



GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Reno, NV 89512
(775) 323-3500 - Hours Monday -- Friday, 9 a.m. to 4 p.m.
Website: www.gsnv.org • E-mail: gsn@gsnv.org



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DATE TBA VIA ZOOM

**Dec. 15, 2021
WEDNESDAY**

**DEC. 16, 2021
THURSDAY
In person and
Via Zoom**

**DEC. 16, 2021
THURSDAY**

GSN WINNEMUCCA CHAPTER MEETING

The Winnemucca Chapter President, Chad Peters is still working on a last minute virtual talk so if anyone is interested please let him know. Chad Peters: cpeters@ridgeline minerals.com.

GSN CHRISTMAS MEETING, SILENT AUCTION & RAFFLE!
REGISTER NOW FOR THE GSN CHRISTMAS MEETING, SILENT AUCTION & RAFFLE ON DEC. 15TH! PLEASE DONATE RAFFLE & AUCTION ITEMS TODAY! The GSN's annual Christmas meeting and Foundation Fundraiser will be held at the Nugget Casino Resort, Sparks, NV. Speaker: Louise Hose. Title: "LEHMAN CAVES: AN ANCIENT CAVE FORMED BY RISING, SULFUR-RICH WATERS". ONLINE RESERVATIONS CAN BE MADE on the GSN WEBSITE by clicking this link: [DINNER RESERVATIONS](#). There is an option to RSVP and pay onsite here too. Dinner cost is \$65 per person. Raffle tickets are \$1 each. Details on page 3.

GSN ELKO CHAPTER MEETING

The GSN Elko Chapter will hold their in-person (& Zoom) meeting at the Western Folklife Center, 501 Railroad St. Speakers: Buster and Molly Hunsaker. Title: "Majuba Hill Porphyry Copper, Pershing County, NV". Food & Drink Sponsors are: **BOART LONGYEAR** and **LEGARZA EXPLORATION**. Please contact Elko President Justin Milliard: justin.b.milliard@gmail.com for more information. All attendees are asked to donate a silent auction item in exchange for the sponsored food & drinks! Details on pp. 8-9.

GSN SOUTHERN NEVADA CHAPTER MEETING

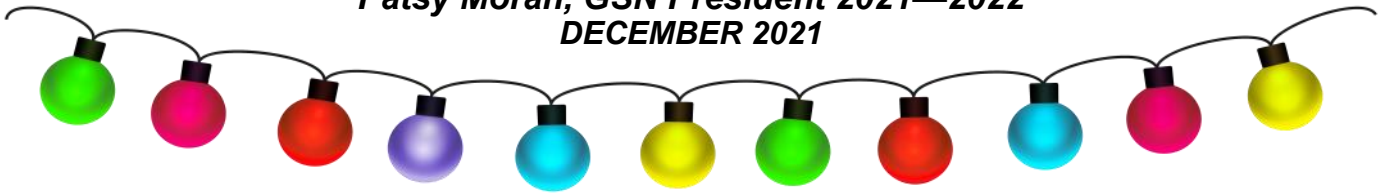
The So Nevada Chapter will host a holiday party at the Nevada Science Center, 331 S. Water Street, Unit D, Henderson, NV. For more information please contact President Josh Bonde at: joshua.bonde@nvscicenter.org. See details plus on page 7.

GSN HOLIDAY Meeting Sponsor!

Envirotech Drilling LLC



FROM THE PRESIDENT
Patsy Moran, GSN President 2021—2022
DECEMBER 2021



We'll have the opportunity to attend several in-person and virtual events before welcoming in 2022. The GSN's annual holiday party and Foundation fund-raiser will kick off at 6 pm on December 15th in the Nugget Casino Resort Grand Ballroom. It's going to be a great night so reserve your dinner and raffle tickets online now. Members and friends can still contribute to the Raffle and Silent Auction.

The Elko Chapter party is at the Western Folklife Center the following night, December 16th, as detailed on page 8. The Elko Chapter is hoping to fill up the scholarship program fund with proceeds from a Silent Auction. GSN is fortunate to have a strong, active membership that understands the importance of the next generations of geoscientists. Your support may be the catalyst that changes a student's life. Please keep this in mind when you're standing in front of those bid sheets.

The Southern Nevada Chapter is hosting a holiday party on December 16th at the Nevada Science Center in Henderson (see page 7 for more details). Starting in January, the Southern Nevada Chapter monthly meetings will be held at a fantastic new venue, The Mine Experience at the McCaw School of Mines. Unfortunately, the Southern Nevada Chapter struggles with participation despite their efforts to keep things fresh with a new venue and active meetings. Virtual and in-person attendance options are available, so if you're in the area or free on the second Tuesday of each month, check them out!

The Winnemucca Chapter President, Chad Peters is working on a virtual meeting for December. Speaker, topic and date to be announced. Please contact Chad if you'd like to volunteer to give a talk.

Wishing you good health, happiness, and success in 2022. Happy holidays everyone!



***The G.S.N. wishes to thank Steve Bills
And TonaTec Exploration, LLC
for sponsoring
the GSN's November 19th Meeting!***



Guest Speaker: Louise D. Hose (AKA Dr. Karst)

Title: “LEHMAN CAVES: AN ANCIENT CAVE FORMED BY RISING, SULFUR-RICH WATERS”

Date: WEDNESDAY, DECEMBER 15, 2021

Time: Drinks/Raffle @ 6 pm, Dinner @ 7 pm, Auction @ 7:45 pm, Talk @ 8 pm

Where: NUGGET CASINO RESORT’S GRAND BALLROOM, SPARKS, NV

ONLINE RESERVATIONS CAN BE MADE on the GSN WEBSITE by clicking this link: [DINNER RESERVATIONS](#).
(There is an option to RSVP online and click pay at the door too!)

