Geological Society of Nevada Southern Nevada Chapter Newsletter

November 2007

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Southern Nevada Chapter
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Student Research Presentation Night

PRESENTERS: **Zach Artz**
Lora Griffin
Robyn Howley
Greg Zellner

DATE: *Thursday, November 29, 2007*
LOCATION: LFG Rm. 105
University of Nevada - Las Vegas
TIME: *Social half-hour at 6:45 pm*
Meeting business at 7:15 pm
Talk at 7:30
SPONSOR: **OPEN**

This November's meeting is no turkey! *This month some of our student members, Zach Artz, Lora Griffin, Robyn Howley, and Greg Zellner, will be presenting their research project posters. This will be a great opportunity for students and professionals to network and to discuss the most recent geology research being conducted on the UNLV campus. For your convenience, abstracts of the student presentations are attached to the end of this newsletter.*

Don't forget next month we will be sharing our holiday meeting with Nevada Friends of Paleontology at the Nevada State Museum. This will not only be a great chance to get to know the members of another local organization and learn more about what they are working on in Nevada, but there will also be a fundraising auction to support our chapter and a speaker who will talk about the exciting things they have been digging up out at Gilcrease Ranch. Donations are needed for the auction to be a success! If you have any items you wish to donate contact Bruce Hurley at hurley@nv.doe.gov. Directions to the museum can be found at the end of this newsletter.

This week's meeting sponsorship opportunity is still open. Contact Bruce at the email address above if you would like to help. We wish you a great holiday season!

Happy Thanksgiving! ***-- Lora Griffin***

HOLIDAY CELEBRATION With FRIENDS OF PALEONTOLOGY

Our December meeting will be held jointly with the Friends of Paleontology. The event will take place at the Nevada State Museum on Saturday, December 15. The time will be announced in next month's newsletter. Please note that this is not going to be held on the traditional Thursday. Festivities will begin with a talk about recent finds at Gilcrease Ranch and continues with a silent auction and charitable fundraiser.

Donations are now being accepted for the silent auction fundraiser. Rock and fossil specimens, geology gear, or gift certificates are all items that could help bring in funds to support our chapter. Other ideas are welcome.

This celebration will have plenty of good food and good conversation, too! It is a great opportunity to build relationships with members of a neighboring organization. To donate items contact Bruce Hurley at hurley@nv.doe.gov. Directions follow later in the newsletter. The time to meet will be announced at the November meeting.

Mammoth

Ichthyosaur

Photos from Nevada Department of Cultural Affairs web site: http://dmla.clan.lib.nv.us/docs/MUSEUMS/lv/ichthyosaur.htm

WELCOME NEW GSN OFFICE MANAGER KELLY PARSONS

The GSN SNV Chapter welcomes Kelly Parsons who recently assumed the duties of GSN Office Manager. Kelly has a big job ahead of her and is working hard to streamline the transition. She is quickly learning the ropes and business will soon be running better than ever. Kelly is available for comments and suggestions at (775) 323-3500.

GSN BOARD CALLS FOR VOTE ON MAJORITY RULE

The required number of attendees for a quorum was again not present at the recent GSN Board meeting, an ongoing problem so far this year. As the GSN bylaws are currently written, a two-thirds majority is required for a vote by the Board, no less than eight of the eleven current board members. This situation was addressed at the GSN Executive Council Meeting following the Board meeting, and a motion was made and approved to change the voting quorum requirement for the Board to a simple majority. This should be approved by the Board via an E-mail response vote, and will then be submitted to the general membership for approval soon.

The Board will be in need of a number of new members for the 2008-2009 year. Becoming a board member is a great way to show your support for the type of work that GSN does everyday and a great way to have a hand in shaping the future of the organization. Now is the time to start thinking about taking a leadership role for next year.

GSN SPRING 2008 FIELD TRIP

The spring 2008 GSN spring field trip is already in the planning stages.

This trip will be heading to the California Gold Country. It will include visits to gold properties and wineries. The field trip has received enthusiastic support already and is expected to draw a large number of attendees.

Details will be announced in future newsletters.

MEETING SPONSORSHIP

Donating funds to sponsor chapter meetings is a valuable part of what makes our chapter successful. Refreshments made possible by a meeting sponsor helps our chapter reserve funding for much needed student scholarships, as well as chapter field trips and other events.

