



# Arizona Geological Society Newsletter Newsletter

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MAY 2014

## May 6, 2014 DINNER MEETING

**Who:** John C. Lacy will speak about "The Genesis of Mining Law."

**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, Student members free with online reservation (\$10 without).

**RESERVATIONS ARE REQUIRED:** CALL (520) 663-5295 or reserve on the AGS website ([www.arizonageologicalsoc.org](http://www.arizonageologicalsoc.org)) by 11 a.m. by Friday, May 2. Please indicate regular (Chicken stir fry with brown rice), vegetarian, or cobb salad meal preference. Please cancel by Friday, May 2 at 11 a.m. if you are unable to attend—no shows and late cancellations will be invoiced.

## Abstract

### The Genesis of Mining Law

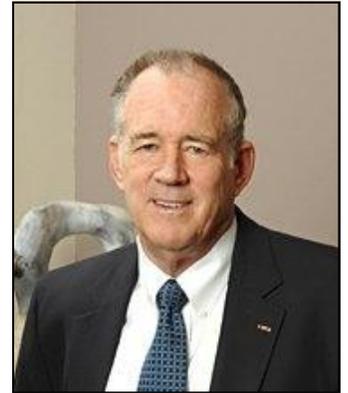
John C. Lacy

DeConcini, McDonald, Yetwin and Lacy, Tucson, Arizona

The "Mining Law of 1872" has been much maligned as being "ancient," "out of date," and "in need of modernization." In fact, governmental systems of regulation of private mineral development can be traced to Greek and Roman precedents and what became the mining laws of the United States reflect a reliance of private initiative that is almost unmatched in the world. Mr. Lacy's thesis is that the modern criticisms of this law reflect arguments for imposition of law that the laws of the United States were designed to avoid. This presentation will trace the roots of mining law from an ancient genesis, through the development of tribal traditions of the "free miners" of medieval Europe and the importation of Saxon/English and Iberian systems into the New World. Once in the Americas, traditions of private custom and regal systems combined into the ordinances and practices in the Viceroyalties of New Spain and Peru, then into the mining camps of the California gold fields and the Comstock Lode and finally were incorporated into the mining laws of the United States. The presentation will try to isolate those portions of the mining laws of the United States that reflect a basic policy of encouraging mineral development from those portions of the law that are rightfully criticized as being archaic.

## About the May Dinner Meeting Speaker

Mr. Lacy is a shareholder in the law firm of DeConcini McDonald Yetwin & Lacy in Tucson, Arizona. His practice emphasizes mining and public land law and encompasses transactional and title consideration involving acquisition of mineral rights from private and governmental agencies together with permitting issues and associated water rights. A significant amount of Mr. Lacy's historic practice has been devoted to international mineral transactions and he assisted in the revisions to the mining law of the Republic of Bolivia and the English translation of the mining laws and regulations of Mexico. He has teaches courses on mining and public land law, oil and gas law and mineral transactions at The University of Arizona Rogers College of Law and in the Department of Mining and Geological Engineering as an Adjunct Professor. He is the author of numerous publications concerning mineral rights and mineral law history and occasionally testifies as an expert witness on these subjects. Mr. Lacy is a past President of the Rocky Mountain Mineral Law Foundation and the Arizona Historical Society.



## Geological Society of Nevada 2015 Symposium

The Geological Society of Nevada has announced a call for papers to be presented at its 2015 Symposium, which will be held at John Ascuaga's Nugget in Reno/Sparks, Nevada on May 14-24, 2015. Co-hosts for this event include the Society of Economic Geologists, Nevada Bureau of Mines and Geology and the U. S. Geological Survey. Its theme is New Concepts and Discoveries. Anyone wishing to present a paper at this meeting needs to submit a draft abstract no later than May 30, 2014. [For more info on this event visit this link.](#)

## Arizona Mining Review



**Arizona Mining Review e-Video Magazine.** The 30 April episode of the [Arizona Mining Review](#) (AMR) includes the following topics and guests:

- Exploration uptick in Arizona. Nyal Niemuth on a recent uptick in mining exploration in Arizona – things are looking up;
- Morenci Mine, Arizona's flagship copper mine. Ralph Stegen, Vice-President for Mine Site Exploration with Freeport-McMoRan Copper & Gold on the geology and history of the Morenci Mine.
- AZGS launches new Minedata site – Casey Brown, AZGS digital archivist, on the launch of the [Arizona Geological Survey Mining Data](#) site. The site includes 1000's of downloadable, historic mining records, reports, maps and photos from the Arizona Dept. of Mines and Mineral Resources collection. A suite of search tools – textual and geographic – facilitate success in locating and retrieving material.

The April episode will be broadcast at 10:00 am MST on 30 April on LiveStream (<http://new.livestream.com/accounts/2496466/azminingreview>). Immediately thereafter it will be available on our AZGS YouTube Channel (<https://www.youtube.com/user/azgsweb>).

## Second Annual Arizona Geological Society Doug Shakel Memorial Student Poster Event

The Arizona Geological Society held its second annual Doug Shakel Memorial Student Poster Meeting on Thursday April 24, 2014 at the Embassy Suites Hotel in Tempe. Student turnout was excellent from all three state universities. Not only did undergraduates participate as well as graduate students, but they also won two of the top three prizes.

Our distinguished panel of judges included Carl Bowser, Professor Emeritus, University of Wisconsin at Madison; Jon Spencer, Senior Geologist at the Arizona Geological Survey; and Barbara Murphy, Senior Geologist with Clear Creek Associates. The Arizona Geological Society also thanks Geotemps, Inc., whose sponsorship helped offset our costs for this event.

Poster viewing was from 6 to 7 PM. Dinner ran from 7 to 9 PM because the poster presenters were required to give a three-minute oral summary of their posters. The ability to summarize one's poster clearly and succinctly was an important part of the evaluation process.

The winners were:

- First Prize (\$500): Jason D. Mizer, Graduate Student, U of A: U-Pb geochronology of Laramide magmatism related to Cu-, Zn-, and Fe-mineralized systems, Central Mining District, New Mexico
- Second Prize (\$250): Lily Jackson, Undergraduate Student, U of A: Lake Malawi sediment record provides clues on climate variability and response to Mount Toba super-eruption
- Third Prize (\$150): Crystlynda Fudge, Undergraduate Student, ASU: The coexistence of Wadsleyite and Ringwoodite in SAH 293: Constraints on shock pressure conditions and olivine transformation

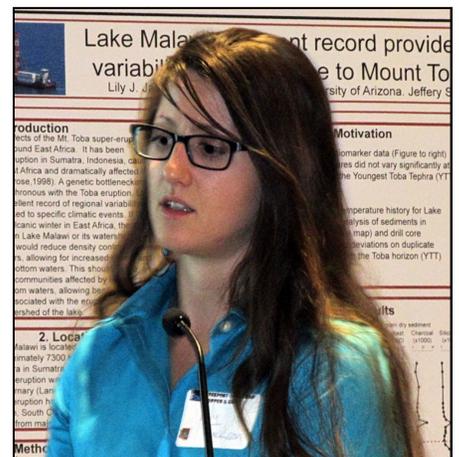
Honorable Mentions: (\$50 each):

- Ada Rosa Dominguez, Graduate Student, U of A: Paleoclimate and magmatic reconstructions of sediment-hosted copper and iron-oxide copper gold deposits
- Meghan Guild, Graduate Student, ASU: Boron isotopic variation in the subcontinental lithospheric mantle
- Daniel R. Hadley, Graduate Student, NAU: Analysis of geomorphic and vegetation change at Colorado River campsites, Marble and Grand Canyons, AZ

It is no exaggeration to say that all the posters and oral presentations were of excellent quality. The proof of this is that the judges, who took their job very seriously, haggled over the winners for an hour, although they had PDFs of most of the posters days before the event.



