



GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Room 107, Reno, NV 89512
(775) 323-3500 - Hours Tuesday -- Friday, 9 a.m. to 4 p.m. Monday by appointment.

Website: www.gsnv.org • E-mail: gsn@gsnv.org



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CALENDAR OF GSN EVENTS

Nov. 8, 2018
THURSDAY
(NOTE 2nd
Thursday
this month!)

SO. NEVADA CHAPTER MONTHLY MEETING (NOTE 2nd Thur. this month)

The monthly meeting will be held at the Las Vegas Natural History Museum, 900 N. Las Vegas Blvd. Pizza & beer at 5:30 pm, Talk at 6 pm. **Speaker: Dr. Jean Cline, UNLV Emeritus Professor. Topic: To Be Announced. Food & Drinks sponsored by MINE DEVELOPMENT ASSOCIATES.** Contact Joshua Bonde for more information. Josh's email is: paleo@lvnhm.org. Details on page 6.

Nov. 14, 2018
THURSDAY

WINNEMUCCA & ELKO JOINT CHAPTER MEETING in Battle Mountain!!

This 8th annual joint Chapter meeting will be held at the **Battle Mountain Civic Center**, 625 S. Broad St., Battle Mountain NV. Drinks at 6:00 pm, Food at 6:30 pm, Talk at 7:15 pm. **Speaker: Gregory French, Nevada Copper, Inc. Title: "Pumpkin Hollow: Nevada's Next Copper Mine". Food, Drinks and Busses Sponsored by: NEWMONT MINING & BARRICK GOLD.** For more information please contact Nate Wright in Elko at: Nathan.Wright@Newmont.com or Matt Fithian in Winnemucca, Matthew.Fithian@ssrmining.com. Details and abstract on page 7.

**Joint
Meeting!**

Nov. 16, 2018
FRIDAY

GSN MEMBERSHIP MEETING (held 3rd Fridays)

The GSN meeting will be held at the Reno Elks Lodge, 597 Kumle Lane, Reno, Nevada. Social hour begins at 6 pm, Dinner at 7 pm and talk at 7:45 pm. **Speaker: Dr. Philipp Ruprecht, UNR Professor. Title: "Lessons learned for crustal magmatic systems from an volcanically-active area in the Chilean Andes". Drinks sponsored by RUEN DRILLING.** Please send dinner RSVPs to Laura Ruud at: gsn@gsnv.org. Details on page 3.

Dec. 12, 2018
WEDNESDAY

GSN CHRISTMAS MEETING!

SAVE THE DATE FOR THE GSN CHRISTMAS MEETING, SILENT AUCTION & RAFFLE!! PLEASE DONATE RAFFLE & AUCTION ITEMS TODAY!



The GSN's annual Christmas meeting and Foundation Fundraiser will be held at the Nugget Casino Resort, Sparks, Nevada. **Speaker: Scott Werschky, Miner's Lunchbox. Topic: Collecting gold specimens. Please make reservations for dinner with Laura Ruud, by emailing gsn@gsnv.org. 775-323-3500. Drinks sponsored by ENVIROTECH DRILLING!!**

G.S.N. NOVEMBER MEETING SPONSOR



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FROM THE PRESIDENT
Richard Bedell, GSN President 2018-2019
NOVEMBER 2018

I think one of the most interesting facets of doing economic geology is that it tests all your geologic skills. As practicing geologists we should all be looking to further our education through journals, lectures, and short courses. In Nevada we have all benefited from great information on general geology including regional structure, stratigraphy, and igneous activity.

In October the GSN field trip was almost pure volcanology of the Mono Craters and Long Valley Caldera. Thank you, Dennis Bryan, and Laura Ruud for making this happen with great success! Importantly, the lifetime work on the area by our main guide Steve Lipshie was just published by GSN as a one-off guidebook. This is a massive guidebook of the area and is extremely well documented. I think most GSN members will want a copy of this to explore this recent volcanic area, that includes great scenery, skiing, fishing, hiking, an active geothermal system and a late Quaternary gold deposit.

To continue our volcanic theme the November speaker will be Phil Ruprecht from UNR who teaches igneous petrology and will speak on Chilean volcanism with some comparisons to Nevada. Understanding how to interpret volcanic edifices and their plutonic sources is critical for understanding most ore deposits in Nevada.

For a GSN field trip in the 1990's, the guidebook contained a new paper by Dave John, Larry Garside and Alan Wallace, beginning to correlate the oxidation state and arc versus intracontinental settings of Miocene volcanics in Nevada with types of epithermal ore deposits. The arc volcanics were andesitic and more hydrous and therefore had a higher oxygen fugacity and hosted most of the high to intermediate sulfidation systems in Nevada. Whereas the continental volcanism was more bimodal and drier with a lower oxygen fugacity begetting low sulfidation epithermal gold systems (John, D.A., Garside, L.J., and Wallace, A.R. 1999, *GSN Special Pub. No. 29 Magmatic and Tectonic Setting of Late Cenozoic Epithermal Gold-Silver Deposits in Northern Nevada. With an emphasis on the Pah Rah and Virginia Ranges and the Northern Nevada Rift*). This was a huge breakthrough in relating specific volcanism to specific deposit types. I remember reading this on the bus during the GSN field trip and being rivetted. This evolved into Dave John's benchmark paper in SEG (John, D.A., 2001; *Miocene and Early Pliocene Epithermal Gold-Silver Deposits in the Northern Great Basin, Western United States: Characteristics, Distribution, and Relationship to Magmatism, Econ. Geol. Vol. 96, pp. 1827-1853*), but we saw it first in a GSN guidebook.

