

# GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Room 107, Reno, NV 89512  
(775) 323-3500 - Hours Tuesday -- Friday, 8 a.m. to 3 p.m. Monday by appointment.  
Website: [www.gsnv.org](http://www.gsnv.org) • E-mail: [gsn@gsnv.org](mailto:gsn@gsnv.org)



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## CALENDAR OF GSN EVENTS

**NO MEETING THIS MONTH** **SO. NEVADA CHAPTER MEETING** *will not meet in September! See below for October meeting information.\**

**Sept. 9, 2015** **WINNEMUCCA CHAPTER MEETING** (*every 2nd Wednesday of the month*)  
**Wednesday** The monthly meeting will be held at the Martin Hotel, 94 W. Railroad St., Winnemucca, NV. Refreshments at 6 pm, Appetizers at 6:30 pm, Talk at 7:00 pm.  
**Speaker: Larry Hillesland, Pershing Gold. Title: "An Update on the Relief Canyon Mine, Pershing County, Nevada".** **Food & Drinks Sponsored by MAJOR DRILLING.** Please contact Matt Fithian at [MFithian@silverstandard.com](mailto:MFithian@silverstandard.com) for more information. Details and abstract on page 6.

**Sept 17, 2015** **ELKO CHAPTER MEETING** (*every 3rd Thursday of the month*)  
**Thursday** The monthly meeting will be held at the Western Folklife Center, 501 Railroad St., Elko, NV. Refreshments/appetizers at 6 pm, Talk at 7 pm. **Speaker: David Schwarz, Extradors Exploration, Title: "A Mudstone Review: from Amadeus<sup>1</sup> to Remus<sup>2</sup> 'n Miss Kitty<sup>3</sup>, with headliners The Shalesman<sup>4</sup>, and the Turbidite Killer<sup>5</sup>".** **Food & Drinks Sponsored by Redcor Drilling, Inc.** For more info. Please contact Mark Travis, [mark.william.travis@gmail.com](mailto:mark.william.travis@gmail.com). Details and abstract on page 6.

**Sept 18, 2015** **G.S.N. REGULAR Membership Meeting** (*every 3rd Friday of the month*)  
**Friday** The GSN Membership Meeting will be held at the Reno Elks Lodge, 597 Kumble Lane, Reno, NV. Drinks at 6:00 p.m., Dinner at 7:00 p.m., Talk at 8:00 p.m.  
**Speaker: Steve Angster, Nevada Seismology Lab at UNR. Topic: Nepal Earthquake. Drinks Sponsored by BOART LONGYEAR.** Dinner cost is \$25 and reservations must be made by TUESDAY, SEPT. 15TH! Please contact Laura Ruud at the GSN office, [gsn@gsnv.org](mailto:gsn@gsnv.org). Details and abstract on page 3.

**Oct. 8, 2015** **\*SO. NEVADA CHAPTER MEETING**  
**Thursday** The monthly meeting will be held at the Las Vegas Natural History Museum at 900 Las Vegas Blvd. N., Las Vegas, NV. Begins at 5:30 p.m. **Speaker: Rich Perry, NV Division of Minerals. Topic: TBA.** Contact Josh Bonde for more information or if you'd like to give a talk! [Joshua.bonde@unlv.edu](mailto:Joshua.bonde@unlv.edu).

**Oct. 17-18, 2015** **GSN FALL 2015 FIELD TRIP—REGISTRATION FORM ON PAGE 9!**  
**Saturday & Sunday** The GSN Fall Field Trip will be heading to Quartz Mountain gold deposit in Lakeview, OR, the Lava Beds National Monument and the Glass Mountain pumice deposit in northern CA. Details and registration form on page 9. Contact Laura Ruud at [gsn@gsnv.org](mailto:gsn@gsnv.org) or call 775-323-3500 for more information. Please sign up now as **DEADLINE is MONDAY, OCT. 5th!!**

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## G.S.N. SEPTEMBER MEETING SPONSOR



# BOART LONGYEAR™

**FROM THE PRESIDENT**  
**Elizabeth Zbinden, G.S.N. President 2015-2016**  
**SEPTEMBER 2015**

One of the themes in geology is ‘Cycles’. Some are easy to predict, some we identify mainly after the fact. Rick Rule spoke to us about one kind of cycle at our Summer Silver Series barbecue: “Where Do We Go From Here? Thriving in Cyclical Markets”. The bull follows from the bear, the cycle will continue. But when? That’s the trick, and no he did not give us an answer. One thing we do know, Rick anchored a great evening enjoyed by many GSN members. Thanks Rick!

A cycle that’s easier to predict is that August is barbecue season for GSN. The Winnemucca Chapter barbecue featured a piñata hoisted by a very brave Robert Thomasson who received many of the swings that missed the piñata itself. The Elko Chapter barbecue featured a mellow D.J. and conversation. The Reno barbecue featured not only the lively talk mentioned above, but also gracious hosting by Dan Kappes at his home. Thank you to food and drink sponsors for August barbecues around the state: Kappes, Cassiday & Associates, Mine Development Associates, CGS Mule, Management Resource Consulting, Boart Longyear, and, doing double duty, ALS Minerals!

Earthquake cycles: reasonably obvious on a geologic time scale, but we don’t yet have them figured out on a human time scale. And it’s the human time scale that’s the catch, isn’t it? At Reno’s September meeting we will hear about the pair of earthquakes in April and May in Nepal. Steve Angster and Ian Pierce from UNR’s Center for Neotectonic Studies will tell us about their research results and about their experience in-country. Look for their abstract elsewhere in this newsletter.

And finally a cycle that’s not so geological but involves a lot of geologists. Burning Man is coming up and will be in full swing by the time you read this. There will be talks about the geology of the Black Rock Desert, the Basin & Range, and western North America. Of course there will also be the less intellectual festivities you hear about elsewhere. Your GSN president will be there and every year I learn of more GSN members who are regulars. Best wishes to all GSN members in their own personal cycles!