**Jason Mizer receives First Place Award from Bob Kamilli**



**Lily Jackson, Second Place Award**



**Crystlynda Fudge, Third Place Award**

## May Member Spotlight - James D. Girardi, 2011 Courtright Scholarship Recipient

**What is the Title of your Ph.D. Dissertation?** Comparison of Mesozoic magmatic evolution and iron oxide(-copper-gold) ('IOCG') mineralization, central Andes and western North America

**Where you are from?** Well, in the geographic sense, I grew up in the New York City/Long Island area. From west to east notable stays were at Rosedale (Queens), and the towns of Inwood and East Meadow (Long Island). I am from a very large and traditional Italian family; the two halves, the Iovino's and Girardi's mostly immigrated to the USA from southern Italy in the 1940's and 1950's. So, in the historical sense, I suppose I am ultimately derived from my Mediterranean ancestors.

**Where Did You Get Your Undergraduate Degree?** I attended a SUNY, which stands for State University of New York. Geology is what I studied as a Bachelor of Science at SUNY Stony Brook, which is located in north-central Long Island. Our campus lies atop the majestic Harbor Hill glacial moraine; this is important because there are no mountains where I am from and to get a few 10's of feet of topography from piled up glacial till is a really big deal for a geologist undergrad living in Long Island. At Stony Brook I was very lucky to be introduced to research, and as an undergraduate research assistant I learned about analog modeling of thrust belts (the "sandbox" experiments), and 2-D and 3-D subsurface imaging using Ground Penetrating Radar (GPR). When I was not in class or doing something geology related (like mineral collecting or GPR surveys), I was working in various deli's, hardware stores, and construction sites to help pay for my college expenses. During that time I could also be found in Manhattan at live music concerts, or out on "The Island," hanging out by the beach, fishing, clamming, and surfing. Really, I am not sure how I graduated in 4 years!

**Why did you come to the U of A for your Graduate Degrees?** I chose to come to U of A because I felt that here I had the best opportunity to develop as a scientist and as a professional. We have a unique group of faculty and students that really have made every day a blast! Like my undergrad experience, way too much fun, every day, if that is even possible... I am going to miss the "serious" work of playing football, wiffle ball, and lacrosse during lunch breaks.

**What got you interested in your thesis topics?** I have always had a great interest in continental arc magmatism. Because many types of ore deposits are intimately associated with arc magmatism, it was only natural to blend the two fields of study. The geochemical and petrologic skills I learned during my M.S. really helped me transition into my PhD, which is focused, broadly, on petrology, geochemistry, and ore deposits.

**What do you plan to do (or hope to do) next?** This summer I'll be working a post-doc with Mark Barton at the U of A. Our plans are to publish several papers from my thesis, and also from our collaborative work in northern Chile. Later on, in early August, I'll be pulling up my tent stakes and moving to Houston, TX. I will be working there as a exploration geologist with BP. I am looking forward to the next challenge, and hopefully staying involved with research on Cordilleran magmatism and ore deposits in some capacity.



## May Member Spotlight - continued from page 5

**How many papers you intend to squeeze out of your thesis work?** Lets see... Two papers will come out soon from my work in northern Chile. One of them talks about the pattern of Mesozoic magmatism in the central Andes and how it compares to coeval magmatism in the Cordillera of North America. The other will use Hf, Nd, Sr, and O isotopes, and whole-rock major and trace elements to show how the compositions and sources of the Andean Coastal Batholith evolved through time. These studies will have implications for how we understand the mechanisms that govern continental arc magmatism and relationships between different magma compositions/sources and ore deposit formation.