Abstract: Louise D. Hose, University of Nevada, Reno; hose@drkarst.net

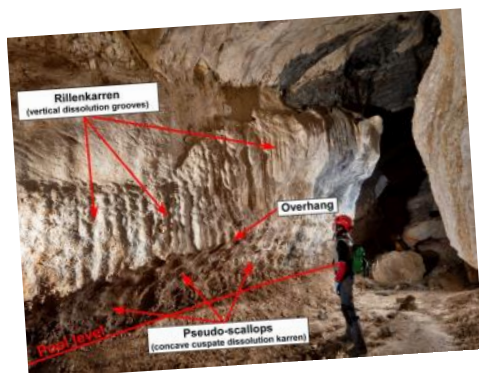
The geology of Lehman Caves in Great Basin National Park within the Southern Snake Range of eastern Nevada, is remarkably understudied. All previously published geologic maps show the cave encased in a single block of Cambrian Pole Canyon Limestone that extends to the surface, failing to recognize that the cave’s host rock is a mylonitic marble, that the older Cambrian Pioche Shale crops out at the farthest western cave passage, and that an extensive, apparently faulted block of Late Proterozoic Prospect Mountain Quartzite overlies much of the cave. The geologic setting of the cave is much more complex than previously understood.

Lehman demonstrates no relationship with modern drainage patterns. We have recently documented compelling evidence that it formed from sulfidic, rising fluids. Extensive Pleistocene infiltration of surface waters has mostly removed the evidence of early sulfidic origins in the cave passages along the tourist trails and deposited the cave’s landmark, beautiful decorations. The host rock is extensively sheared Pole Canyon Limestone, which likely metamorphosed to mylonite as the ~6-km thick sedimentary rock overburden slid along the overlying, Snake Range Décollement about 17 million years ago. Release of the overburden pressure and the beginning of Basin-and-Range faulting introduced extensive fractures into the mylonite.

Warm, sulfide-rich waters rising along the fractures caused the first stage of cave development probably between 10-8 million years ago. Sulfide-driven, condensation corrosion processes dominated when air filled the passages. The source of these waters presents an intriguing question. The second stage probably extended from about eight to three million years ago as the water table dropped and sulfidic gases withdrew. During the time when Lake Bonneville filled the adjacent basin, the third stage of cave development, surface-water infiltration resulted in the iconic and abundant calcite dripstone, flowstone, and shields of Lehman Caves. Stage 4 (approximately eleven thousand years ago through modern day) features an air-filled cave environment dominated by carbon dioxide-driven, condensation-corrosion processes that have significantly altered the cave walls and decorations.

Dr. Louise Hose Bio:

Louise Hose has explored and studied caves throughout the world over the last 50 years. National Geographic has twice featured her work. Once featuring the remarkable and scientifically significant Cueva de Villa Luz and the second time followed her exploration of caves in Oman. Her proudest achievement was placing the term “snottite” in a highly recognized, refereed journal. (That paper now has well over 500 citations.) She earned a PhD in geology at Louisiana State University after completing a MSc, also in geology, at Cal State LA. She spent most of her early career as a professor at the University of Colorado – Colorado Springs and Chapman University but later served as a Senior Scientist for the National Park Service. Now (mostly) retired, she holds an Adjunct Professorship with UNR and occasionally teaches there. She also continues her cave investigations on a volunteer basis around Nevada, with a particular focus on Lehman Caves in Great Basin National Park. Last May, she led a virtual field trip to the caves of eastern Nevada for the GSA Cordilleran Section meeting.



“FACES OF GSN”

JAMES INGRAFFIA

Reno, Nevada

To the Geological Society of Nevada,

Good time of day. I am James Ingraffia, a lithium - specialized economic geologist and solo consultant. Here is the summary of my story, brought to you courtesy of the Geological Society of Nevada. I am very grateful for the privilege to share it with you.

Earthquakes and oil production were the major points of geologic interest in my hometown of Los Angeles, California. After enough visits to gold country areas such as Downieville, Sierra City, and Grey Eagle as a boy, to mine metals in a way that was relevant to societal change, like the gold rush of 1849, was the way for me. To that end, I picked up a bachelor's in geology from California State University of Northridge and decided to save the world by mining metals such as lithium for vehicular rechargeable batteries. Sedimentology, applied petrology, general stratigraphy, and structural geology - microtectonics were my favorite topics. I graduated in 2015.

Through California State University Northridge, work took me into the U.S. Geological Survey for the first with bachelor's degree in hand. Their headquarters at Menlo Park, CA, conferred an excellent global geological perspective and offered experience in volcanology applied to civic hazards prevention. However, there I decided that the private sector, business – not the public sector, government – would be my professional calling.



Standing upon an old timer's shaft while field mapping in NV, fall 2021.



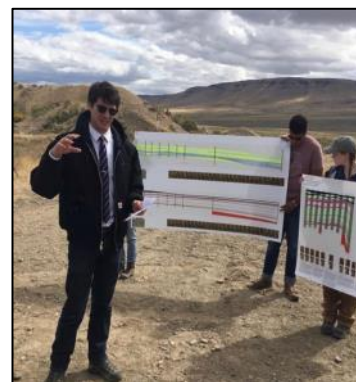
Working in the office on a brine project, spring 2021.



Breaking rock for biotite books, circa 2012.

To specialize in lithium was the best decision, given its strategic position and utility in lithium-ion batteries. This choice was followed by a lateral movement into the USGS for the second time, this time in Nevada. With help, I created a joint program with Pure Energy Minerals Ltd., the USGS, the Center of Research of Economic Geology, and UNR to accomplish an applied master's thesis study. That was in 2017. My focus was the aqueous geochemistry of lithium brine and its interaction with in situ lithium clays. By 2018, with the help of the Nevada geological community at large, I left the USGS and switched projects to another joint master's thesis effort that was forged between myself, UNR, and Lithium Americas Corporation focused on the Thacker Pass lithium claystone deposit. I detailed their deposit from the atomic to kilometer scale by stratigraphic litho-geochemical and several mechanized methods of geologic investigation, figured out how to predict concentrations of lithium in lithium claystone by indirect measurements of different elements, and theorized the processes behind lithium claystone mineralization at that locality.