***The Geological Society of Nevada wishes to thank the  
generous SPONSORS of our Summer Silver Series and  
our Elko and Winnemucca Chapter’s BBQs held in AUGUST!!***



# *GSN September 18, 2015 Membership Meeting!*

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## **Reservations Are Required - Please Cancel if You Are Unable to Attend**

Please e-mail [gsn@gsnv.org](mailto:gsn@gsnv.org) or call 775-323-3500 by 4 p.m. on **TUESDAY SEPTEMBER 15, 2015**.

Social Hour begins @ 6:00 pm; Dinner @ 7:00 pm; Speaker @ 7:45 pm (NOTE EARLIER TIME!)

Location: Reno Elks Lodge, 597 Kumle Lane, Reno, NV (across from the Convention Center)

**DINNER COST—\$25.00 per person.**

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

**The GSN office will be closed Thursday & Friday, Sept. 17th & 18th so please make your reservations on time. There will be no one available to take late reservations this month!**

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## **Field Reconnaissance after the April 25, 2015 M7.8**

### **Gorkha Earthquake**

*Stephen Angster (Presenter), Eric Fielding, Steven Wesnousky, Ian Pierce, Deepak Chamlagain, Dipendra Gautam, Bishal Nath Upreti, Yasuhiro Kumahara, and Takashi Nakata*

#### **Abstract**

Fault scarps and uplifted terraces in young alluvium are frequent occurrences along the trace of the northerly dipping Himalayan Frontal Thrust (HFT). Generally it was expected that the M7.8 April 25, 2015 Gorkha earthquake of Nepal would produce fresh scarps along the fault trace. Contrary to expectation, InSAR and aftershock studies soon indicated that the rupture of the HFT was confined to the subsurface, terminating on the order of 50 km north of the trace of the HFT. We undertook a field survey along the trace of the HFT and along faults and lineaments within the Kathmandu Valley eight days after the earthquake. Our field survey confirmed the lack of surface rupture along the HFT as well as mapped faults and lineaments in Kathmandu Valley. The only significant ground deformation we observed was limited to a ~1 km long NE trending fracture set in the district of Kausaltar within Kathmandu. This feature is not to be the result of tectonic displacement but rather localized extension along a ridge. Our survey also shows the ubiquitous presence of fallen chimneys of brick kilns along the HFT and within Kathmandu Valley. Measurements of a small subset of fallen chimneys across the region suggest a degree of systematic fall direction of the chimneys when subdivided geographically.

#### **Stephen Angster, Bio**

For the past 12 years, Steve has studied various fields of geology starting in the plains of Illinois at Western Illinois University. Longing to see some real geology, he moved out west and continued his education at the Colorado School of Mines where he received his Masters degree studying fractures within the Williston Basin. He later worked for the USGS Earthquake Hazards Science Center as a geologist performing seismic hazard studies. There he was inspired and mentored by other scientists to do a PhD. Currently, Steve is a third-year PhD graduate student here at the Mackay School of Earth Science and Engineering at UNR. He uses field-based structural and surficial mapping techniques along with high-resolution topographic datasets to understand lithospheric deformation of tectonically active regions. Other than his spontaneous work in Nepal, he mostly works within the Walker Lane.

# “FACE OF GSN”

Chad Peters

I grew up on a farm in Manitoba, Canada and although living on a farm was great, I knew from a pretty early age that I wasn't going to be a farmer. I couldn't understand why my dad would want to work a job where he had no control over the markets or the price of the products he sold. Thinking back, it's probably more than a little ironic that I ended up becoming a geologist. When I was a senior in high school my cousin, who worked for Chevron in the oil patch, suggested I try geology. At the time, the oil patch was booming and in his words “those rock sniffers are all rich” which sounded good to me. I enrolled at the University of Manitoba in the Environment and Earth Sciences program in 2004, met my future wife Carla, and quickly learned that I didn't want to work in the oil industry (even though unfortunately that's where all the “rich” rock sniffers worked). As a result I specialized in mining and spent two summers working as a summer student for Premier Gold Mines Ltd. where I logged core in Red Lake, Ontario in 2007 followed by mapping and prospecting for VMS deposits in northwestern Nunavut in 2008.



*Close up with a herd of muskox while mapping in the Arctic*

I graduated with my Bachelors in Geological Sciences in 2009 and was lucky enough to receive a full time offer from Premier Gold to work in a fly-in, fly-out camp and filled in on our other projects in the off-season where needed. In 2010 I accepted a position with SanGold Corporation as an underground ore control geologist at the Rice Lake gold mine in Bisset, Manitoba. Although I prefer exploration, it was a great experience that taught me a lot about mining, economics, and narrow vein geometry that I wouldn't have likely learned on an exploration project. In 2011, Premier offered me a position at the same fly-in camp job I worked in 2009. The fishing was great and I ended up running that project for a year until its closure in 2012. At the same time as my camp job was winding down I met Brian Morris, who was Premier's new VP of Exploration. (cont. pg. 5)

(Peters, cont. from pg. 4)

Brian was closing a deal on the McCoy-Cove property and suggested Carla and I move down to Winnemucca to work at Cove full time. The timing was great; I was getting tired of the shift work and Carla was starting to refer to me as her “part time” husband as I was away from home six plus months of the year. Once our visa cleared, we packed everything up including one very pissed off cat and moved to Winnemucca in August of 2012. Until that point I’d spent my entire career working in Archean rocks; over the next two years Warren Thompson gave me a crash course in Nevada geology, beginning my first week with a four mile hike in the Fish Creek range in 100+ degree heat... I managed to make it back to the truck but it wasn’t pretty. Since then, our team has made a few new discoveries on the property and I am currently the Senior Exploration Geologist for Premier’s U.S. based projects.