Often the results of this support are not easily seen, but the results are very real. By donating funds to sponsor meeting refreshments for one meeting sponsors can improve the lives of fellow members now and in the future. In appreciation meeting refreshment sponsors receive monthly recognition in the GSN SNV Chapter newsletter through the end of the fiscal year.

Businesses and individuals alike are invited to sponsor a social hour at one of our GSN Southern Nevada Chapter meetings. Interested? Contact Bruce Hurley at (702) 295-1284 or hurley@nv.doe.gov .

Share your field experiences with other GSN SNV chapter members through a story and/or photos in an upcoming newsletter.
Interested in sharing?
Contact Lora Griffin at lora.griffin@unlv.edu

MEETING SPONSORS

Rich DeLong, Enviroscientists, Inc.

Lance Taylor, Geotemps

UPCOMING EVENTS

November 29:
Meeting—
Student Research Presentations
Presenters:
Zach Artz: *Magmatism and Gold Ore Deposition: Cortez Hills Deposit, Lander County, Nevada*

Lora Griffin: *Key Alteration Mineralogy in Carlin-Type Gold Deposits, Northern Nevada*

Robyn Howley: *Teaching Teachers through Field Experiences: A Study on the Earth-System Approach for Earth Science Curriculum Development*

Greg Zellner: *Copper and Gold Mineralization: Little Giant Mine, Central Western Arizona*

December 15 (Saturday):
Holiday Party & Joint Meeting with Nevada Friends of Paleontology—
Meeting location: Nevada State Museum
Time: TBA at November meeting
Talk: Recent finds at Gilcrease Ranch
Holiday festivities: Silent Auction and charitable donation

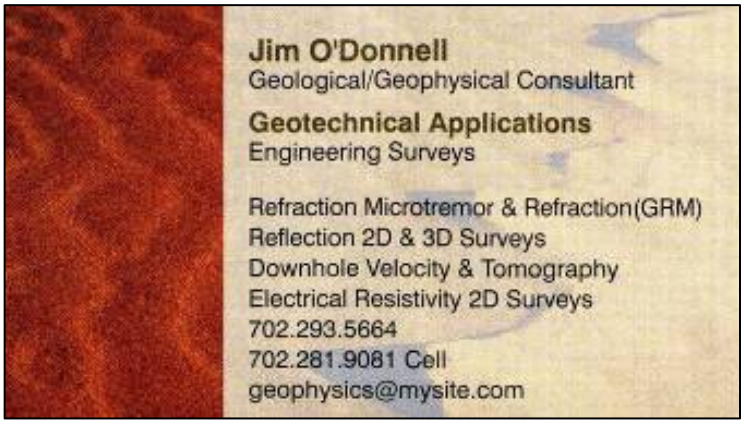
January 31:
Meeting—
Alteration Associated with Gold at Carlin-type Deposits of Northern Nevada -- Lora Griffin

February 28:
Meeting--TBA

March 27:
Meeting--TBA

April 24:
Meeting--TBA

PAID ADVERTISEMENTS



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GSN STUDENT RESEARCH PRESENTATION ABSTRACTS

Magmatism and Gold Ore Deposition: Cortez Hills Deposit, Lander County, Nevada

Zachary Artz
Department of Geoscience, University of Nevada, Las Vegas

Abstract

Carlin-type gold deposits have been mined continuously for about forty years and their reserves ensure that the state of Nevada will continue to be one of the world's leading gold producers. Since their discovery, numerous studies have attempted to elucidate the mechanisms by which the deposits form; a key goal is to develop better exploration models. Oxygen isotope data from ore stage quartz, whose paragenesis is constrained by cathodoluminescence, and oxygen and hydrogen isotope data from fluid inclusions within the quartz suggest that meteoric, magmatic, and/or metamorphic waters may have been involved in gold transport and precipitation. Paleodepth estimates, based on apatite fission track data, suggest that the temperature of the host rocks was not greater than approximately 100ºC at the time of mineralization. Thus, there is a need to invoke either an anomalously high geothermal gradient, or a deep, possibly magmatic, heat source. At the Cortez Hills deposit, located at the southern edge of the Cortez Mountains in Lander County, Nevada, there are abundant intrusive and extrusive igneous rocks which exhibit a variety of pre and post-mineralization contacts with Carlin-type mineralized rocks. This study aims to elucidate the potential relationship between magmatism and gold-ore-deposition at Cortez by bracketing mineralization using cross cutting relationships and by using geochronological analyses to establish a temporal link between magmatism and Carlin-type mineralization.