The lithium research and execution of the Thacker Pass deposit geological characterization was performed in parallel to several applied means of small business development, such as a graduate minor in business administration through the MBA program at UNR. The privilege to serve as the local Vice Chair of the Association of Environmental and Engineering Geologists for several years was conferred upon me. With excellent support and peers, I later co-founded the AEG student chapter in UNR (continued on page 5)



Presentation of the Thacker Pass lithium deposit geology to students, fall 2019.

Ingraffia—Faces of GSN (continued from page 4)

that achieved several recognitions such as a non-profit organization by the IRS and the Mackay School Banquet Auction. Other noteworthy experiences included a summer spent working at the Nevada Bureau of Mines and Geology, to teach Geology 101 lab to geology-major bachelor's students, and to have been elected to represent the College of Science graduate student population at UNR for about 18 months.



Left: proud day after self-organizing a tour of the Tesla Gigafactory in Sparks, NV, for geology and related industry colleagues, spring 2019.



Right: riding an ATV while performing preliminary field reconnaissance at a lithium brine exploration site, fall 2021.

Lithium Arrow LLC, my private consultation firm, was founded in 2020 two months following completion of my graduate program. Through Lithium Arrow, I have been privileged to work upon lithium projects of different scales around the world since my contributions to the Lithium Americas' Thacker Pass deposit. My clients have each been talented, wise, intelligent, fiscally knowledgeable, entrepreneurial, and respectable individuals. Most importantly, each client has been knowledgeable of the price of success, and embraced the concept that "those who take risks, drink champagne." It has been a pleasure to advance their projects by a fundamental principals approach, to bring forward lithium exploration targets, to advance resource reports, and introduce economic development such as connection of a project to an international port.

Left: visit to the State Geological Survey of Ukraine, summer 2021.

Right: tour of a lithium pegmatite deposit in Ukraine with industry colleague and Ukrainian mining company staff, summer 2021.



Entrepreneurship has been rewarding, but not without its challenges. To remain humble, interested, driven, self-reliant, to perpetually learn lithium science, and to create value for others have each been pivotal to success thus far. To speak different languages, Buddhism, and to take one's health seriously have each proven important since striking out on my own, as have strong ties to family. Most importantly, the lesson to never take one's position (cont. on pg. 6)

Ingraffia—Faces of GSN (continued from page 5)

nor anybody else for granted. Nothing in life, business, nor geology is never more than 65% stable – metastable, if you prefer. Through all the challenges, to have had these life lessons made clear by practicing geology and business, it would be impossible for me to give up entrepreneurship for anything.

Through all the challenges, it is both humbling and an honor to report success and happiness in my chosen profession as a geologist, first and foremost. All this work and the privilege to write for you has been made possible by a great many people who have helped along the way. Many of whom, here in Nevada, continue to offer sound council today. I appreciate each of you respectively, and am grateful to be a member of the Nevada geological community.

Thank you for your time and consideration to read my brief biography. For consultation services or to connect, feel free to dial or email me at the following information provided. Please enjoy a pleasant holiday with your family and friends.

Yours truly,

James T. Ingraffia



LITHIUM ARROW *Lithium Consulting Geology*

187 University Terrace, Reno, Nevada, 89503, USA

P: +1 (775) 530 - 6528 E: lithiumarrowllc@gmail.com



Examining field samples prior to their delivery for assay at ALS on behalf of a private land-owner, fall 2021.



GSN WINNEMUCCA CHAPTER UPDATE



Hi Everyone in the Winnemucca Chapter,

We will not be having an in-person meeting in December (you all know why) and I am still working on a last minute virtual talk so if anyone is interested please let me know. Hope to catch up with all of you at AEMA next week!

Cheers,

Chad Peters, P.Geo.

President & CEO

Ridgeline Minerals

GSN Winnemucca Chapter President

Please contact Chad Peters, Winnemucca President, for more info. cpeters@ridgelineminerals.com



Geological Society of Nevada Southern Nevada Chapter News



December 16, 2021 – Lets Party!



Close out 2021 with a gathering and some fun! Please join us in a Holiday Social! Guests Welcomed!

Thursday December 16, 2021 6:00-8:30PM

****Due to lack of RSVP, the holiday social will be moved to the Nevada Science Center****

Nevada Science Center, 331 S. Water Street, Unit D, Henderson, NV 89015

Wear your festive gear and bring your favorite holiday food dish to share! We are seeking sponsors for food and bar! Please email Becky Hall, Chapter Secretary: becky.hall@nvscicenter.org

We hope everyone has a safe, fun holiday season and hope to see everyone soon! Happy Holidays!

Questions, Contact:

Josh Bonde

Joshua.Bonde@nvscicenter.org

Southern Nevada Chapter President



www.ScienceCenterNevada.org



GSN Elko Chapter—December 2021 Update



The Elko GSN Chapter is excited to announce we will be returning to our NORMAL in person Christmas Party and Silent Auction this December. The event will be held at the Western Folk Life Center on Thursday December 16th and **we politely request all attendees bring a silent auction item to donate in exchange for a sponsored dinner, drinks and entertainment!** We'll also gratefully accept cash donations to be directed straight to the scholarship fund. What a deal and it is tax deductible. 🎅

Once all silent auction items are checked in and put on display, we will break for dinner and a show at 7pm. Buster and Molly Hunsaker will be presenting on the developments of their Majuba Hill Project. Following the talk we will return to drinking, final bidding on auction items and eventual winners will be decided when bidding closes at 8:15pm. The event is graciously hosted by dual sponsors, Boart Longyear and Legarza Exploration.