A fundamental understanding of volcanism and plutonism is of great importance and the Great Basin is host to some of the most spectacular examples globally. The Eocene to Oligocene magmatic sweep is a very impressive continental scale igneous feature that has been related to many Carlin-type deposits.

In February John Muntean will give the GSN talk based on his recent SEG publication Diversity of Carlin-style Gold Deposits; Reviews in Economic Geology volume 20. In Nevada the spatial and temporal association with Eocene magmatism is inescapable.

Yes, understanding and keeping abreast of the literature and new concepts in volcanism and plutonism is critical for many of us. Don't go stale, participate in GSN field trips, talks and seminars, and engage in the general geologic literature.

Richard Bedell
GSN President

The G.S.N. wishes to thank BOART LONGYEAR
for sponsoring the GSN's October 19th meeting in Reno!



GSN MEMBERSHIP MEETING—NOVEMBER 16, 2018



SPEAKER: Dr. Phil Ruprecht, Professor, University of Nevada, Reno

TITLE: "Lessons learned for crustal magmatic systems from an volcanically-active area in the Chilean Andes"

Social Hour begins @ 6:00 p.m.; Dinner @ 7:00 p.m.; Talk starts @ 7:45 p.m.

Location: Reno Elks Lodge, 597 Kumle Lane , Reno, NV

(across from the Convention Center)

Dinner Cost is \$25.00 per person

Reservations due by 11:00 a.m. on WEDNESDAY, NOVEMBER 14TH!!

For dinner reservations, please email gsn@gsnv.org or call 775-323-3500

(You will be invoiced if you do not cancel your reservation by Thursday)



"Lessons learned for crustal magmatic systems from an volcanically-active area in the Chilean Andes"

Philipp Ruprecht, UNR

Magmatism in Nevada over the past ~ 50 Myrs is frequently compared to Miocene to Holocene magmatism in the Chilean Andes. Crustal thickening and the growth of subvolcanic magmatic systems make both areas end-members of continental arcs. In Nevada most volcanic systems are largely eroded and have given way to the exposed upper and middle crustal plutons. This contrasts with modern Chilean Arc, which documents the heterogeneity and diversity of the volcanic record and which is the complementary record to the storage regions that ultimately become plutonic arc crust.

In this presentation I will summarize work we have done in an area in the Chilean Andes (the region of Descabezado Grande Volcano-Cerro Azul; ~ 35.5°S) over the course of more than 10 years. This area is among the most volcanically-active areas in the entire Andean Cordillera; both in terms of volume and magma diversity. The temporal and spatial distribution of active volcanic centers suggests large diversity within the magmatic storage regions that is inconsistent with predominantly uniform plutons that represent the final stages of these arc systems. Thus, it remains a challenge to connect the observations we have from active magmatic systems that show drastic changes over hundreds to thousands of years with the plutonic record that commonly resolves time scales of tens of thousands to millions of years.

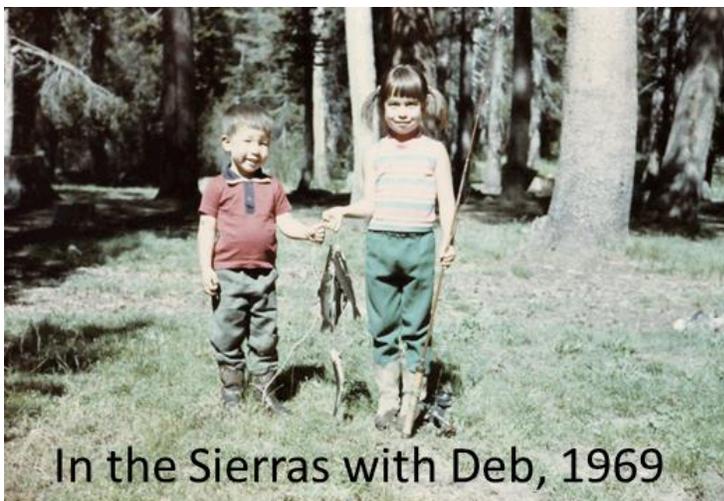
“FACES OF GSN”

Mike Ressel, Reno, Nevada

I consider myself lucky more than I consider my life and career part of a well-crafted plan. I would not have it any other way. I do what I generally like to do, and always have, and I'm thankful for that, realizing not everyone has that privilege. I'm fortunate just to be in the U.S. in the first place, having parents who as kids, grew up too fast during WWII, not here, but in Germany, the other in Japan. I am the product of the “Axis Parents”, as my high school friends joked. There's much more to my parents' remarkable stories, but that isn't for here. Rather, my story is much less exciting but probably typical of many whose parents came here on a wing and a prayer – things commonly have a way of working out given enthusiasm, hard work, and an open mind. Strangely, my dad wound up in the U.S. Air Force, which I think accepted nearly everyone including one German kid ‘fresh off the boat’ as it were in the late 1950s as war began to brew in SE Asia.