These days, our son Jack keeps us pretty busy. Since Carla and I like to travel, Jack already has a few pages worth of stamps in his passport. I try to make it to as many GSN meetings as possible to catch up with everyone and my attendance will likely increase since being elected the Winnemucca Chapter Secretary... I’ll know better than to show up on nomination night next year. With no hockey rink within 200 miles, I attempt to golf in my spare time. I’ve also been lucky enough to draw an archery mule deer tag every year to date, although I’m still waiting on that bull elk tag to come through.



*Christmas 2014 trip to Barbados*

## G.S.N. WINNEMUCCA CHAPTER MONTHLY MEETING

WEDNESDAY SEPTEMBER 9, 2015

**SPEAKER: LARRY HILLESLAND,  
PERSHING GOLD**

Location: The MARTIN HOTEL,  
94 W. Railroad St., Winnemucca, NV

Time: Drinks @ 6:00 p.m.; Appetizers  
@ 6:30 p.m.; Talk @ 7:00 p.m.

Food and Drinks Sponsored by:



**ABSTRACT:**

### **An Update on the Relief Canyon Mine, Pershing County, Nevada**

Richard Fifarek, Consulting Geologist  
**Larry Hillesland, VP Exploration and Development,  
Pershing Gold Corp (Speaker)**  
Doug Prihar, Manager of Exploration,  
Pershing Gold Corp  
Robert Casaceli, Consulting Geologist  
Pete Dilles, Consulting Geologist

The Relief Canyon Mine exploited a carbonate-hosted, disseminated Au-Ag-(F) deposit located at the intersection of the Fencemaker Thrust fault zone and western range-bounding fault of the southern Humboldt Range. A metamorphosed, tectonically thickened section of multiply deformed Middle-Late Triassic platform carbonate, volcanic, and siliciclastic rocks intruded by gabbro dikes and sills comprise the mine section. Compressional deformation was related to the collapse of a back-arc basin and development of the Luning-Fencemaker Fold and Thrust Belt

Two episodes and assemblages of mineralization are spatially superimposed at the deposit. The dominant style consists of multiple generations of jasperoidal quartz-illite-pyrite-fluorite (QIPF). Gold and electrum are associated with (Cont. on pg. 7)

## G.S.N. ELKO CHAPTER MONTHLY MEETING

THURSDAY, SEPTEMBER 17, 2015

**SPEAKER: DAVID SCHWARZ,  
EXTRADOS EXPLORATION**

Location: The WESTERN FOLKLIFE  
CENTER, 501 Railroad St., Elko, NV

Time: Refreshments/Appetizers @  
6:00 p.m., Talk @ 7:00 p.m.

Food and Drinks Sponsored by:



**ABSTRACT:**

**A Mudstone Review: from Amadeus<sup>1</sup> to Remus<sup>2</sup> in  
Miss Kitty<sup>3</sup>, with headliners The Shalesman<sup>4</sup>,  
and the Turbidite Killer<sup>5</sup>.**

<sup>1</sup>Grabau, 1904 <sup>2</sup>Lazar, et al 2015 <sup>3</sup>Millikin, 2014 <sup>4</sup>  
Jürgen Schieber <sup>5</sup>Gnapathy Shanmugam  
with music by the ExxonMobil Boys (Kevin Bohacs,  
Tim Denko, and Joe Maquaker)

Dave Schwarz, PhD, PG Extrados Exploration  
[rockdoc.daveschwarz@gmail.com](mailto:rockdoc.daveschwarz@gmail.com)

**ABSTRACT**

Mudstone – a rock so boring, some of us resort to making up silly lecture titles on it, or chewing it in a lame attempt for a field classification. For over a century, geologists presented classifications for fine-grain sedimentary rocks, defined by the somewhat arbitrary upper size limit of 62.5 microns. Even using this institutionalized size classification, geologists were unable to agree on what to call “it.” Well, “it” started out as mud, typically deposited as an assemblage of particles with a size range encompassing three orders of magnitude, extraordinary compositional variations in grain assemblages, and clay fractions ranging from 10 to 90 percent – all combining to create ten orders of magnitude in its permeability range. Such variations created numerous hand-specimen names, led by the ambiguity-leader “shale”, a term used to describe a (Cont. on page 8)

(Hillesland abstract, cont. from pg. 6)

chalcopyrite, sphalerite, galena, cinnabar, stibnite, tetrahedrite, and native Ag. An illite  $^{40}\text{Ar}/^{39}\text{Ar}$  date of  $23.51 \pm 0.11$  Ma (latest Oligocene) suggests that QIPF mineralization regionally coincides with rapid extension. Minor gold mineralization is associated with quartz-calcite±adularia±kaolinite veins exhibiting bladed and lattice calcite suggestive of boiling fluids at low temperatures ( $\sim \leq 225^\circ\text{C}$ ) and shallow depths ( $\sim < 270$  m). An adularia  $^{40}\text{Ar}/^{39}\text{Ar}$  date of  $14.92 \pm 0.05$  Ma (mid-Miocene) regionally coincides with rapid extension, vertical tectonics, basaltic magmatism, and epithermal Au-Ag mineralization.

QIPF replacement and open-space mineralization occurs in three structurally and stratigraphically controlled zones. Most current (and historic) resources are in *Main Zone* variably silicified, polyphase solution collapse breccias, and cave-fill sediments developed in thick-bedded limestone (Cane Spring Fm.) immediately below a  $D_2$  thrust of the Fence-maker Thrust system. Allocthonous slates, phyllites, siltites, and quartzites of the Grass Valley Formation cap these breccias. *Lower Zone* mineralization follows thrusts, shears, and tectonic-solution collapse breccias in foliated to tectonized limestone interleaved with a pale green, mafic volcanic rock and stretched pebble conglomerate. *Jasperoid Zone* mineralization occurs below and in the same rock package as the *Lower Zone*, but is characterized by intense silicification along limestone tectonites and steeply dipping, sheeted fractures striking  $N 30^\circ - 35^\circ E$ . Sheared contacts of foliated, fine-grained, gabbro sills/dikes are common sites of mineralization.