We will also try again to broadcast the meeting via ZOOM.

Topic: Elko Chapter - December XMas Meeting

Time: Dec 16, 2021 7:00 PM Pacific Time (US and Canada)

Join Zoom Meeting: <https://us02web.zoom.us/j/84508796905?pwd=Q3hyN2kwc3RoTIVCRG0xRWtqcjAzdz09>

Meeting ID: 845 0879 6905

Passcode: Majuba

One tap mobile: +16699006833,,84508796905#,,, *642262# US (San Jose)

Dial by your location: +1 669 900 6833 US (San Jose); +1 253 215 8782 US (Tacoma)

Meeting ID: 845 0879 6905

Passcode: 642262

Find your local number: <https://us02web.zoom.us/u/kblQhHJdzL>

Food and drinks @ 6 p.m. and talk to begin at @ 7 p.m.

Title: “Majuba Hill Porphyry Copper, Pershing County, NV”

Presenters: Buster and Molly Hunsaker

Abstract:

Bam Bam Resources Corp. has drilled two core holes at the Majuba Hill Porphyry Copper Project that discovered more than 350 meters (1,146 feet) of classic porphyry alteration and veining in diorite (granodiorite?). The diorite with copper mineralization was previously unknown. Core logging indicates that the diorite is coeval with the well-known subvolcanic/intrusive rhyolite assemblages at Majuba. The Christmas Program will provide a general overview of the scale of the copper, silver, gold system at Majuba and the magnitude of the intrusive setting for the emerging district. All assays from the recent drill program are pending.

Majuba Hill is a porphyry copper project in Pershing County, Nevada that is 90 km (56 miles) southwest of Winnemucca and 251 km (156 miles) northeast of Reno. Copper, tin, and silver mining started at Majuba in the early 1900s with production into the 1950s. Historic mines in and around Majuba produced copper, silver, tin, gold, lead, and zinc. Most of the documented production came from outcropping subvolcanic/hypabyssal intrusive rhyolite that extends

downward at least 610 meters (2,000 feet) below the top Majuba Hill. (continued on page 9)

Majuba Hill Abstract (continued from page 8)

The recent core drilling discovered a diorite (granodiorite?) intrusive with classic porphyry copper veining and pervasive alteration zonation. Geophysics, soil & rock geochemistry, and geologic mapping suggest that the diorite is widespread peripherally and may extend under the Majuba Hill Mine area. Dikes have been intersected as shallow as 60 meters (197 feet) with the main mass of the diorite extending from 199 to 549 meters (654-1800 feet) down-hole in recent core drilling.

Multiple, magmatic-hydrothermal events in the diorite are indicated by cross-cutting veins and stockworks of quartz, chlorite, quartz/feldspar pegmatitic-type veins, and secondary potassic-feldspar veins. All vein types have variable amounts of chalcopyrite, pyrite, bornite, pyrrhotite, and arsenopyrite along with minor amounts of molybdenite and possible bismuthinite. Phyllic, potassic, and propylitic alteration is prominent in the diorite throughout the core. Potassic alteration in the diorite occurs primarily as secondary biotite.

Classic porphyry alteration zoning has been well documented in the rhyolite intrusive rocks from the upper phyllic zone downward and outward to the surrounding propylitic zone. Copper and silver oxidation, leaching, and enrichment are important as deep as 454 meters (1,490 feet) in the rhyolite intrusive assemblages. Hypogene, protore copper sulfides were intersected in previous core programs that drilled below the leached/enrichment zones of the rhyolite.

Assays for the recent drill program are pending, however the discovery of the diorite copper porphyry zone indicates that substantial additional drilling is required.

Please see their website for more information:

[Bam Bam Resources Corp](#)

Bam Bam is engaged in the business of acquiring, exploring and developing prospective copper properties directly in response to the growth of the electric vehicle (EV) industry. Focused on high grade, prospective copper properties in North America, Bam Bam Resources is building a portfolio of copper projects in prospective, mining-friendly jurisdictions.

Bam Bam is aggressively exploring Majuba Hill to create stakeholder and shareholder value.

Please see our sponsor's websites for more information:

LEGARZA EXPLORATION

<http://legarza.com/>

Legarza Exploration LLC is an earthmoving construction company that has had a specialized focus on mining and exploration support services in Nevada since 1992. We have earned an impeccable reputation of producing quality work in a safe, and efficient manner. We have brought innovative ideas and tactics to some of the hardest to reach places in Nevada. Our reputation, and general quality of work has made Legarza Exploration a preferred contractor to numerous mining and exploration companies.

BOART LONGYEAR

<https://www.boartlongyear.com/>

Established in 1890, Boart Longyear is the world's leading provider of drilling services, drilling equipment and performance tooling for mining and drilling companies. It also has a substantial presence in aftermarket parts and service, energy, mine de-watering, oil sands exploration, production drilling, and down-hole instrumentation.

The Global Drilling Services division operates for a diverse mining customer base spanning a wide range of commodities, including copper, gold, nickel, zinc, uranium, and other metals and minerals. The Global Products division designs, manufactures and sells drilling equipment, performance tooling, down-hole instrumentation and parts and services.

Boart Longyear has a rich history, spanning more than 127 years in the mining and drilling industry. This long record of experience has led them to become the global leaders and experts they are today. With six global manufacturing locations, some of the most advanced drilling technology on the market, and the first U.S. firm to utilize sonic equipment for environmental drilling, Boart Longyear continues to be innovators of the industry. Boart Longyear is headquartered in Salt Lake City, Utah, USA, and listed on the Australian Securities Exchange in Sydney, Australia (ASX:BLY). To get Boart

NEWS FROM THE FOUNDATION

by Cami Prenn

It feels more like Easter than Christmas with this spring-like weather in Reno but we're all used to the uncertainty of Nevada's weather. Merry Christmas!!

