



Arizona Geological Society Newsletter

NOVEMBER 2016

November 1, 2016 DINNER MEETING

Who: Alexander G. Schauss will present Minerals, Trace Elements and Human Health

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 \$30, Guests \$33, 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, October 28th**. Please indicate Regular (Seared Tri-Tip with Chimichurri Sauce), Vegetarian, or Cobb Salad meal preference. Please cancel by **Friday, October 28th at 11 a.m.** if you are unable to attend - no shows and late cancellations will be invoiced.

The November Dinner Meeting is Sponsored by
Independent Mining Consultants, Inc.



The AGS is grateful for Independent Mining Consultants' Sponsorship, which helps us offset the increasing costs of our dinner meetings and other activities of the society.

Minerals, Trace Elements and Human Health

By Alexander Schauss, PhD, FACN, CFS

Only until recently have the elements in the periodic table received more than passing attention in human nutrition and medical textbooks. Why did it take so long?

Abstract Continued on Page 2

Abstract Continued from Page 1

Iron (Fe) was recognized in the 18th century as a constituent of the human body, yet it took over 100 years before inorganic elements gained a modicum of acceptance in terms of playing a role in human physiology, health or behavior.

In 1789, the French chemist, Antoine Lavoisier, discussed 23 elements in his book, *Traite elementaire de chimie* (Elementary Treatise of Chemistry), which many consider the first textbook of modern chemistry. The book included a list of elements or substances that could not be broken down further, forming the foundation for which elements would eventually be organized into the periodic table. He was the first to predict the existence of silicon and established that sulfur was an element rather than a compound.

In the 19th century the list of elements grew to 61, owing to a sequence of discoveries made by such eminent chemists as the Swede, Jons Jacob Berzelius, who is credited with identifying the elements cerium, selenium, and thorium, along with the work of his students who identified lithium, vanadium, and several rare earth elements. Unfortunately, Berzelius erroneously believed that inorganic substances did not play a role in human health, as he persisted in arguing that only organic substances performed such functions.

This belief persisted for some years until the German chemist, Baron von Liebig, demonstrated that both inorganic and organic substances had the ability to nourish animals. Ultimately, this led to the logical conclusion that this might also hold true for humans. Unfortunately, von Liebig's research focused too narrowly on the chemistry of proteins to the point that any metals in foods were seen as little more than a residue left over after being incinerated, which chemists call "ash".

It wasn't just chemists who delayed the recent golden age of research on minerals, trace elements and human health that emerged in the 20th century. One must also point a finger at many prominent biologists, the medical community, and dieticians, most of who disregarded growing evidence of their importance by arguing against their role, with the exception of a few elements, such as calcium, or those that were "toxic", such as arsenic, cadmium, lead, and mercury.

Encouraged by the work of Linus Pauling (Pauling's rules) and other scientists in the early 20th century, they sought to understand how the elements might influence our health and wellbeing. As one element after another was experimentally demonstrated to be essential or semi-essential to health, the research focus eventually moved on to purportedly non-essential elements, sometimes referred to as "trace" and/or "ultra-trace" elements, found in our soil, food and water. In time, it became evident that many of these seemingly "non-essential" elements can play an important role in the prevention, mitigation, progression, and/or treatment of a wide range of diseases. For example, it is now becoming accepted that to build bone density as we age, more than calcium and hydroxyapatite is needed to build and maintain strong bones and reduce the risk of developing osteoporosis.

Today, as never before, multi-disciplinary fields have enriched our understanding of the importance of the elements found in the periodic table and the effect they have on our health. There is now growing evidence that the sufficiency or deficiency of numerous elements in our diet may have a multi-generational effect on the health of offspring for several generations.

We now know that metal ions regulate a vast array of physiological mechanisms important to our health, and our offspring. What is particularly puzzling is why it took so long to gain an appreciation of the role elements play on our health. Maybe if they were positioned as "drugs", their vast array of functions would be better known.

Today, no one disputes that without minerals and trace elements, we would not exist; a major paradigm shift that Alex has personally witnessed during his over 40 years of research on the role that minerals play in human health and behavior.