The most recently completed resource estimated by Mine Development Associates of Reno, Nevada includes 739,000 ounces of gold in the measured and indicated categories (July, 2015). Metallurgical tests of all three gold bearing zones have been completed or are in progress by McClelland Laboratory of Reno. The results suggest gold recoveries in excess of 70 percent are achievable with a 2 inch crush and agglomeration in a heap leach setting.

Pershing Gold has spent more than \$18 million to advance the project since acquisition in mid-2012.



Winnemucca Chapter BBQ—Fun for the Adults!

Laura Ruud

The new 2015-2016 GSN Officers in Winnemucca decided to have a little fun at their annual BBQ at Vesco Park on August 13th. With a lot of help from Robert Thomason, the GSN Members that gathered had a chance to swing at a piñata just like when we were kids! Up first was GSN President, Elizabeth Zbinden, who wacked away at the donkey piñata with a foam noodle. With her eyes covered by blacked out safety goggles, she hit the donkey about twice and wailed on Robert, who was holding the pole, about 50 times! Then it was Don Strachan's turn. They gave him a metal rod to use and he went after the piñata and succeeded in knocking it off the pole. Mary Stollenwerk, from ALS Minerals, was up next with a baseball bat. Mary cracked the piñata open (without hitting Robert again!) and adult prizes fell to the ground. I grabbed a small bottle of vodka that rolled my direction and others picked up plastic shot glasses, field notebooks and ear plugs. Best piñata ever!



Elizabeth Zbinden, whacker and Robert Thomason, whackee



Donald Strachan goes all out to crack the pinata!

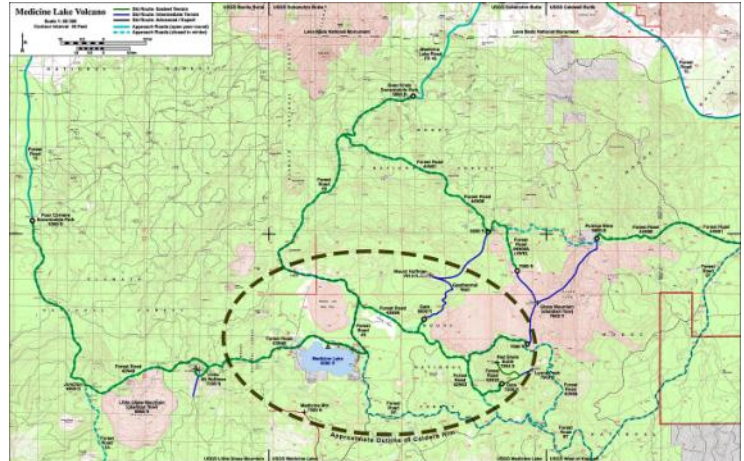


Mary Stollenwerk and her baseball bat finish the job!

## **GSN FALL FIELD TRIP IS OCTOBER 17-18, 2015!!**



Come with us as we journey to the far northwestern reaches of the Great Basin on Saturday and Sunday, October 17 and 18, 2015. On Saturday we will travel to Lakeview, Oregon to visit **Alamos Gold** and review their exploration program of the **Quartz Mountain** epithermal gold deposit. After an overnight stay in Klamath Falls, Oregon, we will continue our trip on Sunday with an exploration of the lava tubes at **Lava Beds National Monument in California**. The last stop on our trip will be a visit to the **Glass Mountain pumice deposit** in the Medicine Lake Volcanic Complex. Complete with spectacular views of Mt. Shasta, this promises to be a field trip with something for everyone! **Registration page 9.**



(Schwarz abstract, cont. from page 6)

weathering phenomenon that develops the characteristic shale fissility. Other commonly-used but rarely defined names include siltstone, argillite, lutite, micrite, claystone, and pelite.

Despite the misname shame, mudstone is the most important of all rock types. It is by far the most abundant sedimentary rock, constituting about two thirds of the sedimentary column on [Earth](#). Mudstone greatly influences groundwater flow; can be rich in metals; and hosts Carlin-type gold deposits. Most importantly, whether containing a fraction of a percent, or several ten percent of organic matter, mudstone is the hydrocarbon source that fuels the world economy. Horizontal drilling and hydraulic fracturing now allow exploitation of vast hydrocarbon reserves stored in mudstone deposits, such as the Eocene Elko Formation, recently tapped by Noble Energy.

I will review mudstone, and present highlights of seminal papers that clarify terminology and debunk a lot of what we think we know about fine-grain rocks and their depositional environments. Highlights will include: description strategies and practical naming guidelines (Lazar, et al., 2015); Miss Kitty's ternary compositional classification featuring carl, tarl, and sarl (Milliken, 2014); and Shanmugam's life-long work that disproves the Bouma turbidite sequence and the myth of quiescence in the deep dark (Shanmugam, 2006). And finally – a large dose of *The Shalesman*, aka, the *Mud Scientist*: Jürgen Schieber, one of the great geologists of our time.