The AF was how my dad met my mom, while he was stationed in Japan for several years. It's that life that my sister, Deb, and I knew as kids growing up in many places. There wasn't much better early preparation for an exploration geologist than being an AF brat. I got to see a lot of geography, but most importantly, I was eager to move, see new things, meet new people, and I became adaptable to change. As they say in Texas and elsewhere, “Stick around 5 minutes, the weather will change.” So has been my life's experience. What does this have to do with geology? Really not much, but, I continue. My parents took my sister and me on camping trips about every other weekend during the warm season. It seemed that travel for the AF wasn't enough. Probably being new to the country, and not as socially attached like the natives, they took it upon

themselves to explore. My earliest rock memories, at age 3 or so, are of a gushing Yosemite Falls, glowing stalactites at Carlsbad, dinosaur bones in Colorado, and a ‘diamond’ embedded in tan rock of a Utah lakeshore. The latter, which likely was a large bipyramidal quartz phenocryst in the Keetley Volcanics, fixated me as I tried to pry it loose while dad slowly pulled the trailer away from the campsite. I never got it, and for a long time after, I thought about that perfect diamond. I over-tell this story, but one possible defining moment of why I became a geologist was in 2nd grade, when my grandparents returned home from a Highway 66 road trip toting many polished stones in plastic containers from national park gift stores they encountered in their travels. The next day in Show-n-Tell, I lied through my teeth (or, did I have front teeth then?) of the names of rocks I had in my collection. Many of my fondest memories growing up were of being outdoors. Even when not camping, my parents let me roam, and as long as I was back for dinner, there wasn't much fuss. I feel lucky to have been raised at a time when that was okay.



In the Sierras with Deb, 1969



“Oh, what a feeling!”, Tasiast, Mauritania, Africa 2010 (Kinross)

My dad took college classes at night for many years. My favorite text on his bookshelf was Longwell's Physical Geology, which I now have on my shelf. That book helped me choose geology as a major on entering college. Cal Poly Pomona, where I went to college, had 6 dedicated faculty (Berry, Herber, Jessey, Klasik, Rossbacher, and Tarman) and about 10 geology majors in my class. Teaching was the focus. We spent a lot of weekends running field trips to the Mojave Desert, coastal California, and the San Gabriel Mountains, which were only short drives away. I have to say that as much as I loved geology then, I realized at Cal Poly (“Cow Patty” as it's affectionately known, being a land-grant college like UNR), that there was a lot of geology that I just didn't understand. I remember upon graduation a few people joking that they'd never hire (cont. on page 5)

geologists from California, because geos from there always made things too complicated. There is some truth to that. On the geology bulletin board at Cal Poly, among many flyers for environmental and hydro jobs, was a lone black-and-white flyer promoting jobs on the Carlin trend, the new gold rush – the flyer had an image of tents on the interstate, and best I could tell, if I took that opportunity, I would be living in one! I chose a geological engineering job instead, working for 5 years out of a slick office in Long Beach, California and thinking that that there had to be more ‘geological’ jobs than this one. I sometimes wonder what would’ve happened had I taken the job sitting rigs on the Carlin Trend. Probably, I would’ve found Meikle, or more likely, been run over by a semi in that tent city! In 1992, eager to get back to ‘real’ geology, I left Long Beach with Maggie for Reno. Bob Watters was in the Mackay geology office one hot July day when we arrived. I mentioned to him that I applied for grad school but hadn’t heard from the school. Bob, kindly and without hesitation, enrolled me on the spot with a nod and a handshake, and probably an unspoken ‘good luck, man’. Mac-



kay had a bunch of unconventional students at the time, many having worked in the mining industry. It made an ideal setting to learn from peers and from professors, Hibbard, Hsu, Larson (“LT”), Noble, Schweickert, Thompson, and Trexler, and from affiliated faculty: Henry, Garside, Connors, Castor, Bonham, Wallace, Desilets, Lechler. Don Noble was my advisor over many years during my MS and PhD – he didn’t so much advise or manage students, we were mostly on our own, but he did teach us, by brute force as he would say, and the field was our laboratory, not the other way around. For a mutual liking of things igneous, Chris Henry got me through the final hurdles at Mackay long after I had begun working for Newmont, and he did manage. Chris says I was his best grad student, and I counter that I was his only grad student.



My first real job in mining was as ‘beat’ geologist in the +1 oz/ton (Au, that is) Deep Star mine in the Carlin Trend. Working underground during a time that predated bolting machines was great fun. Deep Star was a 100% visual ore control mine, which meant you mined and shipped ore long before muck assays came back, and because we were always right, engineers and miners grew uncharacteristically fond of us geos, except when we pushed the mine way past the block model. Several mines followed, as did near-mine exploration. Twin Creeks was also a mostly visual ore control mine, at a giant, open pit scale; we geos devised ways that we could demonstrate the value we added, by mining ore in waste polys and vice versa, after material had moved due to blast heave – the monthly realized value was in the millions of dollars. The work was satisfying, useful, and fun, as was mapping every bit of high wall, modeling the geology in 3D, then targeting drill holes based on projections of the model. Such work is every bit scientific but often stigmatized as less so perhaps because the hypotheses are imminently testable and answers good and bad come fast. Eventually, I was weaned from the mine setting and did district-wide exploration, such was the progression at Newmont at the time, and I think a good model for how it should be. At Newmont, also at Kinross and Victoria Resources, I was able to spread my wings, working regionally in the Basin and Range, then Australia, Africa, Canada, Mexico, and Alaska on utterly raw recon through advanced projects as well as snooping on other explorers. Remote camps were the norm in these far-flung outposts, and such work brought on a (cont. on page 6)



Faces of GSN, Ressel (cont. from page 5)

plethora of geological and logistical challenges unheard of in the Great Basin; paradoxically, these projects demanded exceptional teamwork and individualism alike, and commitment. Through it all, I'm fortunate to have worked with, learned from, and befriended so many good, industrious, and resourceful people, geo-oriented and not.