About the November Dinner Speaker



Dr. Schauss is a Fellow of the American College of Nutrition (FACN), and a Certified Food Scientist (CFS), who earned his undergraduate and graduate degrees in the “soft sciences” at the University of New Mexico in Albuquerque, while “poking around abandoned surface and underground mines in southern New Mexico and Arizona.” He earned his PhD in psychology at California Coast University in Santa Ana, California, where he studied the effect of zinc status on perceptual disorders, including anorexia nervosa and bulimia nervosa, as well as, neurological diseases such as Parkinson’s disease. A former Clinical Professor, and Associate Professor of Research, and lecturer in nutrition, biostatistics and epidemiology, he has been a member of several committees at the National Institutes of Health (NIH), served as an advisor to foreign ministries of health, and appointed to represent the United States at the World Health Organization (WHO) Study Group on Health Promotion.

An Emeritus Member of the New York Academy of Sciences, Founding Honorary Member of the British Society of Nutritional Medicine, and a member of the American College of Toxicology, American Society for Nutrition, American Chemical Society, International Society of Regulatory Toxicology and Pharmacology, Society of Toxicology, and Society for Experimental Biology and Medicine, Dr. Schauss has been recognized for his research and work over several decades beginning in 1983 when he received the McCarrison Lecture Award from the Society for Nutrition and Health at Oxford, UK, and more recently, the Linus Pauling Lecture Award for “contributions in the medical sciences” by the American College for the Advancement of Medicine.

Currently, he is a Research Associate in the Department of Geoscience at the University of Arizona, and member of the UA Mineral Museum Advisory Board, as well as, the Science and Conservation Advisory Council of the Arizona-Sonoran Desert Museum. He is a past-President of Friends of Mineralogy, Life Member of the Mineralogical Society of Arizona, Fellow of The Mineralogical Record, and member of the Arizona Geological Society (AGS), the Flagg Foundation, and the Mineralogical Society of America (MSA).

Among some 23 books, 37 chapters, and over 175 peer review papers authored in the fields of nutrition and botanical medicine, is the book, Minerals, Trace Elements and Human Health, which will be the subject of his presentation.

Reminder - Scholarship Application Deadline is October 28, 2016

Applications for the 2016 Courtright and M. Lee Allison Scholarships need to be submitted by Friday, October 28, 2016. Applications along with letters of recommendation can be e-mailed directly to Bob Powell (rpowell@usgs.gov) or mailed to:

Scholarship Committee
Arizona Geological Society
PO Box 49052
Tucson, AZ 85717



Lowell Program
in Economic Geology



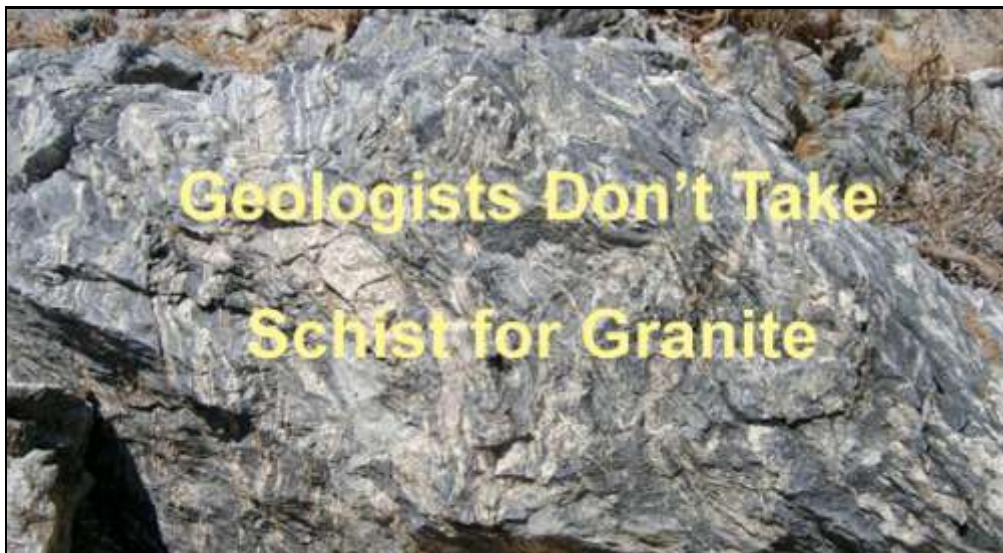
Short Course on Cu, Mo, and Au Porphyry Deposits

