



# Arizona Geological Society Newsletter

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JULY 2017

## July 11, 2017 DINNER MEETING

**Who:** Andrew Zaffos is the featured speaker. See abstract below.

**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 **SABINO 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 (<http://www.arizonageologicalsoc.org/events>) by 11 a.m. Friday, July 7. Please indicate Regular (Lemon Caper Salmon), Vegetarian (Stuffed Bell Pepper) or Machaca Chicken Salad meal preference. Please cancel by **Friday, July 7 at 11 a.m.** if you are unable to attend - no shows and late cancellations will be invoiced. (Please call or text David Briggs at 520-784-3954 if you must cancel after the deadline. We may be able to sell your meal and you won't be billed).

## AGS AUGUST MEETING

**Instead of our usual August meeting, we will have mixer at the downtown Borderlands Brewery on Tuesday, August 22. There is plenty of free parking nearby. A dinner sponsor will provide food (or you can even bring your own if you have dietary restrictions). A variety of beverages, including Borderlands' fabulous beer selection, will be available for purchase. Please join us for an evening of tall tales and delicious brew. We will send out an email blast with more details to all AGS members as the plans develop.**

## ABSTRACT

### Global Tectonics and Marine Animal Diversity

Andrew Zaffos, Arizona Geological Survey

James Valentine proposed two seminal paleobiological hypotheses in 1970. First, he argued that global biodiversity, the total number of unique species, increases when continents are farther apart and decreases when continents move closer together. Second, in a separate paper, he proposed that global biodiversity began to exponentially increase during the Middle Mesozoic (~200 Ma). Putting those two ideas together, he further surmised that the breakup of the supercontinent Pangaea was at least partly responsible for this explosive growth. His first proposition was widely accepted by the scientific community because it made intuitive sense, but it was untestable with the data available at the time. In contrast, his second proposition, exponential growth, was and continues to be heavily debated despite a wealth of data. Our study was the first to quantitatively test the first proposition. In a modification of the original hypothesis, we found that while the separation of continents promotes increasing marine biodiversity, the

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collision of continents does not cause biodiversity to fall. Instead, continental collision causes diversity to plateau. This implies that Valentine was partially correct in arguing for exponential growth of diversity over time, but only when continents are fragmenting. Because we are currently entering a new period of continental collision, we should see long-term stabilization of global marine biodiversity. Furthermore, if we lose many species to extinction in the near future, the global ecosystem is unlikely to recover to current levels of diversity until the next period of net continental separation.

### ABOUT THE SPEAKER

**Andrew Zaffos** is senior research scientist at the Arizona Geological Survey and University of Arizona. His primary interest is the extinction and diversification of marine organisms. Specifically, he studies how patterns of marine deposition and erosion controlled fossil biodiversity throughout the history of complex animal life. He also studies the phenomena of niche conservatism and biogeographic conservatism in ancient marine biotas, at both regional and global scales. He is currently part of several geoinformatics initiatives - the Macrostrat Database, Paleobiology Database, the Rockd and Flyover Country social media applications, and the GeoDeepDive Library of machine-readable scientific documents - which are all working to increase the accessibility of geoscience data for the scientific community and general public.

Andrew received a B.A. in Economics from the College of William and Mary. He then saw the light and switched to the geological sciences. He received an M.S. in Geology at the University of Georgia, a Ph.D. from the University of Cincinnati, and was a postdoctoral fellow the University of Wisconsin in Madison.



### THE AGS EXECUTIVE COMMITTEE NEEDS YOU!!!!

**AGS Past President Don Applebee is heading up a nominating committee for AGS officers and Councilors for 2018. Please consider stepping up to help the Society as we further our mission of promotion and encouragement of the interest in the science of geology and in the geology of the State of Arizona. It's fun and rewarding. Some jobs require more time than others, and Don or David Briggs (our current President) can help you figure out which jobs would be appropriate for your situation. The Executive Committee meets once a month (usually on a Thursday at 6 pm) and if you cannot attend in person, you can all in, although you won't be able to partake in the FREE PIZZA!! (Did I say FREE? Yes I did!). You can reach Don at [dapplebee@asarco.com](mailto:dapplebee@asarco.com) to discuss the possibilities.**

