Jon the Director's Medallion award, and dedicated Digital Geologic Map 111, 'Geologic map of the Cross Roads 7.5' Quadrangle and the southern part of the Gene Wash 7.5 Quadrangle, La Paz County, Arizona, and San Bernardino County, California', for his many contribution to Arizona geology.

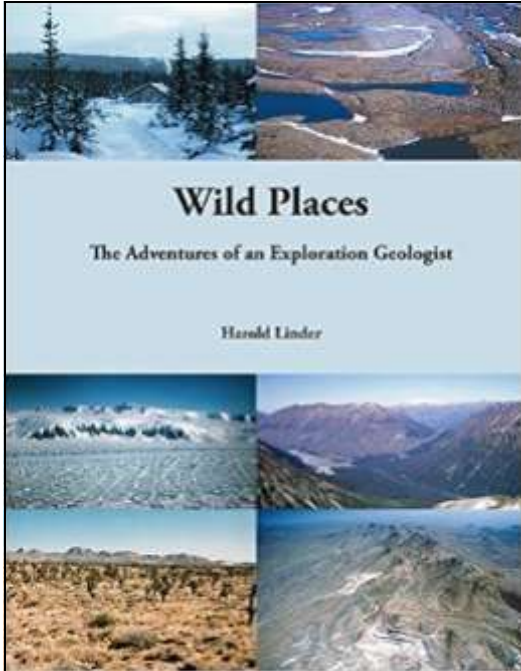
For 17 years, Señor Spencer served as an officer on Arizona Geological Society's Executive Committee, culminating in his leadership role in AGS's 2007 Ores and Orogenesis conference and as co-editor, with Spence Tittley, of 'Ores and Orogenesis: Circum-Pacific tectonics, geologic evolution, and ore deposits': Arizona Geological Society Digest 22, p. 1-3. In 2014, Jon unstinting service to AGS was rewarded with a lifetime membership.

Dr. Spencer's extensive knowledge of Arizona geology and his insightful approach to ferreting out and clarifying important geologic problems will be sorely missed. The AZGS staff joins Jon's many colleagues and friends in wishing him well in the years ahead.



Señor Geologist Jon Spencer waxing philosophical on the Fall 2015 AGS field trip to the Northern Plomosa Mtns.

Wild Places: The Adventures of an Exploration Geologist



Long time AGS member Harold Linder has recently published an autobiography on his 50-year career as an exploration geologist, who has explored seven continents after graduating from the Massachusetts Institute of Technology and University of Minnesota.

This book is about his life of prospecting for mineral deposits in some of the wildest and most remote places on earth. This included living in tents for several years and working in extremes of hot, cold, wet and dry.

This is a story, based on his diary, of commuting to work by canoe and snowshoe in northern Canada and by helicopter in Alaska; of following wombat trails in the rainforests of Tasmania; of bear encounters in the Yukon; bush plane crashes in British Columbia; prospecting in the Mojave Desert of California and going where no man has gone before in Antarctica.

You will read about his adventures on an Antarctic expedition to the Transantarctic Mountains and the Ross Ice Shelf in 1961 and 1962. He describes being weather-bound by whiteout conditions in a small two-man tent only a few hundred miles from the South Pole and the dangers of crossing unknown crevasse fields.

You will learn about prospecting and mineral exploration and the detailed history of two major discoveries that he made as a consulting geologist. In 1968 he discovered the still-unmined giant copper-molybdenum deposit at Schaft Creek, British Columbia, in a rugged, mountainous area of northern Canada so remote it is accessible only by bush plane.

In 1986 he discovered the world-class Castle Mountain gold deposit in the Mojave Desert of southern California. It was the culmination of a life in exploration and he achieved the goal of every exploration geologist: to discover a major mineral deposit and stay with it all the way to production. The Castle Mountain mine was permitted after much difficulty and produced more than 1,250,000 ounces of gold between 1992 and 2001.

This book records the seldom-heard experiences and views of a mineral exploration geologist, whose knowledge of wild places certainly deserves equal consideration with that of "environmentalists." Many of the wild areas where Dr. Linder explored are now withdrawn from mineral exploration and mining. The encroachments of civilization, government land withdrawals and bureaucratic regulations threaten mineral exploration and mining. The wilderness prospector seems destined to go the way of the early explorers and trappers, never to return.

Wild Places: The Adventures of an Exploration Geologist is available at the [Arizona Experience Store](#) and [Amazon.com](#).



Arizona Geological Survey News Brief



November's [Arizona Mining Review](#) (AMR) will be available by 10am, Wed. 25 Nov.

Arizona mining update with Nyal Niemuth (AZGS)

- Arizona Zeolites – the magic bullet for remediating acid mine drainage? Dan Eyde, President, St Cloud Mining, Tucson, Arizona
- Geology and mineral potential of the northern Plomosa Mtns – in the field with Dr. Jon Spencer (AZGS) and Nyal Niemuth

New Publications – Online at the AZGS Document Repository

AZ Geology E-magazine Fall 2015 – [Pinacate volcanic field in stereo](#) by Dan Lynch.

Spencer, J.E. and Pearthree, P.A., 2015, Fall 2015 Arizona Geological Society field-trip guide: [Northern Plomosa Mountains and Bouse Formation in Blythe Basin](#). Arizona Geological Survey Open-File Report OFR-15-10.

Ferguson, C.A. and Cook J.P., 2015, Geologic map of the Kingman 7.5 Quadrangle, Mohave County, Arizona. Arizona Geological Survey Digital Geologic Map DGM 113, 1 map sheet, 1:24,000 scale. (URL pending).

Ferguson, C.A. and Cook J.P., 2015, Geologic map of the NW Kingman 7.5 Quadrangle, Mohave County, Arizona. Arizona Geological Survey Digital Geologic Map DGM 114, 1 map sheet, 1:24,000 scale. (URL pending).

Newly released online

Reynolds, S.J., 1985, [Geology of the South Mountains, central Arizona](#). Arizona Geological Survey Bulletin-195, 75 p., 1 map plate, scale 1:24,000.

Recent Donations to the Arizona Geological Society

Donations to the Arizona Geological Society are used to fund the Courtright and AGS Scholarship programs. The Arizona Geological Society is grateful for the generosity of the following individuals, whose contributions will help students achieve their professional goals.

Jon Carpenter

Richard Jones

Errol Montgomery

Eric Seedorff

Joseph Coronas

Paul Lindberg

Michael Rice

Volker Spieth

William Elliot

Rebecca Miller

Alexander Schauss

Howard Ward

ANNOUNCEMENTS

Welcome New AGS Members

Edward Barrie

Chris Osterman

Audrey Warren

Jesse Clah

Christian Rathkopf

Intan Yokelson

Beverly Furfaro

Tom Shaw

Darby Young

Greg Mchone

Derek Thorkelson

Arizona Geological Society is grateful to Freeport-McMoRan, Inc for their generous support of our student members!



Freeport-McMoRan is sponsoring student dinners for the 2015 AGS monthly meetings.

2015 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, PO Box 40952, Tucson, AZ 85717

Dues (check box) 1 year: \$20; 2 years, \$35; 3 years: \$50; full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street: _____ City: _____ State: _____ Zip Code: _____

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-mail: _____ Check this box if you do not have an email address

All newsletters will be sent by email. If you do not have an email address, we will mail a hard copy to you, but we cannot guarantee timeliness.

If registered geologist/engineer, indicate registration number and State: _____

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright or the Arizona Geological Society Scholarship Funds.