In two short weeks we'll be having the GSN Christmas party with the Foundation's traditional raffle, silent auction, and live auction! December 15 at the Nugget; tickets are \$65 and available on the website (www.gsnv.org) along with raffle tickets for \$1. Raffle tickets are sold in quantities of 5 online.

We have some wonderful prizes stacking up at Paragon Geochemical (1555 Industrial Way, Sparks) – please consider adding to the inventory. It would be much appreciated if all donations are delivered by Monday, Dec. 13.

We have fabulous live auction items donated by Envirotech Drilling and Steve Neilsen:

A Christensen Arms Mesa Titanium SS in 6.5 Creedmoor Hunting Rifle, plus several Gold Specimens from various locations!



We will also have another amazing gold specimen donated by Scott Werschky with Miner's Lunchbox!

We hope to see you there – we all missed this fun event last year!

Another thing to keep on your radar in the next two weeks is the opportunity to double your donation to the GSN Great Basin Scholarship! All donations will be matched up to a total of \$100,000 as long as they're received by December 15th! Please take a moment to donate to this scholarship fund. We appreciate all your support of the Foundation's programs!

2022 DIRECTORY ADVERTISING SPACE NOW AVAILABLE!

Don't miss this opportunity to advertise your company or yourself in the GSN 2021 Membership Directory! Hundreds of GSN Members rely on this directory year-round to find contact information for colleagues, vendors, services, etc.

PRICES ARE THE SAME:

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Full Page Ad—\$450

You can now order and pay online for your ad! Click the link now:

<https://www.gsnv.org/shop/directory-advertising/>



NBMG Nevada Geology Calendar 2022

Order from Nevada Bureau of Mines and Geology (NBMG): Online: <https://pubs.nbmj.unr.edu/Nevada-geology-calendar-2022-p/cal2022.htm>; Phone: 775-682-8766; Pickup: [2175 Raggio Pkwy, Reno](#)

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12-month calendar



calendar dimensions: 13" x 9.5"

Monthly topics include... Goblin Knobs • South Pahroc Range • Columnar Joints • Big Den Creek Canyon • Hot Springs
• Peak Bagging • Beatty Mountain • Pinto Valley Wilderness • Santa Rosa Range • Goshute Mountains • Lake Tahoe
• Cavernous Weathering • Interesting facts about Nevada and Nevada geology also included

NEVADA BUREAU OF MINES AND GEOLOGY — Nevada's Geological Survey

DAPHNE (D.D.) LAPOINTE**August 26, 1951—November 9, 2021**

Daphne Denise LaPointe (called D.D. since birth) passed away peacefully in her home on November 9, 2021 after a long battle with cancer. D.D. was a woman of many talents who dedicated her life to helping others through higher education and will be sorely missed by those who knew her.

D.D. was born in the small village of Summit, Rhode Island on August 26, 1951. In the eighth grade, D.D. was fascinated by the geology field trips that her class participated in, and as a result she was hooked on rocks and minerals for life. Inspired to embark upon studying geology, she attended Smith College and Williams College in Massachusetts. There she had the opportunity to participate in a field program in the summer of 1972 that allowed her to venture into the Colorado Front Range and Sunlight Basin in Wyoming – her first excursion west of the Hudson River. Enchanted by the unfamiliar and exciting geology in these new frontiers, she applied to graduate school out west. She began her graduate studies at UCLA and completed them at the University of Montana in Missoula.



During what was some of her first experiences in the minerals business, D.D. worked for Exxon Minerals Exploration as a field geologist exploring precious metals in Idaho and western Montana. On her last day of work at that job, she was transporting soil samples when her truck was run off the road and overturned by another driver. Fortunately, she was not badly injured, and another Exxon geologist and his summer student working nearby came to the rescue with a replacement truck to help retrieve her samples. That geologist's name was Tom Irwin, and in 1975 Tom and D.D. were married in Coventry, Rhode Island.

Tom and D.D. continued to work in Missoula until Tom's job at Exxon transferred him to Tucson, Arizona, where they moved in 1976. In Tucson, D.D. took a break from field work and practiced real estate until their first daughter, Tamison, was born in 1978. Soon afterwards, Tom's work transferred him to Reno, Nevada, where they settled in 1979.

In Reno, D.D. felt the urge to return to studying geoscience and found work at the Nevada Bureau of Mines and Geology. Both she and Tom became active members of the Geological Society of Nevada (GSN). In 1982 they welcomed their son, Tommy, into their family. When Tommy was diagnosed with cancer, the community rallied to support the family and the GSN members played a huge part in helping with his treatment. Beyond the tremendous amount of emotional support and help they provided, many friends, family, and GSN members traveled to where he was being treated in San Francisco to donate blood and even platelets to him. D.D. recalled how grateful she was for the outpouring of support during the tough journey through his treatment and passing on September 23, 1989, shortly before his 7th birthday. In the summer of 1991, D.D. and Tom had their second daughter, Teila, in Reno. Both of D.D.'s daughters followed in her footsteps of being bright academically, both going to college and graduating with science degrees with Tamison going on to become a nurse and Teila an engineer.

D.D.'s three grandchildren were some of the true joys of the last 13 years of her life. Whether it was diaper changes, doing puzzles, watching ball games and concerts, playing Pokemon Go, or guest teaching in their classrooms, she always loved to be with them helping to shape them into the wonderful little humans they are today.