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**Geological Society of Nevada (GSN) Fall 2014 Field Trip  
Saturday and Sunday, October 17-18, 2015**

**Quartz Mountain, OR; Lava Beds National Monument and Glass Mountain Pumice**

Saturday, October 17th: 7:30 a.m. Meet at the GSN Office, 2175 Raggio Parkway, Reno, NV  
OVERNIGHT PARKING WILL BE AVAILABLE!  
8:00 a.m. Depart GSN Office and drive to Alamos Gold office in Lakeview, OR  
11:30 a.m. Presentation by Alamos Gold and viewing of drill core  
Box lunch will be provided  
1:30 p.m. Depart Alamos Gold office and drive to the Quartz Mountain gold property  
5:00 p.m. Arrive Klamatha Falls, OR and check into Olympic Inn  
6:00 p.m. Drinks, dinner and evening speaker at Mr. B's Steakhouse

Sunday, October 18th: Free Breakfast at the Olympic Inn (or on your own)  
8:00 a.m. Depart Klamath Falls and drive to Lava Beds National Monument  
10:00 a.m. Explore Lava Beds National Monument  
Noon Tour of Glass Mountain Pumice Plant and Deposit  
Box Lunch to be provided  
6:00 p.m. Arrive in Reno, NV

**THANK YOU TO OUR GENEROUS SPONSORS!!**



**Payments must be made by Monday, October 5, 2015**  
**No refunds after Monday, October 5, 2015**

Lodging:  Single  Double

Double Roommate: \_\_\_\_\_

**MEMBER COSTS:**

- \$250 - Single Room
- \$200 - Double Room (Limited Number)
- \$150 - Member's Spouse (in a Singles Room)
- \$0 - GSN Student Member Helpers (limit 6)

**\*NON-MEMBER COSTS:**

- \$300 - Single Room
- \$200 - Double Room (Limited Number)
- \$150 - Non-Member's Spouse (in a Singles Room)

\*Non-members are encouraged to become members of the GSN for \$50 annual dues in order to take advantage of the reduced rate.

Total amount included with this form: \_\_\_\_\_

Payment:  Check # \_\_\_\_\_  Cash  Visa  Master Card  Discover  American Express

Card Number: \_\_\_\_\_ Exp. Date: \_\_\_\_\_ 3-digit security code: \_\_\_\_\_

Name (as it appears on card): \_\_\_\_\_

Return with payment to: Geological Society of Nevada  
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Reno, NV 89512  
Phone: (775) 323-3500, Fax: (775) 323-3599  
E-mail: gsn@gsnv.org

**2015 Annual General Meeting  
Rescheduled to November 6!!**

2015 Annual General Meeting  
Friday, November 6, 2015  
Silver Legacy Resort & Casino  
407 North Virginia Street  
Reno, NV 89501

Meeting Rooms: Silver Baron One & Two  
Luncheon & Reception: Rum Bullions Patio

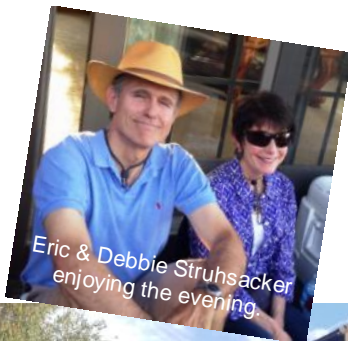
**GSN 14th ANNUAL SUMMER  
"SILVER" SERIES**

Dan Kappes and Kappes, Cassiday & Associates again hosted another very successful evening of the GSN's Summer Silver Series. 145 GSN Members and guests gathered in Dan's backyard in Reno, NV to listen to Rick Rule, President of Sprott Holdings talk about junior companies, availability of cash, and the real need to explore for and find good deposits now.

Rick had pertinent and valuable thoughts to share with the attentive audience who walked away with a better understanding of the markets and hopes that this downturn is actually an opportunity to jump into the mining business for the ride back up again.



Dan Kappes, Host & Sponsor, welcomes the crowd to his home.



Eric & Debbie Struhsacker enjoying the evening.



Rick Rule addresses the attendees.

**G.S.N. BABY ANNOUNCEMENTS!**

The G.S.N. welcomes two new baby boys to the fold! Sean and Harmony (Farnsworth) Warren welcomed beautiful boy, Lachlan during the GSN Symposium on May 18th! Also, Lucia Patterson and Travis Locken had their precious little boy, Augie on June 5th right after the Symposium. (Both babies attended the Symposium, just in different forms!) Congratulations to all of the proud parents who are all current GSN members I'm happy to say! One of these little guys is a future geologist for sure!

Announcing...



**Lachlan Richard  
Warren**

May 18, 2015  
7lbs. 19ins.

Proud Parents: Sean & Harmony






**Agostino "Augie" Shane Locken**

Proudly born to Travis G. Locken and Lucia M. Patterson on June 5th 2015 7lbs 11oz 21" long.



## **NEWS FROM THE GSN FOUNDATION**

Last year was another very successful year for the Foundation. The following is a summary of our activities.

### **K-12 Field Trip Grants/Field Camp Grants**

\$16,457 was distributed as part of the K-12 field trip grant program, which is one of our most important programs. The Foundation funds transportation costs for field trips to help mold young minds into thinking about Earth Sciences as a career choice, or at least an interest in later life. During FY2014-2015 we reached 68 classes from seven Nevada communities (Incline Village, Reno, Minden, Fernley, Sparks, Winnemucca, and Las Vegas area).

For the third year Goldcorp provided the Foundation with a generous donation of \$5,000 to increase the funding for UNR Geology Field Camp scholarships. This allowed the Foundation to award seventeen \$1,000 scholarships representing about half of the tuition for the course.

The opportunity to support the UNR porphyry mapping course in the Yerington mining district was available again. Funding was supplied to cover student's room and board, which totaled \$1,560. This was a special request for John Muntean, the course instructor.

### **UNR/UNLV Geology Scholarships**

The Foundation continues to contribute to the UNR geology scholarship which commonly makes two awards each year. The Foundation is also working with the geology department at UNLV to endow a scholarship. We are half way to having the endowment fund at which time a scholarship can be awarded. UNLV is seeking alumni, and others, who are interested in contributing to the endowment, along with contributions from the Foundation.

### **NBMG Mapping Program**

The Foundation contributed \$5,000 to the Bureau which assisted with the publication of four geology maps; Welcome Quad-Map 184, RBM Pit Bald Mountain-OF15-1, South Eureka District-Map 183, and Central Robinson Mountain-OF15-2.

### **FY2015-16**

Thanks to all of the GSN golfers the Foundation received \$2,810 from the sale of mulligans and raffle tickets. Thank you again, this gets us off to a good start for the coming year.