## MEMBER SPOTLIGHT: SARAH BAXTER



Sometimes the scenic route is also the most interesting. Sarah Baxter would tell you that her career path has certainly been a journey. AGS Member and Executive Committee member Sarah Baxter was born in Torrance, California. She attended University of California, Davis, where she received a BA in Political Science and California State University, Sacramento where she received a BA in Government. After working for 4 years in a San Francisco law firm in tax controversy and bankruptcy law, she decided it wasn't for her. She ended up studying at Portland State University, School of Civil/Environmental Engineering from 2004-2006. It was here she found that she loved geochemistry and decided to study geology. She applied to Oregon State University where she studied Economic Geology under Dr. John H. Dilles. After 5 years in the mining industry, she enrolled at University of Arizona where she earned her Professional Science Master's degree in Economic Geology. Sarah lives in Tucson with her husband, ASARCO geologist Don Applebee, and her dog, Petra. She works for the US Forest Service at the Coronado National Forest Supervisor's office.

In college Sarah was a social activist (she worked on several political campaigns) and a rower. In September she plans to hike down the North Rim of the Grand Canyon, down to Ribbon Falls and back in one day. For her 42nd birthday she will hike the Rim to Rim in the Grand Canyon.

### **How did you first become interested in geology?**

When I was a kid my dad had a placer gold claim in San Bernardino National Forest from 1978-1991. We would always go "hunting for rocks" as a kid. I have vacationed and camped my entire life off of Forest Service roads where my Dad would go rock hunting and prospecting. And we would shoot guns at night.

### **What was your first job as a geologist?**

I was recruited and hired by Freeport McMoRan Copper and Gold before I graduated from Oregon State University. I interviewed in April in Tucson and in less than 48 hours the offer letter was sent to my parent's house in Tigard, Oregon. I was so excited. I was hired by the Exploration office in Oro Valley in the brown-fields exploration group. However, I never worked out of that office because my first assignment was to help with near minesite exploration at the Morenci Mine, Morenci, Arizona. I helped log drill core during the 2008-2009 exploration campaign. When I was in Portland for Christmas in 2008 and copper hit a low of \$1.23. I remember telling my parents that maybe I wouldn't fly back to Arizona because I probably didn't

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have a job anymore. Boy was I right! A federal WARN Act was filed in January 9, 2009 and the exploration department at Morenci was cut by 70%. I was one of those laid off. However, it was the best thing that FMI could have ever done for me. Within 4 months I was hired to work in Alaska to do grassroots exploration in the Alaskan interior at a helicopter-supported reconnaissance project by Pathfinder Mineral Services that was working solely for Sumitomo Metal Mining trying to find the next Pogo Mine (I got to work at Pogo too!). I commuted to work every day by helicopter. It was the best job I ever had in Geology (next to my current job with the Forest Service).