D.D. also enjoyed traveling with her family. Among the many adventures she undertook were moose hunting in British Columbia, halibut fishing in Alaska, and sightseeing in New York, France, England, and Nova Scotia just to name a few. She loved spending time in the wilderness with Tom and they spent many hunting seasons together hunting deer, elk, antelope, moose, and big horn sheep in Montana, Nevada and Canada. During her many visits to the mountains of western Montana, she discovered a love for huckleberry picking and would make jams, pies, cakes and other goodies to share with everyone she could.

One of the most evident ways that D.D. will continue to impact lives for years to come is through the beautiful artwork of her quilts. Throughout her life, D.D. has been known as a talented artist of various media, including painting, drawing, tie-dyeing, and knitting, but her vibrance and creativity were really exemplified by her quilting. Over the years, D.D. made countless quilts of all shapes, sizes, and styles for her friends, family, and for charity. One of her favorite things to do was to make baby quilts to donate to the local hospital. She also made personalized quilts for family and friends for weddings, new babies, graduations, and other life events. Remarkably, after coming home from her final surgery in April 2021, D.D. completed a total of 18 quilts for friends, family, and charity. (continued on page 14)

DD LaPointe Obituary (Cont. from page 13)

Her generosity went far beyond her quilting and extended to the public through educational outreach, earth science workshops for K-12 students and teachers, and volunteer work all across the state of Nevada. She helped organize and co-lead public Earth Science Week field trips with the Nevada Bureau of Mines and Geology and also coordinated educational outreach programs at the University of Nevada, Reno (UNR) for many years. A regular volunteer instructor of classroom sessions in rocks, minerals, and mining, she cared deeply for her students and would do anything to help them succeed, even opening her own home to a student who needed temporary housing. Over the years, she was presented with several state and national awards honoring her many years of outstanding service as a research geologist. The dozens of publications she authored and co-authored will continue to provide valuable teaching resources for geology students for years to come. In addition to her significant contributions to academics, in 2018, D.D. partnered with the GSN Foundation to establish and fund a scholarship fund for aspiring geologists at UNR.

Another trait D.D. will be remembered for is her sharp wit. She would never shy away from a humorous retort, often to the embarrassment of her daughters. When she lost her ability to speak verbally, she never missed an opportunity to display her good natured (mostly!) humor through her written messages and even quite adeptly through charades. Everyone who was fortunate enough to spend time with her during the last 8 months were amazed by her unrelenting cheerfulness, positive outlook in the face of adversity, and her ever-present sense of humor.

She will be remembered as a brilliant geoscientist, dedicated teacher, talented quilter, and loving wife, mother, and grandmother.

D.D. is predeceased by her father Raymond LaPointe, mother Dorcas LaPointe (Shute), and son Thomas (Tommy) Irwin. She is survived by her sister Linnea Ferraro, brother Darryl LaPointe, husband Thomas Irwin, daughters Tamison Joyer (Mike) and Teila Irwin (Zach Plenert), and grandchildren Bradley, Hannah, and Emily Joyer.

A celebration of life was held on Thursday, November 18, 2021 at LifeChurch Reno South Campus in Reno, NV.

In lieu of flowers, please consider donating to the D.D. LaPointe Scholarship Fund by visiting <https://www.gsnv.org/donations/>.

(The photos of D.D. below were taken by Laura Ruud who shared some fun times with D.D. at the Tin Cup Tea, NBMG Earth Science Week field trips, at GSN functions and an ammonite collecting adventure near Mina, NV. We'll miss her!)



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The Symposium Committee is diligently working on the details for the 2022 Symposium! We expect to re-open registration in late January 2022.

Mining Activity Update

Mike Brady, OCTOBER 2021

LMB Brady@aol.com

NEVADA

Kinross Gold USA Inc. announced that it leased the Jackson's Wash Property from Sunrise Resources plc. for \$5,000/year payments in years 1-3 and \$10,000/year payments in years 4-6. *Press Release:* October 7

Headwater Gold Inc. announced that recent drill results at the Highland Project include 137.2-146.3 meters @ 0.43 gpt Au, 13.8 gpt Ag (HL21-01); 57.9-59.4 meters @ 1.40 gpt Au, 1.7 gpt Ag (HL21-02); 225.5-233.2 meters @ 0.42 gpt Au, 45.0 gpt Ag (HL21-03) and 118.9-121.9 meters @ 0.62 gpt Au, 23.6 gpt Ag (HL21-04). *Press Release:* October 5

Headwater Gold Inc. announced that it terminated its interest in the Highland Property of Bravada Gold Corp. *Press Release:* October 5

Calibre Mining Corp. announced that it offered to acquire Fiore Gold Ltd. through a 0.994 share Calibre/1.0 share Fiore exchange basis. (reserve @ Pan = 21,320,000 tonnes @ 0.42 gpt Au proven+probable) *Press Release:* October 25

Americas Gold and Silver Corp. announced that it suspended mining operations at the Relief Canyon Mine while it attempts to resolve metallurgical issues associated with the carbonaceous material in the ore. Heap leach operations will continue. (reserve = 24,814,000 tonnes @ 2.0 gpt Au proven+probable) *E/MJ:* September 2021

EMX Royalty Corp. announced that it acquired 16 geographically diverse royalties from SSR Mining Inc. for 12,323,000 of its shares (12.5% of the outstanding). *Press Release:* October 25

Scorpio Gold Corp. announced that recent drill results at the Goldwedge Project include 0.6-6.3 meters @ 50.2 gpt Au (GWUG21-015). (resource = 300,000 tonnes @ 10.58 gpt Au indicated) *Press Release:* October 26

Timberline Resources Corp. announced that recent drill results at the Eureka Project include 248.4-329.4 meters @ 1.38 gpt Au (BHSE-193); 301.8-368.8 meters @ 2.36 gpt Au (BHSE-194) and 257.6-333.6 meters @ 1.74 gpt Au (BHSE-195). (resource @ Lookout