Biography

Zach received his Bachelor of Science degree in geology from Kutztown University of Pennsylvania, where he achieved Summa Cum Laude, in May 2006. He worked for Kinross Gold Corp, Round Mountain, Nevada in Summer 2006 and for Barrick at the Cortez Joint Venture in Nevada in Summer 2007. He has been a Graduate Teaching Assistant at the University of Nevada, Las Vegas since 2006.

Zach's research interests are in the exploration for and acquisition of economically viable earth resources. He chose the topic of this study because Cortez Hills is a Carlin-type gold deposit that is in the early stages of mining. Studying a deposit from the beginning of its life when drill core is your primary information, to the end of its life, when it is completely mined out, is a rare insight into the mining industry. The Cortez Hills deposit is intimately associated with numerous intrusive igneous rocks and is a prime target to investigate any magmatic links to Carlin-type mineralization.

Zach plans to graduate from UNLV with a Master of Science degree this coming spring, 2008.

KEY ALTERATION MINERALOGY IN CARLIN-TYPE GOLD DEPOSITS, NORTHERN NEVADA

Lora J. Griffin, Jean S. Cline, and Debra Soukup
Department of Geoscience, University of Nevada, Las Vegas

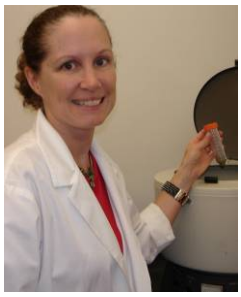
Abstract

The Carlin-type gold deposits in northern Nevada comprise one of three regions in the world that have produced more than 50 million ounces of gold, yet the geochemical processes involved in the formation of these deposits are not well understood. To better understand geochemical processes related to deposit formation, studies were conducted to identify clay and mica minerals that accompany gold precipitation. Although previous studies in some deposits have identified various clay and mica minerals associated with gold, no study has systematically 1) identified minerals at multiple deposits on multiple trends, 2) determined which clay/mica minerals are present, and 3) determined which clay/mica minerals correlate consistently with gold abundance and, therefore, formed in association with gold.

During this study, samples from 6 transects across 5 deposits from the Getchell and Carlin trends were evaluated using X-ray diffraction of whole rocks and clay separates, petrographic analysis, and geochemical analysis. Analyses were conducted to 1) identify primary minerals in wall rocks, 2) identify secondary alteration minerals that correlate with gold abundance, 3) quantify mineral abundances, 4) determine variation of mineralogy as a function of gold grade, and 5) correlate elemental concentrations with mineralogy. Analyses determined that 1) gold correlates positively with quartz, illite, illite-smectite, and kaolinite, 2) gold correlates negatively with calcite and/or dolomite, 3) there is a correlation between kaolinite, and/or illite and high-grade ore, and 4) XRD analyses of clay mineral separates effectively refines mineral identification.

Some variations in clay and mica mineralogy were identified at different deposits and are likely caused by small differences in system chemistry including composition of host rocks, pressure, temperature, and ore fluid chemistry. For example, more rapid ore fluid cooling would have increased quartz deposition and greater ore fluid acidity probably enhanced carbonate dissolution and clay mineral formation. Such variations in conditions probably produced local variations in clay minerals associated with gold, and show that gold deposition was accompanied by the presence and/or absence of, and variations in the abundance of kaolinite, illite, and illite-smectite.

Biography



Lora is currently working toward completion of a Bachelor of Science degree in Geology at the University of Nevada, Las Vegas. She has been conducting research on Carlin-type gold deposits under the guidance of Dr. Jean S. Cline since June 2006 when she received her first award from NSF-EPSCoR to conduct such studies. She has since received 3 additional NSF-EPSCoR grants to continue research related to these deposits. The work conducted during these studies has been recognized for a fifth place award at the 2007 Northwest Mining Association Student Poster Contest and a first place award at the recent Arizona Geological Society Ores and Orogensis Conference. Lora is president of the student chapter of the Association of Environmental and Engineering Geologists, Secretary of the Geoscience Club at UNLV, Chair of Abstracts for Programs for the 2007 & 2008 Las Vegas GeoSymposiums, and has been the GSN Southern Nevada Chapter newsletter editor since spring 2005.