December 6-15, 2016

The Lowell Program in Economic Geology at the University of Arizona is pleased to announce the opening of registration for the 13th annual offering of our popular Porphyry Short Course, which will take place December 6-15, 2016, in Tucson, Arizona. We now alternate between the two formats of the course, and this year we are offering the version entitled “Cu, Mo, and Au Porphyry Deposits.” This short course is designed for members of the industry and graduate students and will be led by Eric Seedorff, Mark D. Barton, and others. It has a focus on exploration geology and will include 3½ days of lectures and 2 days of labs in Tucson, as well as 3½ days of field trips to representative ore systems in Arizona. [For more information see flier and a registration form.](#) To request further information or to register, contact Rocío Brambila by e-mail at brambila@email.arizona.edu.

The Arizona Geological Society thanks James Stephens of National Exploration, Wells and Pumps in Gilbert, Arizona for volunteering to pay our bar tab at the October 2016 dinner meeting.

National



Executive Committee Reaches Out to AGS Members

by Sarah Baxter and David Briggs

In an effort to improve participation in Arizona Geological Society functions, the Executive Committee commissioned a survey of AGS members on ways to improve attendance at our dinner meetings. The results of this survey are presented below.

1. How many AGS dinner meetings do you attend each year?

Answer Choices	# of Responses	%
All 12 Meetings	1	1.43
9 to 12 Meetings	7	10.00
6 to 8 Meetings	12	17.14
3 to 5 Meetings	13	18.57
Less than 3 Meetings	23	32.86
I have not attended any meetings in the last year	14	20.00
Total	70	100.00

2. What are some of the reasons why you might or might not attend a meeting?

	Strongly Disagree	Generally Disagree	Neither agree nor disagree	Generally Agree	Strongly Agree	Not Applicable	Total Number of Responses
The cost of the meal is too high	17.91%	11.94%	22.33%	16.42%	13.43%	17.91%	67
The quality of the meal is not satisfactory	17.91%	20.90%	25.37%	16.42%	4.48%	14.93%	67
The location of the meeting is not convenient	20.59%	17.65%	20.59%	10.29%	25.00%	5.88%	68
The time of the meetings is too late	25.00%	22.06%	13.24%	19.12%	10.29%	10.29%	68
The length of the meetings is too long	17.65%	35.29%	20.59%	10.29%	5.88%	10.29%	68
The topics presented do no interest me	29.41%	26.47%	16.18%	19.12%	4.41%	4.41%	68

3. Are you generally happy with the current meeting venue (Sheraton Tucson Hotel and Suites)?

Answers Choices	# of Responses	%
Yes	53	75.71
No	17	24.29
Total	70	100.00

4. Would you like to see the meetings held at a different venue?

Answers Choices	# of Responses	%
Yes	28	40.58
No	14	20.29
No Opinion	27	39.13
Total	69	100.00

Executive Committee Reaches Out to AGS Members (continued from page 5)