Mountain = 26,254,000 tonnes @ 0.62 gpt Au measured+indicated) *Press Release:* October 27

I-80 Gold Corp. announced that recent drill results at the Granite Creek Project include 121.6-123.1 meters @ 11.7 gpt Au (IGU21-04); 203.6-208.5 meters @ 8.0 gpt Au (IGU21-05); 119.8-126.9 meters @ 41.3 gpt Au (IGU21-07) and 136.9-144.2 meters @ 16.0 gpt Au (IGU21-09). (resource = 20,460,000 tonnes @ 1.95 gpt Au measured+indicated) *Press Release:* October 28

Lithium Americas Corp. announced that based on recent drill results at the Thacker Pass Project, resources aggregate 1,153,600,000 tonnes @ 0.223% Li measured+indicated and 391,600,000 tonnes @ 0.211% Li inferred. (was 385,300,000 tonnes @ 0.292% Li measured+indicated and 147,400,000 tonnes @ 0.293% Li inferred) *Press Release:* October 7

Getchell Gold Corp. announced that recent drill results at the Fondaway Canyon Project include 227.2-234.6 meters @ 2.4 gpt Au (FCG21-09). (resource = 2,050,000 tonnes @ 6.18 gpt Au indicated) *Press Release:* October 20

Gold Springs Resource Corp. announced that recent drill results at the Gold Springs Project include 93.0-138.7 meters @ 0.98 gpt Au, 13.4 gpt Ag (CR21-05); 153.9-158.5 meters @ 0.68 gpt Au, 14.5 gpt Ag (CR21-06); 150.9-172.2 meters @ 1.16 gpt Au, 7.4 gpt Ag (CR21-08) and 109.7-121.9 meters @ 0.50 gpt Au, 4.3 gpt Ag (CR21-10). (resource = 35,657,000 tonnes @ 0.53 gpt Au, 9.4 gpt Ag measured+indicated) *Press Release:* October 19

Phenom Resources Corp. announced that it acquired an option to earn a 100% interest in the Smoke Property from Nevada Gold Ventures LLC. for \$10,000 cash, 600,000 shares and \$500,000 in exploration expenditures over 3 years. *Press Release:* October 28



"Uncovering the Secrets Behind Earth's First Major Mass Extinction"

By Dan Bernardi, November 1, 2021 (Reprinted from Science Daily online: <https://www.sciencedaily.com/releases/2021/11/21>)

We all know that the dinosaurs died in a mass extinction. But did you know that there were other mass extinctions? There are five most significant mass extinctions, known as the "big five," where at least three-quarters of all species in existence across the entire Earth faced extinction during a particular geological period of time. With current trends of global warming and climate change, many researchers now believe we may be in a sixth.

Discovering the root cause of Earth's mass extinctions has long been a hot topic for scientists, as understanding the environmental conditions that led to the elimination of the majority of species in the past could potentially help prevent a similar event from occurring in the future.

A team of scientists from Syracuse University's Department of Earth and Environmental Sciences, the University of California, Berkeley and the University of California, Riverside, Université Bourgogne Franche-Comté, the University of New Mexico, the University of Ottawa, the University of Science and Technology of China and Stanford University recently co-authored a paper exploring the Late Ordovician mass extinction (LOME), which is the first, or oldest of the "big five" (~445 million years ago). Around 85% of marine species, most of which lived in shallow oceans near continents, disappeared during that time.

Lead author Alexandre Pohl, from UC Riverside (now a postdoctoral research fellow at Université Bourgogne Franche-Comté in Dijon, France) and his co-authors investigated the ocean environment before, during, and after the extinction in order to determine how the event was brewed and triggered. The results from their study will be published in the journal *Nature Geoscience* on Nov. 1.

To paint a picture of the oceanic ecosystem during the Ordovician Period, mass extinction expert Seth Finnegan, associate professor at UC Berkeley, says that seas were full of biodiversity. Oceans contained some of the first reefs made by animals, but lacked an abundance of vertebrates.

"If you had gone snorkeling in an Ordovician sea you would have seen some familiar groups like clams and snails and sponges, but also many other groups that are now very reduced in diversity or entirely extinct like trilobites, brachiopods and crinoids" says Finnegan.

Unlike with rapid mass extinctions, like the Cretaceous-Tertiary extinction event where dinosaurs and other species died off suddenly some 65.5 million years ago, Finnegan says LOME played out over a substantial period of time, with estimates between less than half a million to almost two million years.

One of the major debates surrounding LOME is whether lack of oxygen in seawater caused that period's mass extinction. To investigate this question, the team integrated geochemical testing with numerical simulations and computer modeling.

Zunli Lu, professor of Earth and environmental sciences at Syracuse University, and his students took measurements of iodine concentration in carbonate rocks from that period, contributing important findings about oxygen levels at various ocean depths. The concentration of the element iodine in carbonate rocks serves as an indicator for changes in oceanic oxygen level in Earth's history.

Their data, combined with computer modeling simulations, suggested that there was no evidence of anoxia – or lack of oxygen – strengthening during the extinction event in the shallow ocean animal habitat where most organisms lived, meaning that climate cooling that occurred during the Late Ordovician period combined with additional factors likely was responsible for LOME.

On the other hand, there is evidence that anoxia in deep oceans expanded during that same time, a mystery that cannot be explained by the classic model of ocean oxygen, climate modeling expert Alexandre Pohl says.

"Upper-ocean oxygenation in response to cooling was anticipated, because atmospheric oxygen preferentially dissolves in cold waters," Pohl says. "However, we were surprised to see expanded anoxia in the lower ocean since anoxia in Earth's history is generally associated with volcanism-induced global warming."