We Ressels have been in Reno for 26 years. Maggie would say that she's been in Reno 26 years, and I've been here maybe half that. We've grown fond of Reno, our kids, Anna and Chris (both 25), and Peter (16), were born and raised here, and we love Nevada. After lots of stomping around in other states, countries, and continents, I have to say few things are as satisfying to me as coming home to Nevada, hanging with GSNers, and the ease with which good geology and exploration are accomplished here. I've been at NBMG for four years, and in some respects have come full circle, arriving back to my academic roots at Mackay. My work at the Bureau is diverse, practical, and satisfying, and my end goal remains the same: to contribute to Nevada's success by doing work readily useful to others. I like mapping, teaching, and collaborating on applied Nevada research, the latter with terrific students and industry cohorts. I still explore, only now with a wider brush and fewer air miles. How lucky I am to be here.



GSN SOUTHERN NEVADA CHAPTER MEETING

THURSDAY, NOVEMBER 8, 2018 (note 2nd Thursday this month!)

Location: Las Vegas Natural History Museum, Africa Hall

900 Las Vegas Blvd. North, Las Vegas, NV

(please park behind the museum)

Time: Pizza & Drinks @ 5:30 p.m. with Talk to follow

**Speaker: Jean Cline, UNLV Emeritus Professor
and GSN Honorary Lifetime Member**

Topic: To Be Announced

Food & Drinks Sponsored by:

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**MINE DEVELOPMENT
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Cost: \$5 donation for non-students, Student GSN members Free!

GSN ELKO & WINNEMUCCA CHAPTERS' 10th JOINT MEETING!

THURSDAY NOVEMBER 14, 2018

Location: The Battle Mountain Civic Center

Time: Drinks-6:00 p.m.; Food served at 6:30 p.m.—Talk @ 7:15 p.m.

Speaker: Greg French, Nevada Copper, Inc.

Title: “Pumpkin Hollow: Nevada’s Next Copper Mine”

Food and Drinks Sponsored by:



ABSTRACT:

Pumpkin Hollow: Nevada’s Next Copper Mine

by Greg French, Hank Ohlin and Korin Carpenter
Nevada Copper, Inc.

The Yerington mining district, Lyon County is the oldest copper mining district in Nevada. The Pumpkin Hollow property has been known to geologists since the 1960's. It is a cluster of large magnetite-rich copper skarn deposits located in the southeastern part of the district. The deposits are hosted by Triassic sedimentary rocks intruded by the Jurassic Yerington batholith. Great Basin extension has dismembered the batholith, country-rock and post-mineral Tertiary rhyolite tuffs resulting in plus ninety-degree westward-rotation along normal faults. The Pumpkin Hollow deposits are completely blind with a cover of alluvium and Tertiary age rocks.

Since discovery in the 1960's majors, juniors and Nevada Copper have drilled over 1.2 million feet. The open pit reserve is 572 million tons grading 0.47% copper equivalent containing 5.0 billion pounds of copper, 761 thousand ounces of gold, and 27.6 million ounces of silver. The underground reserve is 23.9 million tons grading 1.74% copper equivalent containing 759 million pounds of copper, 153 thousand ounces of gold, and 3.3 million ounces of silver. There is also a large open-pittable iron (magnetite) resource stand at 235 million tons at 30.7% Fe. An equally large, if not greater, iron resource is present at depth.

In the early 1960's US Steel successfully used magnetic surveys to target and intercept thick zones of magnetite mineralization. Their first hole was very successful intercepting 858 feet averaging 45.5% iron and 0.18% copper, and bottomed in ore!

The property has a long history of continued exploration and resource expansion. During the 1970's Anaconda picked up the property. Re-logging relevant core they were able to locate skarn breccia-hosted, copper mineralization on the west edge of a large magnetite body. In 1980, Conoco successfully used skarn mineral zoning and the marble-front model to verify large high-grade underground copper resources. This was followed by pre-development programs by Plexus, Cyprus and Taurus from 1981 through 1999.

In 2006, Nevada Copper acquired the property and started drilling and expanding the resource. Integrating the large amount of drill data with the previous operator's observations, the district model of Proffett and Dilles, and a 'critical mass' of new drilling has developed a working geologic model. Pumpkin Hollow is dominated by skarn and calcic-sodic alteration of the early monzodiorite phase of the batholith. The monzodiorite serves as a major host for magnetite mineralization. Late stage quartz monzonite porphyry and andesite dikes are spatially related to mineralization, similar to the Yerington porphyry copper deposits. Multiple episodes of brecciation and replacement dominated by magnetite with subordinate calc-silicates, calcite and sulfides are present in the ore zones. The sulfides are dominated by pyrite, chalcopyrite, and pyrrhotite with molybdenite, minor bornite, sphalerite and rare galena. Typical intrusive-country rock relationships of contact metamorphic deposits are present but sill-like geometries of monzodiorite along the lower contact of the Mason Valley Limestone explains the large size of the Pumpkin Hollow skarns. Several different styles of copper-iron mineralization are present in the deposits;

- massive magnetite-chalcopyrite endoskarn bodies with IOCG affinities
- multiple stages of skarn breccia with several stages of copper mineralization in hornfels, endoskarn or magnetite skarn
- marble-front with endoskarn (-magnetite) in contact with dolomitized marble (-talc)
- stratiform copper mineralization disseminated in magnetite along and below a marble-endoskarn sill contact
- garnet skarn bodies with disseminated sulfides
- fracture-controlled skarn veinlets in hornfels
- arcuate shells of skarn zones with disseminated sulfides in hornfels above endoskarn and monzodiorite

In the early 2000's the academic world recognized fingerprints of the IOCG deposit model at Pumpkin Hollow.

The model explains Pumpkin Hollow's extreme abundance of magnetite, and some of the alteration and geochemical features which are unusual for porphyry-associated skarns.