Then there is the work I have done in the Mojave Desert... this will be submitted for publication soon as well, and that work focuses on a framework geologic study of the Jurassic magmatic arc in the central Mojave Desert (roughly the region between Blythe and Barstow) and links between “Kiruna-type,” “Iron-skarn,” and iron-oxide-copper-gold (IOCG) deposits. This work will show that the Mojave Desert is one of the best places in the world to study IOCGs because we can study system scale zoning of hydrothermal features over >250 km of strike across extended terrane and variable levels of crustal exposures. The Jurassic Mojave IOCG systems have not received much attention because nearly all of them were not economic to mine after the late 1880’s. Although one (Eagle Mountain) produced until the 1980’s, none are feasible today... ***Despite this, I contend that there is much to learn from the rocks whether or not they are associated with economic resources!***

I have rattled through the main papers above, but collaborative work Mark Barton, Frank Mazdab, and Gordon Haxel will result in a few more papers on topics that include Chilean IOCGs, Mojave Desert IOCGs, and Jurassic magmatism in the southwestern United States.

**What are your other interests, hobbies, talents, etc., etc?** I enjoy many hobbies. The main ones right now include tinkering on old cars (I own a 1970 VW camper), playing guitar, hiking, mineral collecting, and fishing. I also enjoy sports: football, baseball, wiffle ball, and lacrosse. I novice at cycling and I am currently training for long distances and climbing to the top of Mount Lemmon on my road bike.

I have met many great people through the AGS, and I’d like to stay in touch even after I leave town. My contact info is available at my website: [www.terracryst.com](http://www.terracryst.com).

## More Photos from the Second Annual Arizona Geological Society Doug Shakel Memorial Student Poster Event



Ann Pattison and Alison Jones Congratulating  
Themselves on No longer Being Students



Mariah Romero Points Out Where She was  
Stalked by a Bear

## **Students Who Participated in the Second Annual Arizona Geological Society Doug Shakel Memorial Student Poster Event**

- Vaden Aldridge, Graduate Student, NAU: Estimating recharge in semi-arid ponderosa pine forests using the chloride mass balance method
- Wadyum Ayyad, Undergraduate Student, U of A: Plate boundary zone deformation associated with Panama South American collision using GPS
- Deon Ben, Graduate Student, NAU: Cultural adaptations of climate change: Navajo livestock grazing practices and animal husbandry on the Navajo Nation
- S. Sarah Cronk, Undergraduate Student, ASU: (U-Th)/He geochronology of detrital grains in baked zones to date young volcanic flows
- Ada Rosa Dominguez, Graduate Student, U of A: Paleoclimate and magmatic reconstructions of sediment-hosted copper and iron-oxide copper gold deposits
- Crystlynda Fudge, Undergraduate Student, ASU: The coexistence of Wadsleyite and Ringwoodite in SAH 293: Constraints on shock pressure conditions and olivine transformation
- Meghan Guild, Graduate Student, ASU: Boron isotopic variation in the subcontinental lithospheric mantle
- David E. Haddad, Graduated Student, ASU, Effect on mechanical stratigraphy on hydraulically induced fractures in shales
- Daniel R. Hadley, Graduate Student, NAU: Analysis of geomorphic and vegetation change at Colorado River campsites, Marble and Grand Canyons, AZ
- Lily Jackson, Undergraduate Student, U of A: Lake Malawi sediment record provides clues on climate variability and response to Mount Toba super-eruption
- Angela Lexvold, Graduate Student, NAU: Testing two hypotheses on Proterozoic crustal growth in north-western Arizona using geochronology and thermobarometry analyses of metasedimentary rock
- Alejandro Lorenzo, Graduate Student, ASU: On the lower radius of exoplanets
- Megan Miller, Graduate Student, ASU: Spatiotemporal monitoring & modeling of land subsidence in Phoenix, Arizona, USA
- Jason D. Mizer, Graduate Student, U of A: U-Pb geochronology of Laramide magmatism related to Cu-, Zn-, and Fe- mineralized systems, Central Mining District, New Mexico
- Mariah C. Romero-Armenta, Undergraduate Student, U of A: Timing of exhumation of Laramide ranges in Montana and Wyoming constrained by apatite fission track thermochronology
- Simone Runyon, Graduate Student, U of A: Fe Oxide-Cu Mineralization at the Minnesota and Pumpkin Hollow Deposits, Yerington, Nevada
- Kelsey E. Young, Graduate Student, ASU: The use of handheld x-ray fluorescence (XRF) technology in unraveling the eruptive history of the San Francisco volcanic field, Arizona