They attribute the deep-sea anoxia to the circulation of seawater through global oceans. Pohl says that a key point to keep in mind is that ocean circulation is a very important component of the climatic system.

He was part of a team led by senior modeler Andy Ridgwell, professor at UC Riverside, whose computer modeling results show that climate cooling likely altered ocean circulation pattern, halting the flow of oxygen-rich water in shallow seas to the deeper ocean.

According to Lu, recognizing that climate cooling can also lead to lower oxygen levels in some parts of the ocean is a key takeaway from their study.

"For decades, the prevailing school of thoughts in our field is that global warming causes the oceans to lose oxygen and thus impact marine habitability, potentially destabilizing the entire ecosystem," Lu says. "In recent years, mounting evidence point to several episodes in Earth's history when oxygen levels also dropped in cooling climates."

While the causes of Late Ordovician extinction have not been fully agreed upon, nor will they for some time, the team's study rules out changes in oxygenation as a single explanation for this extinction and adds new data favoring temperature change being the killing mechanism for LOME.

Pohl is hopeful that as better climate data and more sophisticated numerical models become available, they will be able to offer a more robust representation of the factors that may have led to the Late Ordovician mass extinction.

Story Source: Materials provided by Syracuse University. Original written by Dan Bernardi. *Note: Content may be edited for style and length.*

Journal Reference: Alexandre Pohl, Zunli Lu, Wanyi Lu, Richard G. Stockey, Maya Elrick, Menghan Li, André Desrochers, Yanan Shen, Ruliang He, Seth Finnegan, Andy Ridgwell. **Vertical decoupling in Late Ordovician anoxia due to reorganization of ocean circulation.** *Nature Geoscience*, 2021; DOI: [10.1038/s41561-021-00843-9](https://doi.org/10.1038/s41561-021-00843-9)

OTHER UPCOMING EVENTS

December 2, 2021: NPGS - Join the NV Petroleum & Geothermal Society on Dec 2nd for the annual Christmas Party and our return to in-person meetings at Tamarack Junction! Activities will include happy hour, buffet-style dinner and raffle. Price is \$35 dollars and will cover registration for the event and dinner. Tamarac Casino Banquet Room, 13101 S. Virginia St, Reno, NV.
Please click here to register: [REGISTER](#)

December 3, 2021: DREGS - Join the Denver Regional Exploration Geologist Society at their annual Christmas Party on Friday, December 3rd at 6:30 pm. Calvary Episcopal Church, 1320 Arapahoe, Golden, CO. Gourmet potluck dinner with savory beef, plank salmon and fermented beverages provided by DREGS. \$20 per person at the door. Please make a reservation by contacting Craig at cfhgeo@outlook.com; 303-842-0452.

December 5-10, 2021: AEMA—American Exploration & Mining Association Annual Meeting “Mining's Role in Securing America's Future”. Nugget Casino Resort, Reno/Sparks, NV. Click the link for more information and to get registered: <https://www.miningamerica.org/2021-annual-meeting/> IF YOU'LL BE ATTENDING IN PERSON, PLEASE VISIT THE GSN BOOTH IN SPACE #119!

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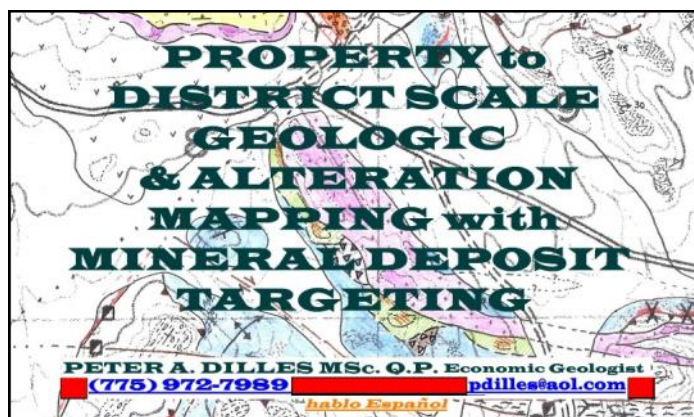
December 5-6, 2021: SME Arizona Conference, hosted by the Society for Mining, Metallurgy & Exploration, in Tucson, Arizona. For more information on the SME Arizona Conference, visit <https://www.sme.arizonaconference.org/>

December 7, 2021: AGS—Arizona Geological Society. Speakers: Steve Reynolds & Julia Johnson. Title: “Roadside Geology of Arizona”. 6:30 p.m. via Zoom: <https://arizona.zoom.us/j/87908544524> PASSCODE: AGS-2021. For more information and to read the meeting flyer please click here: <https://arizonageologicalsoc.org/>

MAY 2-5, 2022: GEOLOGICAL SOCIETY OF NEVADA'S SYMPOSIUM 2022! Nugget Resort, Sparks/Reno Nevada. Technical Sessions, Field Trips, Short Courses, Exhibits, Luncheons, Parties! Visit the Website for more information: WWW.GSNSYMPIUM.ORG

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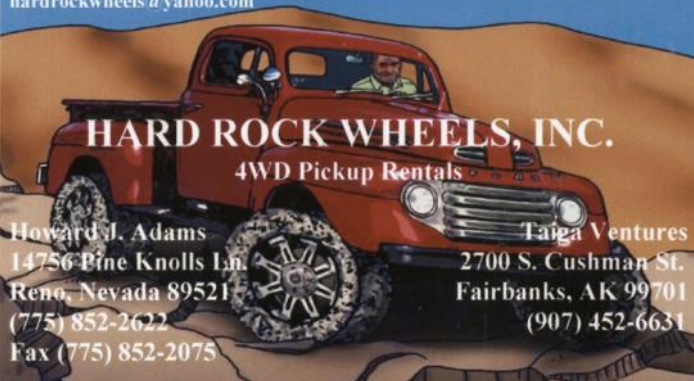


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