Nevada Copper is currently deepening the 24' diameter vertical production shaft, commenced sinking a 12' diameter ventilation shaft, and constructing a 5,000 ton per day flotation mill. The long road to development has followed commodity price swings, corporate 'lane changes', and the evolution of geologic models that continue to find new targets and intercept ore.

GSN FOUNDATION

News from the GSN Foundation

Cami Prenn, Chair

I have been shocked to see Christmas decorations in the stores already! But it's a reminder to me that we have just a few short weeks to plan for GSN's December meeting and raffle/silent auction/auction. The meeting – the Christmas party – will be December 12th at The Nugget. The format will be the same – raffle and silent auction set up in the west part of the Rose Ballroom with drinks and appetizers, then dinner and talk in the east side of the Ballroom. Our speaker is Scott Werschky who will be talking about collecting gold specimens. With luck, we'll have a few of those to auction.

With your help we'll have a great selection of raffle and silent auction items. Please think about what you'd like to win and donate a prize. We've had some really unique and beautiful items in past years that span every category you can imagine! Items can be dropped off at the GSN office and at Mine Development's office or you can call me to pick up your gift; cami@mda.com or 775-856-5700.

We have a new scholarship fund that was generously started and funded by DD LaPointe and Tom Irwin. It's called the GSN – D.D. LaPointe Scholarship and will be awarded to a UNR student studying economic geology, either to a graduate student or to a very focused undergraduate. The Foundation will be administering that scholarship starting this year. Donations can be made to the fund by anyone and we would greatly appreciate any and all contributions.

Happy Thanksgiving everyone! We hope to see everyone at the Christmas party.

Donate auction items today!



Thank you to our generous sponsor for the Elko Chapter's OCTOBER MEETING!



GSN UNR SCHOLARSHIP AWARDED

The University of Nevada's College of Science held their annual Scholarship Luncheon on Tuesday, October 30th in the ballroom of the Joe Crowley Student Union on the UNR campus. Cami Prenn, GSN Foundation Chair, and I were honored to attend this event and very pleased to meet this year's recipient of the GSN's scholarship awarded to a Mackay School of Earth Sciences and Engineering undergraduate each year. Riley Marie Cromie, a Geological Engineering Junior, received the scholarship. She hopes to graduate in December 2019.

Jeff Thompson, Dean of the College of Science, announced that over 200 students in the college were awarded about \$500,000 worth of scholarships for the 2018-2019 school year. We extend our congratulations and support to Riley as she works towards her degree!

Also, we want to again thank ALL of you GSN members who have so generously donated to the GSN Foundation! Your donations go directly to students like Riley to help them with their college expenses and also helps K-12 students get outside on field trips and experience earth science first hand.

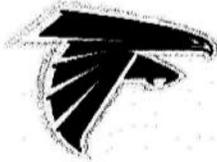


Riley Cromie and Cami Prenn

Thank you to our generous Sponsor for the Winnemucca OCTOBER MEETING!



Below is just one of the many thank-you letters that the GSN Foundation receives each year. Your donations to the GSN Foundation make it possible to fund the transportation costs for MANY K-12 earth science oriented field trips every year. Thank you AGAIN!



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October 11, 2018

Cami Prenn
2175 Raggio Parkway, Room 107
Reno, Nevada 89512

Dear Ms. Prenn:

The sixth grade teachers at Fernley Intermediate School would like to thank the Geological Society of Nevada for their generous donation for our field trips to Grime's Point, Hidden Cave, and the Nevada Wonder Stones. This enabled all twelve of our 6th grade classes, a total of 323 students and teachers, to benefit from this educational trip.

Our field trips were taken on May 14, 16, 17, 24, 29, and 30 of 2018. Our School does not have the funding available for field trips, so we truly appreciate this donation. In fact, this is the only field trip that our students took this year.

Each year we look forward to this trip as most of the students have never been to Grime's Point or to see the Wonder Stones, so it is a new experience for them. This outdoor trip enables students to see tufa, basalt, wonder stones and hike the beautiful Nevada desert. We always take the ½ mile hike to the top of the hill overlooking Stillwater and Fallon in the distance. The guides for Hidden Cave do a very good job teaching the geology of the area.

This trip also supports the common core units in earth science and the study of geology, as well as, our social studies unit on prehistoric and Native American cultures.

With the current budget there are no funds available for us to take our students on this worthwhile trip. This trip in the Nevada outdoors lets students to be able to hike the trails and learn about and observe the remnants of ancient Lake Lahontan and is a wonderful experience for all.

Thanks again for your continued support of our staff and students here at Fernley Intermediate School.

Thank you to our generous donors in October!

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(This fund covers the registration costs for college students who wish to go on the GSN field trips each year)

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G.S.N Fall 2018 Field Trip Another Success

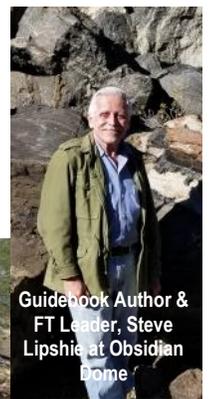
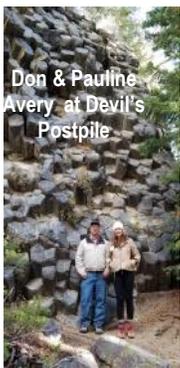
By Dennis Bryan, GSN VP and Field Trip Leader

Thanks to our always outstanding sponsors and participants of the GSN 2018 fall field trip which took place in early October. "Shaped by Fire and Ice", another success story to add to GSN's vast array of notable field trips. Our sponsors for the trip were:

BOART LONGYEAR, ENVIROTECH DRILLING, NATIONAL GOLD MINING, KINROSS GOLD, AMERICAN ASSAY LABORATORIES, EDM SOLUTIONS and ALS MINERALS!