5. Would you like to see the meetings held earlier in the evening?

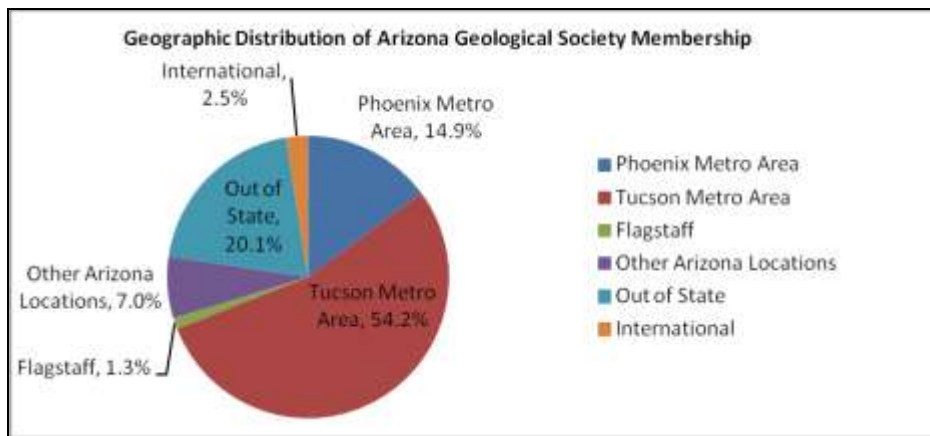
Answers Choices	# of Responses	%
Yes	22	31.88
No	32	46.38
No Opinion	15	21.74
Total	69	100.00

6. Would you like shorter meetings (limit speaker to 40 minutes)?

Answers Choices	# of Responses	%
Yes	17	24.64
No	30	43.48
No Opinion	22	31.88
Total	69	100.00

Survey respondents also made many helpful suggestions on how our monthly dinner meetings could be improved. These comments focused on three main themes: 1) the location of the venue, 2) meeting format and presentation topics, and 3) dinner costs and meal choices.

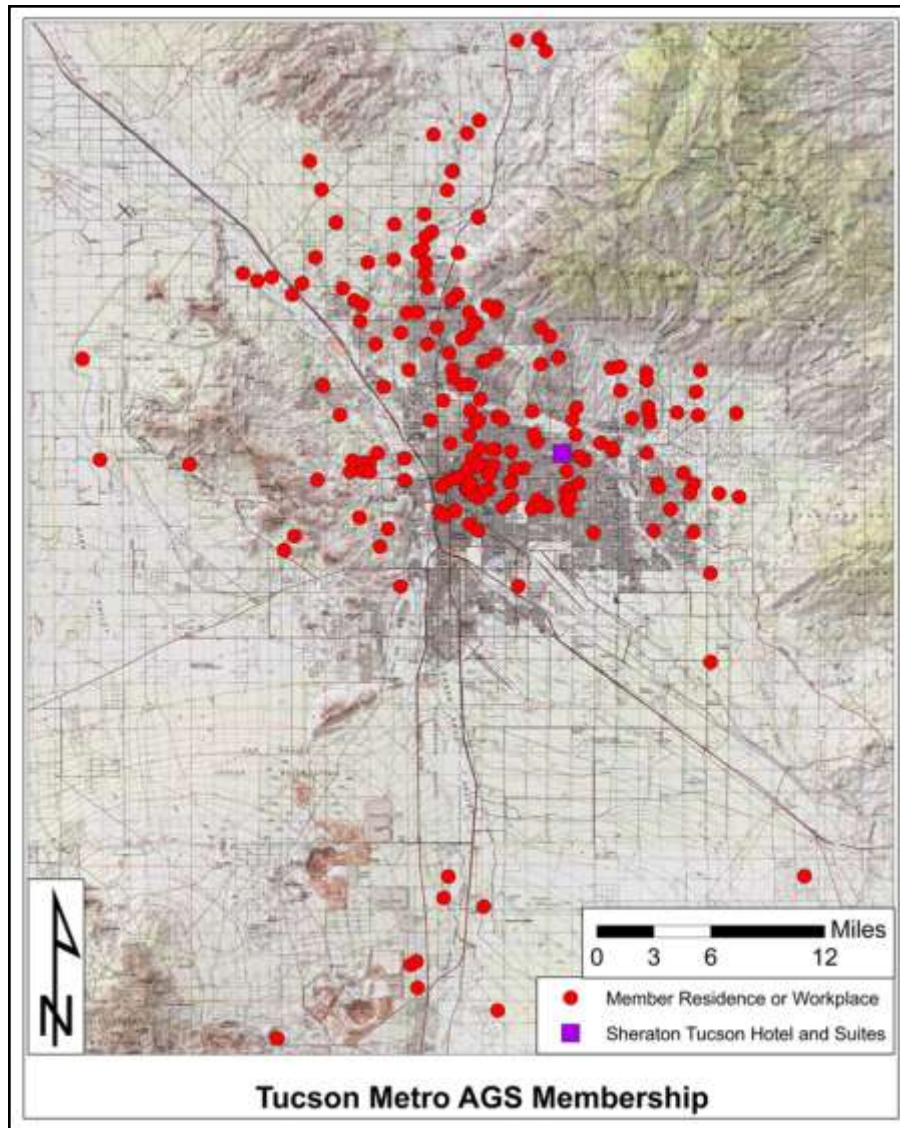
Suggestions about our dinner meeting venues can be subdivided into two basic categories: 1) having more of the AGS meetings in Phoenix or possibly Flagstaff, and 2) considering alternative meeting places in the Tucson metropolitan area.