### **Thank You for Your Donations to the Courtright and AGS Scholarship Funds**

Dan Laux

Don Hammer

M. C. Kleinkopf

Bruce Walker

## New Publications from the Arizona Geological Survey

(Available free, online at the [AZGS Document Repository](#))

Chenoweth, W.L., 2014, [The Geology and Production History of the Black Rock Point Nos. 1 and 3 Uranium-Vanadium Mines, Apache County, Arizona](#). Arizona Geological Survey Contributed Report, CR-14-B, 12 p.

Briggs, D.F., 2014, [History of the San Manuel-Kalamazoo Mine, Pinal County, Arizona](#). Arizona Geological Survey Contributed Report, CR-14-A, 9 p.

UPDATED Arizona Geological Survey, 2014, [Locations of Mapped Earth Fissure Traces in Arizona, v. 03.31.14](#). Arizona Geological Survey Digital Information (DI-39 v. 03.31.14), Arc GIS Layer Package.

Palmer, R., 2014, [Setting up Hyper-V 2012 Replication on Workgroup Servers: A Guide](#). Arizona Geological Survey Open File Report, OFR-14-04, 27 p.

Cocker, M.D., 2014, [Lateritic, supergene rare earth element \(REE\) deposits](#), in, Conway, F.M., ed., Proceedings of the 48th Annual Forum on the Geology of Industrial Minerals, Phoenix, Arizona, April 30 - May 4, 2012. Arizona Geological Survey Special Paper #9, Chapter 4, p. 1-18.

McLemore, V.T., [Rare Earth Elements Deposits in New Mexico](#), 2014, in Conway, F.M., ed., Proceedings of the 48th Annual Forum on the Geology of Industrial Minerals, Phoenix, Arizona, April 30 - May 4, 2012. Arizona Geological Survey Special Paper #9, Chapter 3, p. 1-16.

[Arizona Geology e-Magazine](#) will be rolling out the Spring 2014 issue the week of 28 April. The feature article will on the state of knowledge of landslides and mass movement phenomenon in Arizona.

# MAJOR

**Drilling America, Inc.**

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- Geotechnical Testing and Sampling
- Well Construction & Remediation Wells
- Discrete Water Sampling & Packer Testing
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**Contact info:** **Jon Tedrick:**  
**Nguyen Do:**

cell (320) 630-3636  
cell (801) 554-8383

[jon.tedrick@majordrilling.com](mailto:jon.tedrick@majordrilling.com)  
[nguyen.do@majordrilling.com](mailto:nguyen.do@majordrilling.com)

# ANNOUNCEMENTS

## Welcome New AGS Members

Jacob Alden	Meghan Guild	Larry Lepley	Bob Sandefur
Wadyan Ayyad	David Haddad	Alejandro Lorenzo	Mary Schultz
Michael Bierwagen	Daniel Hadley	Diane Love	Jim Scott
Melissa Boerst	Abeer Hamdan	Megan Miller	John Stitzer
Joseph Cain IV	Sky Jackson	Mary Pendleton Hoffer	Berkley Tracy
Irene Castillo	Michael Jaworski	Tony Potucek	Kelsey Young
Stephanie Cronk	Devin Keating	Simon Russell	Guang Zhai
Ada Dominquez	Mostafa Khoshmanesh	Andrea Sanchez	Megan Zivic

**Arizona Geological Society is grateful to Freeport-McMoRan Copper and Gold for their generous support of our student members!**

**Freeport-McMoRan is sponsoring student dinners for the 2014 AGS monthly meetings.**



## 2014 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 Scholarship Fund.