The field trip to the Mammoth Lakes – Long Valley area turned out to be just what those road trip disadvantaged, recent volcanic-deprived geologists ordered. We saw some of the youngest rocks on the planet, lots of obsidian and pumice and volcanic domes, what rocks look like when two magmas mix, witnessed what is left behind when glaciers melt, spent some quality time examining that unique columnar jointing in the Devils Postpile National Monument, and learned there was more in the area than we had time to see. We even got snowed on briefly late one day (at 9,000 feet elevation). Otherwise the weather was great and the scenery spectacular.

Thanks especially to Steve Lipshie, guide extraordinaire, for leading the procession of vans and pickups to the various sites visited. The inspiration for the field trip was GSN's recently published "Geologic Guidebook to the Long Valley – Mono Craters Region of Eastern California" by Steven R. Lipshie. Thanks also to Gene Suemnicht who presented an interesting program on geothermal exploration and resources of the Long Valley area one evening. Thanks to the Stewart Indian School for showing off their beautiful native rock buildings constructed in the early 20th century in Carson City by students at the facility. Thanks to Zach at U.S. Pumice for providing us some really neat pumice samples. Thanks to the folks at Devils Postpile National Monument. And thanks also to the van drivers, and to Laura Rudd for all the logistics she had to juggle to make the trip successful. Oh, and Dennis Bryan originally suggested such a trip and helped to organize it in such a way as to not miss a thing worth seeing (at least that was the original intention but alas, we didn't see everything but at least you all now have the "Guidebook" so you can return and see the rest if you are so inclined).



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Geological Society of Nevada, Elko Chapter:

SCHOLARSHIP OPPORTUNITY



WHO: This opportunity is for any graduate or undergraduate student who intends to pursue or is currently involved with a research topic related to Nevada geology or regionally related to Nevada geology.

WHAT: The successful applicant will be awarded a tuition scholarship in an amount between \$500 - \$1,500 depending on tuition needs.

WHEN: We will be awarding this tuition scholarship for the 2019 spring semester with a submission deadline of **January 31st**, 2019.

WHERE: Any undergraduate or graduate student with a project that involves Nevada-related geology is eligible to apply for this tuition assistance. Preference will be given to economic geology associated projects within Northern Nevada, but this is not necessary.

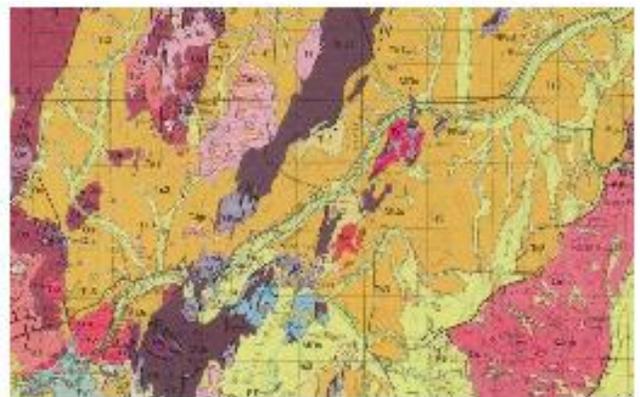
WHY: The successful applicant upon completion of their research will be invited give back to GSN Elko in the form of a technical presentation at one of our regularly scheduled meetings to present your research.

HOW: Please submit an application to GSN Elko Executive Committee via mail, email, or online and you will be contacted as opportunities are formalized.

Applications can be found on-line here: <http://gsnv.org/chapters/elko.php>

For more details or to send in applications:
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P.O. Box 2591
Elko, NV 89803-2591

Or email –
Chelsea Raley, Secretary
craley@barrick.com



Mineral discoveries in the Galapagos Islands pose a puzzle as to their formation and origin

Date: October 22, 2018; Source: Johannes Gutenberg Universitaet Mainz

Reprinted from Science Daily Online—<https://www.sciencedaily.com/releases/2018/10/181022122807.htm>

The Galapagos archipelago is one of the most famous groups of islands in the world. Many of the animal and plant species are unique because of the islands' isolated location in the Pacific, 1,000 kilometers off of the coast of Ecuador. Thanks to a recently-signed special cooperation agreement, geoscientists based at Johannes Gutenberg University Mainz (JGU) in Germany will have the opportunity in coming years to research the geological development of the Galapagos Islands. An unusual mineral has recently been discovered that raises far-reaching questions about the composition of the magma source from which these oceanic islands were formed.

The idea for the collaboration came from geologist Dr. Yamirka Rojas-Agramonte, a member of the Isotope Geology group at JGU's Institute of Geosciences. She has been studying the ages of the rocks from various islands in the archipelago since 2014 and was astounded when she suddenly came across the mineral zircon on a sandy beach. "It is extremely unusual to find zircons in basalt rock formations, such as those that predominate throughout the Galapagos," explained Rojas-Agramonte. Zircon, a zirconium mineral, is commonly used to date ancient rocks. Zircon takes in trace amounts of uranium when it crystallizes in a newly-formed rock. Over time that uranium slowly decays to lead. The ratio between the lead formed and the uranium left can be used to determine the age of the zircon and thereby its host rock.

The zircon grains, commonly less than 0.2 millimeters in size, are first investigated under the microscope in Mainz and then, if appropriate, sent to China or Australia to be analyzed using a device called a sensitive high-resolution ion microprobe. "For the purposes of so-called SHRIMP dating, we have been collaborating for many years with a lab in Beijing, the Beijing SHRIMP Center," said Professor Alfred Kröner of JGU, shortly before again departing with Galapagos zircon samples in his luggage.