Arizona Geological Society membership is geographically concentrated in two areas: Tucson and Phoenix. Members of the AGS executive committee have long recognized the Phoenix metropolitan area as a place where we could establish an AGS chapter and expand our membership. However, the establishment of a chapter in the Phoenix area will require several local volunteers to plan and execute meeting logistics. We are willing to assist AGS members in the Phoenix area with start-up costs, advertising and event registration.

Executive Committee Reaches Out to AGS Members (continued from page 6)

With respect to the meeting venues within the Tucson metropolitan area concerns revolved around a convenient, accessible location. The accompanying map shows the distribution of AGS member residences or workplaces in the Tucson metropolitan area in relation to our present venue at the Sheraton Tucson Hotel and Suites at 5151 East Grant Road. With our membership spread throughout this large area it is very difficult to find a venue that can meet the society's needs at an affordable price that is convenient for everyone.



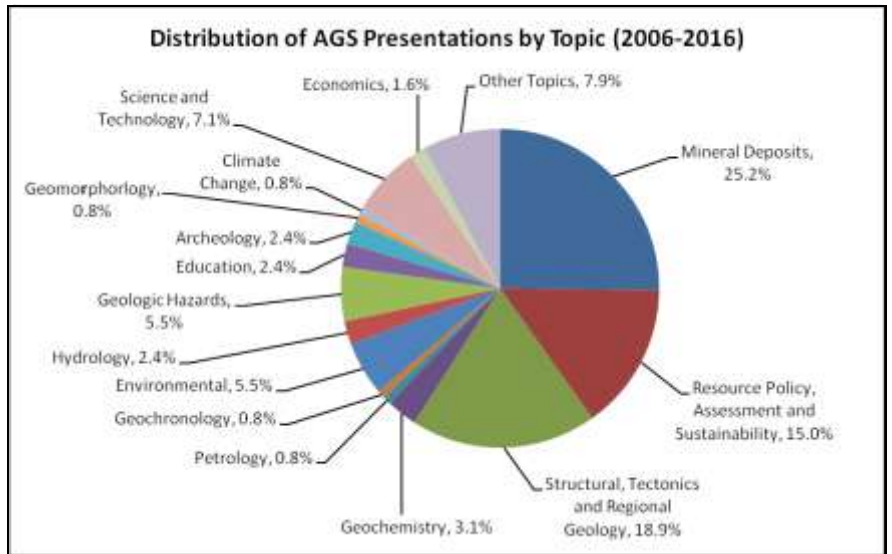
Some of the respondents to the AGS survey, expressed a desire for a less formal format at our monthly meetings. Historically, our meetings have been a divided into three parts: 1) a social hour, 2) a three course dinner, and 3) a formal presentation. Although members have an option to attend one, two or all parts of the meeting, only those attending the dinner are charged a registration fee, which covers the costs for the meals and the venue. If the meetings were changed to a less formal format (i.e. with beer and appetizers), a less costly venue that could serve our needs may be possible, but everyone would have to chip in on covering the costs for the meeting.

Executive Committee Reaches Out to AGS Members (continued on page 8)

Executive Committee Reaches Out to AGS Members (continued from page 7)

Several respondents to the survey thought there were too many mining related talks at our dinner meetings. Although mineral deposits or resource policy, assessment and sustainability have been the most common topics at our monthly meetings over the last eleven years, our Vice President of Programs has done a pretty good job getting interesting talks on a wide variety of other topics (see pie diagram).