Roger C. Steininger  
Chair, GSN Foundation



# Foundation

*Thank you to our  
generous donors in  
August!!*

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# ROCK TALK

## Landslides Triggered by Nepal Earthquakes A Scientific Look at What Happened and What Could Happen this Monsoon Season

Reprinted from USGS website, July 28, 2015



Villagers in Kerauja, Nepal standing below a large rock slide that resulted in one fatality.

MENLO PARK, Calif. — A new report from the U.S. Geological Survey provides critical landslide-hazard expertise to Nepalese agencies and villages affected by the April 25, magnitude 7.8 earthquake that shook much of central Nepal. The earthquake and its aftershocks triggered thousands of landslides in the steep topography of Nepal, and caused nearly 8,900 fatalities. Hundreds of those deaths were due to landslides, which also blocked vital road and trail lifeline routes to affected villages.

Landslides caused by the earthquakes continue to pose both immediate and long-term hazards to villages and infrastructure within the affected region. Several landslides blocked rivers, creating temporary dams, which were a major concern for villages located downstream. The report provides a rapid assessment of landslide hazards for use by Nepalese agencies during this current monsoon season.

With support from the U.S. Agency for International Development's Office of U.S. Foreign Disaster Assistance, and in collaboration with earthquake-hazard organizations from both the United States and Nepal, the USGS responded to this landslide crisis by providing expertise to Nepalese agencies and affected villages. In addition to collaborating with an international group of remote-sensing scientists to document the extent and spatial distribution of landsliding in the first few weeks following the earthquake, the USGS conducted in-country landslide hazard assessments for 10 days in May and June. Much of the information obtained by the USGS in Nepal was conveyed directly to affected villages and government agencies as opportunities arose. Upon return to the United States, data organization, interpretation and synthesis immediately began in order to publish a final report.

This new report provides a detailed account of the assessments performed in May and June, with a particular focus on valley-blocking landslides because they have the potential to pose considerable hazard to many villages in Nepal. The results include an overview of the extent of landsliding, a presentation of 74 valley-blocking landslides identified during the work, and a description of helicopter-based video resources that provide over 11 hours of high resolution footage of approximately 1,000 km (621 miles) of river valleys and surrounding areas affected by the earthquakes. A description of site-specific landslide-hazard assessments conducted while in Nepal and detailed descriptions of five noteworthy case studies are also included. The report ends with an assessment of the expectation for additional landslide hazards in the summer monsoon season following the earthquakes.

The full report, [USGS OFR 2015-1142](#), "Assessment of Existing and Potential Landslide Hazards Resulting from the April 25, 2015 Gorkha, Nepal Earthquake Sequence" is available [online](#), as well as the [video footage](#) collected during the research.



Photographs showing the Langtang, Nepal debris avalanche, which destroyed the entire village of Langtang. An estimated 200 people were killed in this single event. A, Oblique northwest view of deposit with cliff in which the debris became airborne. Homes in foreground were pushed over by the ensuing airblast. B, Aerial view of debris avalanche deposit showing location of the Langtang River tunnel through ice and debris.



Aerial photographs showing landslides triggered by the April and May 2015 Gorkha earthquake sequence in central Nepal. A, Widespread ridgetop landsliding in Gorkha district. The Kerauja rock slide (cover image of report) is wide scar on ridge visible in photograph background (arrow). B, Partially breached Gogane landslide dam in Rasuwa district of Nepal. Top of scarp below village (arrow) is approximately 400 m above river level. C, Rock falls in the Urkin Kangari Valley, Sindhupalchok district. Image shows approximately 1,200 m relief between top of foreground cliffs and valley floor.

## Activity Update

Mike Brady, July 2015

[www.activityupdate.com](http://www.activityupdate.com)

### NEVADA

Nevada Copper Corp. announced that recent drill results at the Pumpkin Hollow Project include 106.7-153.9 meters @ 0.37% Cu, 0.05 gpt Au (S-04); 243.8-380.4 meters @ 0.29% Cu, 0.04 gpt Au (S-05); 216.4-307.9 meters @ 0.18% Cu, 0.01 gpt Au (S-06) and 167.6-304.2 meters @ 1.00% Cu, 0.16 gpt Au (S-07). (resource = 485,840,000 tonnes @ 0.45% Cu, 0.03 gpt Au measured+indicated) *Press Release:* July 15

Pacific Wildcat Resources Corp. announced that it acquired an option to earn a 100% interest in the Rift Property from Sunline Resources Ltd. for \$50,000 cash and 22,000,000 shares. *Press Release:* July 10

Corvus Gold Inc. announced that recent drill results at the North Bullfrog Project include 47.54-51.65 meters @ 1.3 gpt Au, 2.7 gpt Ag (NB15-425) and 154.84-158.53 meters @ 1.31 gpt Au, 1.5 gpt Ag (NB15-426). (resource = 15,230,000 tonnes @ 0.37 gpt Au indicated) *Press Release:* July 9

Allied Nevada Gold Corp. (bankrupt) announced that it suspended all mining operations at the Hycroft Mine. The will continue to process the leach heaps and stockpiled ore for the Merrill-Crowe plant for an estimated additional 12-18 months. (reserve = 1,007,300,000 tonnes @ 0.37 gpt Au, 15.7 gpt Ag proven+probable) *Press Release:* July 8

Western Lithium Corp. announced that it offered to acquire Lithium Americas Corp. through a 1.0 share Lithium Americas/0.789 share Western Lithium exchange basis valuing Lithium Americas at roughly \$64,000,000. (Cauchair-Olaroz, Argentina Project = 3<sup>rd</sup> largest lithium brine resource in the world) *M.J.:* July 3