Unexpected discovery of zircons in basalt rock

It has now been established that the zircon originates from young basalt rock, the main rock type that forms the Galapagos Islands. This rock is produced by volcanic eruptions such as those still occurring in the western sector of the archipelago. "Some of our newly discovered zircons are much older, however, than one would expect to find in young magmatic rock," stated Kröner. How exactly these ancient zircons got into the Galapagos basalts remains a mystery. The explanation might well have wide-ranging implications for understanding the Earth's crust-mantle system and the mantle geodynamics of the Earth. One of the current theories is that previously unexplained recycling processes might have taken place in the deep layers of the mantle.

Geoscientists at Johannes Gutenberg University Mainz and their colleagues from Spain, Australia, and Ecuador working in a wide range of different disciplines will, for the first time, be collaborating in this project in order to investigate the various hypotheses and search for further pieces of the puzzle that will help provide a solution. Over the next few years, they will be researching together on the Galapagos in a multi-disciplinary approach designed to explore a geological enigma, the significance of which could extend well beyond simply clarifying the formation of the Galapagos Islands.

The framework cooperation agreement between Mainz University and the Galapagos National Park Directorate has an initial duration of three years to the end of 2020 and will be extended by specific agreements on individual research projects. For reasons of nature conservation, there are strict controls on access to the Galapagos Islands. In addition to Dr. Yamirka Rojas-Agramonte and Professor Alfred Kröner, sedimentologist Dr. Klemens Seelos has also been permitted to work on-site. The next expedition involving representatives of the Geophysics, Volcanology, and Petrology groups at JGU is planned for June 2019. Additional partner institutions are the University of Granada, the Australian National University, and Universidad de las Fuerzas Armadas in Quito, Ecuador. The preliminary work has been financed by the German Research Foundation (DFG) and through inner-university research funding provided by Johannes Gutenberg



The island of Daphne to the north of Santa Cruz as seen from an aircraft approaching Baltra Airport. This island consists of a volcanic crater rising 120 meters above sea level. *Credit: Photo copyright Yamirka Rojas-Agramonte*

Story Source: [Materials](#) provided by [Johannes Gutenberg Universitaet Mainz](#). *Note: Content may be edited for style and length.*

University Mainz.

Activity Update

Mike Brady, September 2018

www.activityupdate.com

NEVADA

Pasinex Resources Ltd. announced that recent drill results at the Spur Project include 43.28-87.17 meters @ 14.2% Zn (SRDD18-01); 60.96-61.57 meters @ 10.8% Zn (SRDD18-02) and 88.1-90.84 meters @ 8.1% Zn (SRDD18-04). *Press Release:* September 11

Allegiant Gold Ltd. announced that recent drill results at the Eastside Project include 289.6-344.4 meters @ 0.31 gpt Au (ES-162); 365.8-416.1 meters @ 0.38 gpt Au (ES-163); 321.6-332.2 meters @ 0.34 gpt Au (ES-167) and 347.5-361.2 meters @ 0.18 gpt Au (ES-168). (resource = 35,780,000 tonnes @ 0.57 gpt Au inferred) *Press Release:* August 31

Fiore Gold Ltd. announced that based on recent drill results at the Gold Rock Project, resources aggregate 9,006,900 tonnes @ 0.82 gpt Au indicated and 7,787,500 tonnes @ 0.72 gpt Au inferred. (was 12,967,000 tonnes @ 0.75 gpt Au indicated and 17,893,000 tonnes @ 0.58 gpt Au inferred) *Press Release:* September 12

McEwen Mining Inc. announced that based on recent drill results at the Gold Bar Project, resources aggregate 24,551,000 tonnes @ 0.92 gpt Au measured+indicated and 6,827,000 tonnes @ 0.90 gpt Au inferred. (reserve = 11,900,000 tonnes @ 1.16 gpt Au proven+probable) *Press Release:* September 6

Barrick Gold Corp. announced that it would merge with Randgold Resources Ltd. through a 6.128 share Barrick/1.0 share Randgold exchange basis. (approximately 66% Barrick and 33% Randgold) (reserve @ Cortez = 167,920,000 tonnes @ 1.87 gpt Au proven+probable) *Press Release:* September 24

Pershing Gold Corp. announced that it acquired 4,235 acres of fee mineral rights and mining claims near its Relief Canyon Project from Newmont Mining Corp. for \$1,100,000. (resource @ Relief Canyon = 33,561,000 tonnes @ 0.68 gpt Au measured+indicated) *Press Release:* August 28

NuLegacy Gold Corp. announced that recent drill results at the Red Hill Project include 273.8-295.9 meters @ 6.59 gpt Au (SR18-02C). *Press Release:* August 27

Gold Standard Ventures Corp. announced that recent drill results at the Pinion/Dark Star Project include 175.3-288.1 meters @ 0.61 gpt Au (DR18-70); 80.7-202.7 meters @ 0.81 gpt Au (DR18-103); 24.4-265.2 meters @ 1.70 gpt Au (DR18-104) and 62.5-292.7 meters @ 1.87 gpt Au (DR18-105). (resource = 15,380,000 tonnes @ 0.54 gpt Au indicated) *Press Release:* September 24

General Moly Inc. announced that recent drill results at the Mt. Hope SE Project include 7.0% Zn, 7.5 gpt Ag (MH-249) and 0.91-28.04 meters @ 7.3% Zn, 15.3 gpt Ag (MH-250). *Press Release:* September 4