Attendance at our dinner meetings has been dependent on the presentation topic and the speaker's reputation. Seasonable variability is a lesser factor with talks given during the summer months being less well attended. Historically, presentations on mineral deposits and regional geology of the southwest have been the most popular topics at our monthly meetings. This is understandable considering Tucson's role in our nation's mining industry. Attendance at presentations on other topics has been generally less.



Similarly, some respondents of the survey were critical of the limited diversity of speaker affiliations. This criticism appears to be unfounded as shown by the pie chart presented below.



As 2017 is nearly upon us, the AGS executive committee has decided to extend our contract with the Sheraton Tucson Hotel and Suites, while other meeting formats and venue options are investigated. While the location of the Sheraton is not perfect, more than 75% of the survey respondents were generally satisfied with this venue. In the meantime, we are working with the Sheraton to improve the quality and variety of the menu selection during the coming year. We have also taken steps to insure pre-meeting preparations are made so our meetings are run on schedule, introductions of speakers are brief and the dinner meetings are completed by 9:00 PM.

2017 Grand Canyon Geology Raft Trip



AGS member Alison Jones and Gary Byerly (Louisiana State University, Emeritus) will be leading a Grand Canyon geology motorized raft trip from July 9-16, 2017. The trip will launch at Lee's Ferry and end at Whitmore Wash (mile 188). Hatch River Expeditions will be the outfitter. Please contact Alison for more information. ajones@clearcreekassociates.com or (520) 270-2825.

Arizona Geological Society Membership Stats (10/21/2016)

Total Membership	Professional Members	Student Members	Organizational Members
399	347	45	7

Up-coming Arizona Geological Society Dinner Meetings

Date	Speaker	Title of Presentation
12/6/2016	John Ewert	How the U.S.G.S. Responds to Volcano Crises in the U.S. and Abroad with Some Case Study Examples
1/3/2017	Dave Sawyer	Regional Aquifer Hydrogeology and Petroleum Geology of the Central Rio Grande Rift, Northern New Mexico
2/7/2017	Daniel Hummer	Mineral Ecology: Predicting and Discovering New Mineral Species



Mining Leadership Program - February 7-10, 2017

We are pleased to announce that the University of Arizona Lowell Institute for Mineral Resources and Vanto Group are jointly sponsoring a Mining Leadership Program. The inaugural offering of the four-day program “Leadership: Inventing the Future, A Breakthrough Leadership Program for the Mining Industry and Its Stakeholders,” will be February 7-10, 2017, in Tucson, Arizona, and will be led by executives of the Vanto Group. Please go to the IMR home page at <http://imr.arizona.edu>, click on the Featured Project (Mining Leadership Program), then download the Information Packet for further information and instructions regarding registration. Please contact Rocío Brambila by e-mail at brambila@email.arizona.edu to register.

[For more information see Announcement.](#)

Geology in the News

[State Budgets, Geological Surveys, and the New Reality](#); by Rex Buchanan, Earth and Space Science News, September 26, 2016.

[NAU Researchers Test Planetary Science at San Francisco Volcanic Field](#); by Emery Cowan, Arizona Daily Sun, October 22, 2016.

[Annual Trek to Meteor Crater, Other Sites Offers Incoming Earth and Space Majors Hands-on Experience in the Field](#); by Anonymous, Arizona State University, October 7, 2016.

[Devon Energy Chief Says Permian is Hot and Petro Science is Boosting Production](#); by Jeffrey Weiss, Dallas News, October 17, 2016.

[Federal Funding for the Geosciences, 1970-2015](#); by Anonymous, American Geosciences Institute, October 19, 2016.

[Estimation of Relative Size of the Geoscience Workforce in Various Countries](#); by Anonymous, American Geosciences Institute, September 6, 2016.

[A Driller and a Geologist Walk into a Bar](#); by Erik C. Ronald, Coring Magazine, July 29, 2016.

[Mine Tales: San Xavier-area Mine now a UA Teaching Lab](#); by William Ascarza, Arizona Daily Star, October 21, 2016.