Silver Standard Resources Corp. announced that recent drill results northwest of the 8 South Pit at the Marigold Mine include 140.2-231.6 meters @ 2.48 gpt Au (MRA-6034) and 221.0-277.4 meters @ 1.18 gpt Au (MRA-6104). (reserve = 196,430,000 tonnes @ 0.52 gpt Au proven+probable) *M.J.:* July 10

Scorpio Gold Corp.(70%) announced that recent drill results at the Mineral Ridge/Bluelite Project include 28.96-38.10 meters @ 4.18 gpt Au (MR151535); 114.3-117.35 meters @ 0.98 gpt Au (MR151536); 62.48-65.53 meters @ 7.82 gpt Au (MR151538) and 19.81-22.86 meters @ 1.06 gpt Au (MR151539). (resource = 4,230,000 tonnes @ 1.47 gpt Au indicated) *Press Release:* July 20

Pershing Gold Corp. announced that based on recent studies at the Relief Canyon Project, oxide resources aggregate 11,074,000 tonnes @ 0.82 gpt Au measured; 22,487,000 tonnes @ 0.58 gpt Au indicated and 6,300,000 tonnes @ 0.34 gpt Au inferred. Unoxidized resources aggregate 379,000 tonnes @ 1.85 gpt Au indicated and 1,800 tonnes @ 0.86 gpt Au inferred. (was 24,270,000 tonnes @ 0.68 gpt Au measured+indicated and 9,200,000 tonnes @ 0.57 gpt Au inferred-oxide and 227,000 tonnes @ 2.42 gpt Au indicated and 148,000 tonnes @ 1.64 gpt Au inferred- unoxidized) *Press Release:* July 6

Premier Gold Mines Ltd.(40%) announced that based on recent studies at the South Arturo Project, resources aggregate 19,128,000 tonnes @ 1.35 gpt Au measured+indicated and 3,866,000 tonnes @ 0.68 gpt Au inferred) (was 31,098,000 tonnes @ 1.67 gpt Au proven+probable) *Press Release:* July 23

Klondex Mines Ltd. announced that it received state approval to expand the tailings dam at the Midas Mine by an additional 820,000 tonnes capacity. (reserve = 220,000 tonnes @ 12.9 gpt Au, 372.9 gpt Ag proven+probable) *Press Release:* July 14

Nevada Zinc Corp. announced that recent drill results at the Lone Mountain Project include 146.3-152.4 meters @ 2.71% Zn, 0.41% Pb (LM15-33); 128.02-144.78 meters @ 4.20% Zn, 1.76% Pb (LM15-34) and 146.3-237.74 meters @ 9.49% Zn, 1.34% Pb (LM15-36). *Press Release:* July 22

NuLegacy Gold Corp.(70%) announced that recent drill results at the Iceberg Project include 134.1-166.1 meters @ 0.19 gpt Au (RHB-55); 53.3-86.9 meters @ 0.20 gpt Au (RHB-56); 67.1-83.8 meters @ 0.20 gpt Au (RHB-57) and 131.1-166.2 meters @ 3.41 gpt Au (RHB-58). *Press Release:* July 23

## CLASSIFIED ADS

Atoka Gold has 3,000 ft. of new drill casing and 200 ft.+ of one-time used. It is 4.5" O.D. x .237 wall x 20' lengths ASTM A53 grade B w/F480 thread.

It is located at our field office in Battle Mountain, NV. We would like to get \$10/ft. or offer.

Please contact: Arthur Leger, (775) 560-2856 or

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# OBITUARY

## Dr. M. Dean Kleinkopf, Geophysicist/Geologist February 1, 1926 to August 1, 2015

The national geologic community and the Tobacco Root Geological Society in particular have lost one of our long term and most distinguished members. Dr. Kleinkopf passed away in Henderson, Nevada, Saturday, August 1. A three-year cancer survivor, he fought a courageous battle with a positive attitude until the end. Dean loved his family, rocks, wine and spirits, pie, traveling with his wife, Nancy, and stayed in good enough shape to hike the Grand Canyon at age 77.

Appointed to West Point, Dean then served in the Navy during World War II. Returning home, he earned a mining engineering degree from what is now the Missouri University of Science and Technology at Rolla. He received his PhD in Geology from Columbia University in 1955, and promptly accepted a position at Chevron Oil as an exploration geologist for petroleum in the Western United States and Alaska for ten years. In 1965, he moved his young family to Denver to work for USGS at the Federal Center in Lakewood.

In September 1988, Dean married Nancy. Over the last twenty-seven years, they spent many weeks abroad on adventurous foreign travels: Europe, Asia, Africa, even the Middle East. Dean remained a civil servant until 2000. After retiring, the couple built a home in Mesa, Arizona. His status changed to Emeritus Geologist when he joined the USGS Tucson office, adding his expertise for several years before uprooting, and relocating to Nevada as a sincere retiree.

During his 33-year tenure as a Research Geophysicist/Geologist, Dean worked overseas extensively, including Thailand, Bangladesh, Indonesia, and Saudi Arabia. He worked in many U.S. states as well, focusing primarily on geophysics in Montana, Idaho, and Colorado. He produced innumerable USGS publications, including professional papers, open-file reports, and aeromagnetic and Bouguer anomaly maps. He also worked extensively in the Belt, including older projects such as RARE II and the Upper Mantle Project. He studied the regional gravity and magnetic anomalies of the Stillwater Complex, and contributed to Special Publication 92 produced by the Montana Bureau of Mines and Geology. His journal articles and abstracts were published in the Geological Society of America's *Geology* and *GSA Bulletin*, the American Geophysical Union's *Eos*, and the Tobacco Root Geological Society's *Northwest Geology*.

Service work for professional societies was important to Dean, giving generously of his time and council. His many memberships included the American Association of Petroleum Geologists and the American Geophysical Union; he was certified by the American Institute of Professional Geologist and was elected President of the Arizona Section in 2004; he became a Fellow in the Geological Society of America, serving as President of the International Division in 2002-2003, and serving a three-year term on GSA's Annual Program Committee representing the International Division.