Corvus Gold Inc. announced that based on recent drill results at the Mother Lode Project, resources aggregate 13,226,000 tonnes @ 1.72 gpt Au measured+indicated and 2,168,000 tonnes @ 1.60 gpt Au inferred. (was 8,545,000 tonnes @ 1.57 gpt Au inferred) *Press Release:* September 18

Contact Gold Corp. announced that recent drill results at the Pony Creek Project include 100.0-149.36 meters @ 0.64 gpt Au (PC18-28); 88.39-123.45 meters @ 0.34 gpt Au (PC18-29); 92.97-128.02 meters @ 0.39 gpt Au (PC18-31) and 41.15-92.97 meters @ 0.31 gpt Au (PC18-33). *Press Release:* September 20





NEW GSN WEBSITE



Molly Hunsaker, GSN Membership Chair

GSN is in the process of building a new GSN website. The new site will have easy access to all our publications and will allow you to purchase, download or order any guidebook, symposium volume, or individual symposium article. There will be a new membership portal with full access to the directory, signing up for events, and online voting. We will have a digital calendar and space to share photos from GSN events. This is a big project but will help make our wealth of geologic information more accessible.

The website will offer our members a convenient place to search for vendors. It will also offer GSN service providers a place to be seen and a NEW place to advertise.

If there is something you would like to see on the website, let us know!! Be sure to check out the new 2020 GSN symposium website at <http://gsnsymposium.org/> to get a taste of what is to come.

OTHER UPCOMING EVENTS

1 November: Nevada Petroleum and Geothermal Society Monthly Dinner Meeting. **LOCATION: Tamarack Junction, 13101 S. Virginia St., Reno, NV. Cocktail Reception 6:30 PM; Dinner Served at 7:15 PM. SPEAKER: Scott T. Hector, of Hobby Energy, will be giving a talk titled, "Becoming a Registered Professional Geologist and Making Mineral Remoteness Opinions, Another Way For Consulting Geologists to Make a Living". RSVP By Tuesday, Oct 31 at this Link: <https://s07.123signup.com/event/details/hpkqk?mid=5044444>**

4-7 November: Geological Society of America—130th Annual Conference, Indianapolis, IN. We look forward to highlighting the Indiana area geology as well as the wider world of geoscience research at GSA 2018. Click here for more information and to Register: <https://community.geosociety.org/gsa2018/home>

4-10 November 2018 Alaska Miners Association Fall Convention & Trade Show. Dena'ina Convention Center, Anchorage, AK. Click the link to register: <https://alma.memberclicks.net/2018-convention>

6 November: Arizona Geological Society. Sheraton, 5151 E Grant Rd. (& Rosemont), Tucson AZ 85712. **Speaker: William Wilkinson Presents - The Good, The Bad and The Ugly: Three Decades of Exploration. Registration closes at 11am on the Friday Prior to the Date of the Event.** More information and online registration: [William Wilkinson Presents - The Good, The Bad and The Ugly: Three Decades of Exploration](#)

8 November: AEG—Great Basin Section: Speaker: Gary Luce. Title: "Burning Man, Black Rock Playa Investigation", Sure Stay Plus, Best Western, 1981 Terminal, Reno NV. Drinks @ 5:30 pm; Dinner @ 6:30 pm; Talk @ 7:00 pm. Please contact Merrily Graham for more information or to RSVP for dinner: Merrily_Graham@mkgraham75@gmail.com

12 November: Northern Nevada Section of the SME **"KICK-OFF THE HOLIDAYS PARTY AND SILENT AUCTION FUNDRAISER"**, Circus Circus Hotel, Reno, NV. Raffle and Auction items still needed! Please contact Sarah Lightner to donate: slightner@geopros.com. For more information email: NNevSME@gmail.com and to register online click this link: <https://squareup.com/store/nnevsmc>

2-7 December 2018 American Exploration & Mining Association Annual Meeting "Challenges, Problems, Solutions". Spokane Convention Center, Spokane, WA. Click the link for more information and to get registered: <https://www.miningamerica.org/2018-annual-meeting/>

11 December 2018 AIPG Exploration Roundup, Atlantis Resort and Casino, Reno NV, sponsored by Boart Longyear. Contact Kel Buchanan, summitcrk@aol.com for reservations, or call HB Engineering at 775-786-4515.



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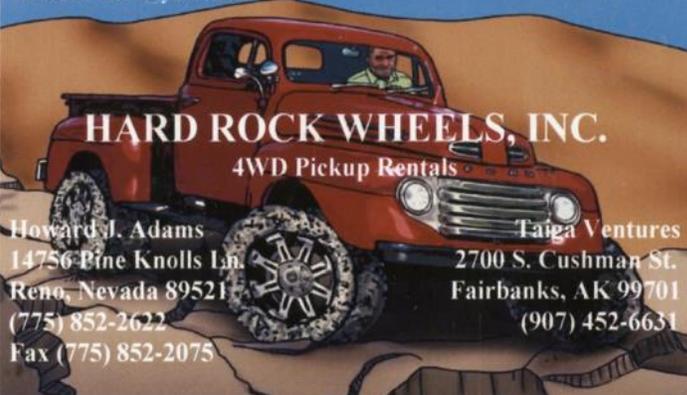
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TRAVELING GSN BACKPACK PHOTOS

(submit your photos anytime and I'll place them when I have room!)

GSN Member, David Shaddrick has been traveling the WORLD with his GSN backpack. He also snapped a pic of Sam Nunnemaker with his backpack in the Black Hills of South Dakota and Joe Laravie at some hot springs in New Zealand! From Left to Right: Beppu, Japan; Black Hills, SD; waiting for the Bullet Train in Japan; Sea Fortress in Helsinki; and New Zealand Hot Springs.