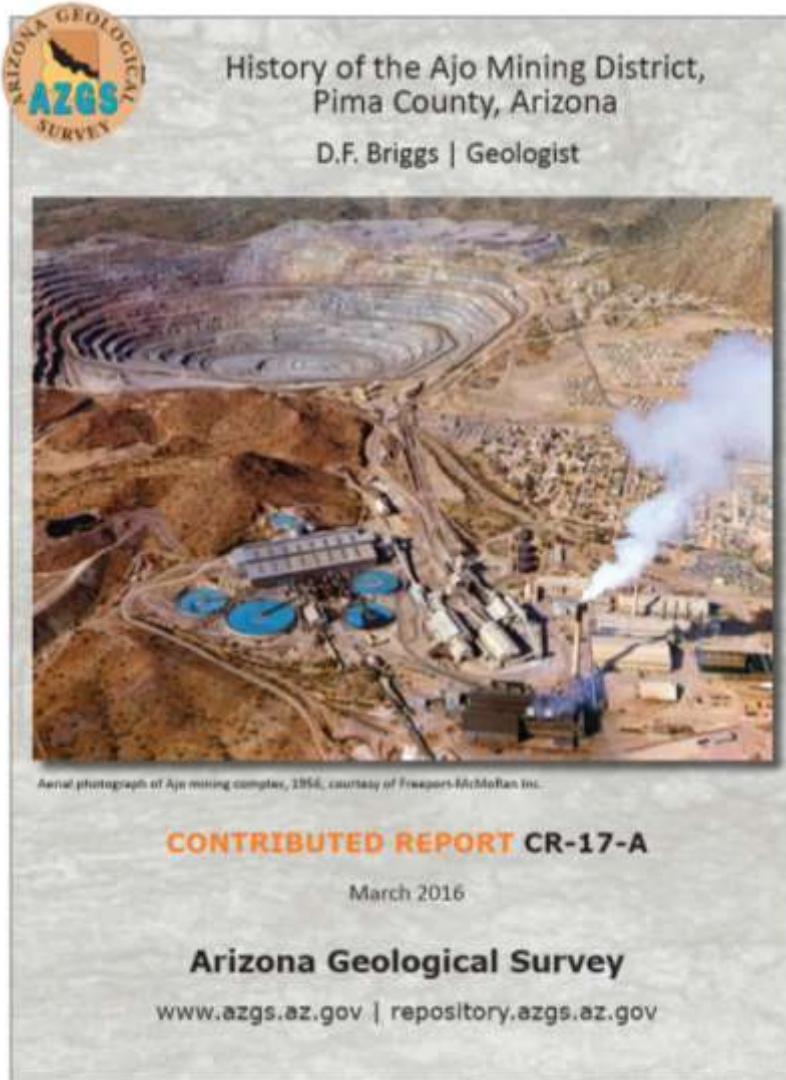
### What are your hobbies?

Rocks, going “jeeping” in my 1997 Jeep Wrangler, hiking with Petra, and wine tasting with Don. I would like to get back into rowing. I was an NCAA Athlete in college. I earned my varsity letter in Women’s Rowing at both Sacramento State (1998) and UC Davis (1999). There is just one problem. Where do you find enough water to row on in Southern Arizona?!

**Right: Sarah at the Rosemont Copper Project**



**Sarah (standing, far right), gold medalist rower with her team from Sacramento State in 1997.**



Kudos to **AGS President David Briggs** and the **Arizona Geological Survey** for this recently-issued report on the Ajo Mining District. As described on the AZGS website, “The hostile environment of southwestern Arizona’s low desert presented many challenges to those who sought to discover and exploit the mineral wealth of the region. Ajo’s remote location combined with hot summer days and scarce water created a number of obstacles that needed to be overcome. Despite these impediments, the district’s wealth was mined by Native Americans long before the arrival of first Spanish explorers, who recognized its potential soon after establishing outposts in this region. Many years passed before mining professionals with the knowledge, skills and financial backing achieved commercially viable copper operations at Ajo. Application of new technologies and mining practices enabled them to develop Arizona’s first large copper operation to successfully employ open pit methods.”

You can download the entire document from this link:

[http://repository.azgs.az.gov/uri\\_gin/azgs/dlio/1710](http://repository.azgs.az.gov/uri_gin/azgs/dlio/1710)

### FALL FIELD TRIP!

We are in the preliminary stages of working on a multi-day field trip to Jerome, AZ in the fall. Stay tuned!

Please contact the AGS Secretary if you are interested in advertising in this monthly newsletter.



### Copper Triangle Mining Services

160 West Main St., Superior, AZ 85713  
520-689-5200 [www.carlin-trend.com](http://www.carlin-trend.com)

Claim Staking & Claim Staking Supplies  
Soil Sampling—Surveying Supplies  
Geology & Drafting Supplies  
Temporary Employees in All Fields

## Scholarship Contributions

Last year we were switching over our accounting system. In the process, we failed to acknowledge in this newsletter the following generous donors to our scholarship funds:

**Richard D. Jones, Bob Powell, William J. Elliott, Scott Manske. Thank you!**

**Arizona Geological Society is grateful to Freeport-McMoRan, Inc. for their generous support of our student members! Freeport-McMoRan sponsored student dinners for the 2017 AGS monthly meetings.**



## 2017 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

YOU CAN RENEW OR SIGN UP as a new member and pay online. Please go to our website, [arizonageologicalsociety.org](http://arizonageologicalsociety.org). Or use the form below if you are more comfortable with the old school approach.

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.