TEACHING TEACHERS THROUGH FIELD EXPERIENCES: A STUDY ON THE EARTH-SYSTEM APPROACH FOR EARTH SCIENCE CURRICULUM DEVELOPMENT

Howley, Robyn A.[1], Johnson, Kimberly A.[1], and Campbell, Brett D.[2]
[1]Department of Geoscience & [2]Office of Academic Assessment, University of Nevada, Las Vegas

Abstract

The weak state of science education in the U.S. is resulting in a generation of students who lack exposure to scientific investigation, leaving the U.S. far behind other countries in both science and technology. Comprehensive science-education reform requires collaboration of scientists and educators at all levels. Teaching Teachers through Field Experiences trained local teachers in the basic techniques of today's Earth scientists using the Earth-system approach to learning. This 4-day, field-based workshop used the natural outdoor laboratory of southern Nevada to improve the science teaching of local 3rd through 5th grade educators. During 2 full-day field experiences, teachers performed exercises that reinforced the observation of the Earth as an interconnected set of systems. Assessments, surveys and interviews were conducted both prior to and after the field experiences. These assessments were used to determine what effect field-based experiences had on teacher knowledge and confidence in teaching Earth science. Results indicate an increase in Earth science content knowledge and comfort leading field trips, however confidence in teaching science did not change. Inexperienced teachers expressed the need for more basic experiences such as rock identification, whereas experienced teachers sought basic Earth-system science experiences. Future field experiences should focus on either the inexperienced or experienced separately.

Biography

Robyn is currently a 4th year PhD candidate in the UNLV Department of Geoscience working on the sequence and chemostratigraphy of the Middle Cambrian succession in eastern Nevada and western Utah for which she was awarded the UNLV President's Graduate Fellowship for the 2007/08 academic year. Robyn received her B.S. in Geology from Salem State College in 1999 and M.S. in Geology from UNLV in 2002. After receiving her M.S. degree, Robyn was employed for 2 years by Geosciences Management Institute, Inc. in Boulder City with her work focused primarily on the Yucca Mountain project for the State of Nevada, Agency for Nuclear Projects. Robyn served as President of the GSN Southern Chapter and on the GSN Board of Directors from 2005 – 2006 and has also been our Vice President, Newsletter Editor and is our current Webmaster. Her Geoscience Education research that will be presented is the result of a UNLV Public Initiative Award to Dr. Kimberly Johnson for 2006/07 of which Robyn was a project facilitator.

Copper and Gold Mineralization at the Little Giant Mine, Central Western Arizona

Greg Zellner
Department of Geoscience, University of Nevada, Las Vegas

Abstract

Copper and gold mineralization at the Little Giant Mine in central western Arizona has been mined intermittently for more than a century, but the source of mineralizing fluids are poorly understood. A combination of mapping, petrography, vein mineralogy, stable isotope, fluid inclusion microthermometry, and geochemistry may elucidate the parental source and timing of ore forming fluids. Three potential sources of ore forming fluids are being considered, based on field mapping and previous work. 1) ore mineralization is the product of degassing felsic magma which is parental to local rhyolite volcanics; 2) mafic intrusions supplied the ore forming fluids; 3) basinal brines mixed with deep fluids are responsible for ore mineralization, as previous work suggests. This study hopes to better constrain the source of ore forming fluids to a magmatic or brine source. Moreover, the age of mineralization will be bracketed based on field observations and Ar/Ar geochronology. This study will help describe and constrain the source of mineralizing fluids at the Little Giant Mine, and may help develop a model for exploration in similar phisogeographic areas.

Biography

Greg received his Bachelor of Science degree from Kutztown University of Pennsylvania in 2005. He worked for a junior mining company in Scottsdale Arizona for approximately one year before beginning graduate work at UNLV. His work in Scottsdale was primarily in exploration, and consisted of mapping, sampling, and defining potential resources. Greg is interested in working in the field of economic geology and more specifically in Au-Cu mining. His research interests focus on determining how deposits formed with the intention of discovering and exploiting metallic resources. His current work is being conducted on what was believed to be detachment-fault mineralization with a possible magmatic influence. Greg chose this topic because of his previous exposure to this field area during his time in Scottsdale. He was told that the deposit was part of a detachment-fault system, but the mineralogy appeared similar to magmatic epithermal veining. He thought that if he could constrain the source of the mineralizing fluids that he may be able to locate other ore mineralization in the area.