[San Andres Fault is Set to Snap at any Minute](#); by Ashlee DeMarinto, Arizona Family, October 3, 2016.

[GV Mines Attract International Crowd for Seminar](#); by Kitty Bottemiller, Green Valley News, October 12, 2016.

[The Gold Mine was Shut During WWII. Now is Operating Again](#); by Anonymous, Mining.com, October 18, 2016.

Arizona Geological Survey News Brief

AZGS in UA NEWS. AZGS seismic monitoring program was showcased in the UA NEWS article, [UA-Based AZGS is Making Noise About Earthquakes](#) by Robin Tricoles.

From the article, "The idea is to be able to record earthquakes systematically at least down to magnitude 3, Pearthree says. "That gives us an idea of how frequently earthquakes are occurring in different parts of the state, and you can learn something about how frequently larger ones may occur by how many smaller ones occur." Understanding and mitigating seismic activity and active fault systems in Arizona is a long term commitment of the Survey's. Establishing a sustainable funding model has been challenging and we are open to suggestions.

MMNRE Museum News! AZGS is hosting its first meeting for museum stakeholders at the Polly Rosenbaum Building on the Capitol Mall in Phoenix on 5 November. Our chief objective is to inform stakeholders of the conceptual model for the Arizona Mining, Mineral and Natural Resources Education Museum and to respond to their questions and concerns. For many, this will be the first time since May 2011 that they will have returned to the old Arizona Mining and Mineral Museum.

IF you would like to support the museum, please pledge your tax deductible support through the University of Arizona Foundation: <http://tinyurl.com/SupportMM-NREMuseum>. Interested in learning more? Contact AZGS' MMNRE coordinating team – fmconway@email.arizona.edu.

Great Arizona ShakeOut! Nearly 63,000 Arizonans participated in this year's [Great Arizona ShakeOut](#) (10:20 a.m. MST; 20 Oct. 2016) promoted by AZGS and the Arizona Department of Emergency Management and Military Affairs. This 2-minute 'Drop, Cover & Hold On' drill prepares people for the ground shaking that accompanies a modest to large earthquake.

Celebrating Lee Allison' Life. On the evening of 19 Nov. 2016, people are gathering at Tohono Chul Park in Tucson to celebrate the life of Lee Allison, former Director of AZGS. Lee died in August 2016 from a fall. For details contact Mike Conway at fmconway@email.arizona.edu or 520.971.3688.

Friends of Lee Allison thank the following groups for their financial support of the evening's events: Arizona Geological Society, American Institute of Professional Geologists, Association of Environmental & Engineering Geologists, Arizona Rock Products Association and Southern Arizona Business Coalition.

Recent Publications

Cook, J. P., Pearthree, P. A., Gootee, B. F., Conway, B. D., and Youberg, A., [Landslides are Surprisingly Large and Widespread in Arizona](#). Geological Society of America Annual Conference 2016, Denver CO., September 2016, Abstract.

Allison, M. L., and Spencer, J. E., 2016, [Review of a U. S. Geological Survey Scientific Misconduct Incident that Potentially Affected Mining and Land Management on Federal Land in Northern Arizona](#). Arizona Geological Survey Open File Report 16-02, 4 p., 6 appendices.

Pearthree, K. S., and Youberg, A., [Surficial Geology and Geologic Hazards of Bonita and Rhyolite Canyons, Chiricahua National Monument, Arizona](#). Geological Society of America Annual Conference, Denver CO., September 2016. Poster presentation.

Announcements

Welcome New AGS Members

Sue Beard	Jill Cohen	Bill Elliott	Stephanie Kukolich	Kamila Shiratori
Katherine Boot	Joseph Coronos	Scott Gibson	Phillip McFarland	
Tasnim Boufelfel	Sergei Diakov	Alexandra Horne	Arthur Osakwe	
Ellie Broadman	Robbie Donald	Jacob Kho	Yu Yu Shiratori	

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



Freeport-McMoRan sponsors student dinners for the 2016 AGS monthly meetings.

2016 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 M. Lee Allison Scholarship Funds.