Dean was one of the first regular attendees of the Tobacco Root Geological Society, and rarely missed a meeting in its 40-year history. He made newcomers feel welcome, served on several committees, was elected President in 1987-1988, and then appointed to the Board of Directors in 1989. He received the Society's highest honor, the "Hammer" award, in 2004, and was granted Honorary Member status in 2010. Dean was also a member of the Geological Society of Nevada's Southern Nevada Chapter.

## OTHER UPCOMING EVENTS

**1 September—Arizona Geological Society meeting, "The Genesis of the Kramer Borax Deposit, Rogers Lake, Mojave Desert, CA: A 50 Year Retrospective"** presented by **Carl Bowser**. 6 p.m. to 9 p.m. at the Sheraton, 5151 E Grant Rd. (& Rosemont), Tucson, AZ To register click on the link: [www.arizonageologicalsoc.org/event-1929071](http://www.arizonageologicalsoc.org/event-1929071)

**3 September—Nevada Petroleum & Geothermal Society meeting –Speaker: Dick Benoit, Consulting Geothermal Geologist. Topic: Dixie Valley Geothermal Power Project.** at the Ramada Reno Hotel, 1000 East 6th St., Reno, NV. Cocktails—6:30 pm; Dinner—7 pm. Please RSVP by Monday, August 31, for the Dinner Meeting with the following link: <https://docs.google.com/forms/d/1LHEMiXnKmTXGCC2zFkvxECHx79vkGxz2k9lxK6NvF0l/viewform>

**12-16, September—Heap Leach Solutions 2015**, Peppermill Resort Hotel Casino, Reno, Nevada. For more information see add on page 18 or visit the website: [www.heapleachsolutions.com](http://www.heapleachsolutions.com).

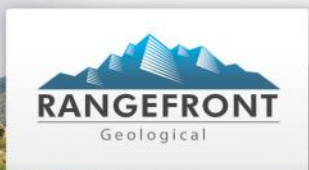
**18-20, September—the NMEC (Nevada Mineral Exploration Coaliton) is hosting the 3rd Annual Great Basin Rendezvous** at Camp Lamoille near Elko, NV. Contact Dave Shaddrick, [DShaddrick@aol.com](mailto:DShaddrick@aol.com) or Warren Thompson, [wthompson@premiergoldmines.com](mailto:wthompson@premiergoldmines.com) for more information.

**20-23, September—the GRC—Geothermal Resource Council 2015 39th Annual Meeting & GEA Geothermal Energy Expo.** Register now for the 2015 GRC Annual Meeting & GEA Expo to be held at the Peppermill, Reno, NV. <http://www.geothermal.org/meet-new.html>

**23-25, September—SMA—Society of Mineral Analysts Annual Conference**, Elko Convention Center, Elko, NV. <https://www.sma-online.org/index.php/display-div-div>

**27-30, September—SEG 2015: World-Class Ore Deposits: Discovery to Recovery, Hobart, TAS, Australia.** Visit <http://www.seg2015.org/> for details and to register online.

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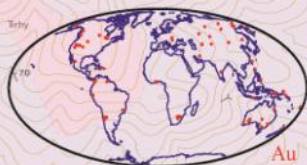
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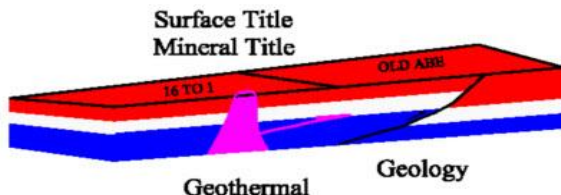
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**REMINDER—VOLUNTEERS NEEDED!**



**National Science Teachers Association  
in Reno on October 22-24, 2015  
GSN Volunteers Welcome**



As many as 5,000 teachers are expected to attend the National Science Teachers Association area conference in Reno October 22-24 (Thursday-Saturday), 2015.

The Minerals Education Coalition of the Society for Mining, Metallurgy, and Exploration is coordinating activities at a 10x20-foot geology and mining booth in the exhibition hall at the Reno-Sparks Convention Center. They will bring various posters and handouts for the teachers to take back to their classrooms.

The Education Committee of the Nevada Mining Association is gathering samples of ores and minerals (1,500 each) to give away, and the Mackay Rockhounds (UNR's geology club) will be helping to put the samples and labels in plastic bags. We expect to get gold ore from Round Mountain, silver ore from Coeur Rochester, copper-silver ore from Phoenix, diatomite from EP Minerals in Pershing County, gypsum from Empire, barite from Lander County, and pumice from California.

GSN volunteers will be most welcome to assist in explaining to teachers the importance of mining and the uses of the metals and industrial minerals as they pick up their samples. Booth times are:

- 11:00 a.m. to 5:00 p.m. on Thursday, October 22
- 9:00 a.m. to 3:00 p.m. on Friday, October 23, and
- 9:00 a.m. until noon on Saturday, October 24.

If you think you can help, please send Rachel Grimes, MEC Outreach Coordinator, <[grimes@smenet.org](mailto:grimes@smenet.org)>, and Jon Price, GSN Past President, <[JonathanGPrice@alumni.ls.berkeley.edu](mailto:JonathanGPrice@alumni.ls.berkeley.edu)>, an e-mail.

## GEOLOGICAL SOCIETY OF NEVADA



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### **YOUR 2016 G.S.N. MEMBERSHIP RENEWALS ARE DUE NOW!**

It is time to renew your membership dues for the current fiscal year 2016!

You can renew online at the G.S.N. website by following this link:

<http://gsnv.org/membership/join-gsn.php>

You can also use the paper form available at the same link above (or print it from the August newsletter) and return it to the GSN office by Fax (775-323-3599) or mail to: GSN, 2175 Raggio Pkwy., Reno, Nevada 89512.

(Thank you in advance for paying now as it relieves Laura's stress as the deadline approaches!)