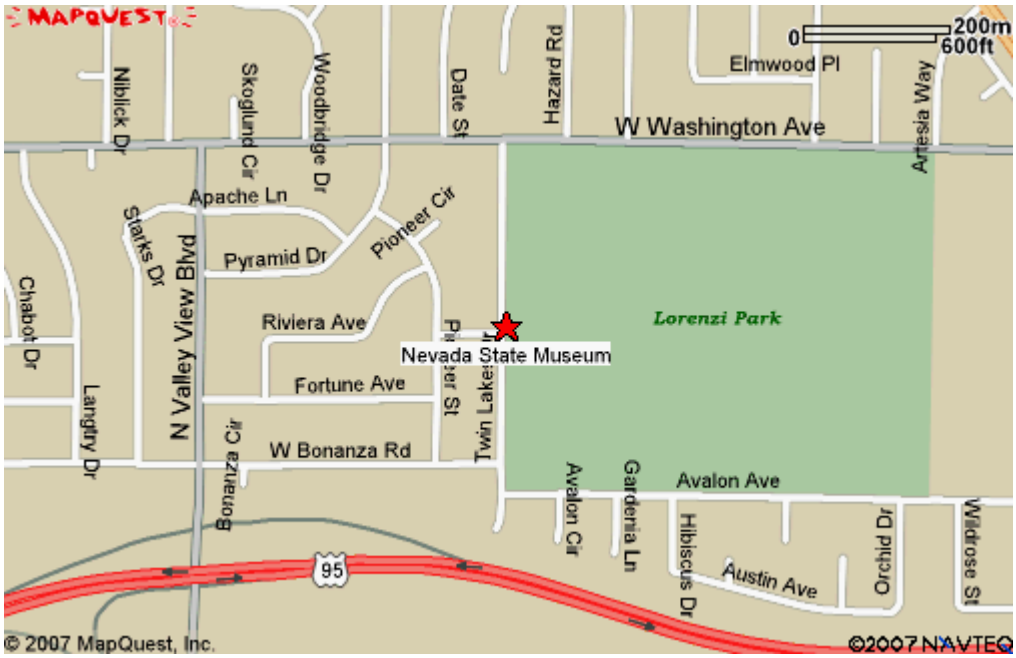
Greg has developed a love of underground hard rock mining and hopes to return to working in the mining industry after graduation. He is especially interested in the extraction and refinement methods by which useable often valuable metal is produced.

Nevada State Museum:

700 Twin Lakes Dr.
Las Vegas, NV 89107
702-486-5205

Directions from UNLV:

Travel west on Flamingo
Turn right onto I-15 N
Turn onto US-95 N at exit 42A continue for ~2.2 miles
Take exit 78, onto Valley View Blvd. heading north, go <0.1 miles
Turn right on West Bonanza Road and travel east until you come to
Twin Lakes Drive and turn left
The Museum is located near Lorenzi Park and Nugget Avenue.



Map copied from Mapquest.com

GEOLOGICAL SOCIETY OF NEVADA

6/06

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The Geological Society of Nevada (GSN) is a non-profit, educational organization whose principal objective is to promote the advancement of geological sciences, especially as they relate to Nevada. GSN supports the dissemination of information through meetings, field trips, publications and academic endeavors. Membership is open to geologists, geophysicists, geochemists, engineers, educators, students, prospectors or anyone else with an interest in the geological sciences and/or the goals of the GSN.

The GSN membership year begins in June. Annual dues of $35.00 ($17.50 for full time students) are due in the fall. The GSN sponsors a Field Trip in the Fall and one in the Spring of each year. Monthly meetings are held on the third Friday of each month, September through May. The following are sanctioned Chapters of the GSN: Elko Chapter, based in Elko; Southern Nevada Chapter, based in Las Vegas, and the Winnemucca Chapter, based in Winnemucca.

Please remember the GSN Foundation when renewing. Foundation dollars are used for the Kindergarten through 12th grade Field Trip Grant Program, Nevada Mapping Grants and University of Nevada scholarships.

MEMBERSHIP APPLICATION/RENEWAL

DATE _____

NAME: _____ POSITION/TITLE _____

CONSULTANT ☐ COMPANY NAME: _____

STUDENT ☐ UNIVERSITY: _____

ADDRESS: _____

CITY: _____ STATE/PROVINCE: _____

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I authorize GSN to send to me, via email: GSN announcements, publication updates, employment opportunities, etc. Yes ☐ No ☐

☐ Regular Membership Dues - email newsletter $35.00	☐ Honorary	$ _____
☐ Regular Membership Dues - hardcopy newsletter via postal service $40.00	☐ Honorary	_____
☐ International Membership Dues - email newsletter only $35.00		_____
☐ International Membership Dues - hardcopy newsletter via postal service $50.00		_____
☐ Student Membership Dues - email newsletter only $17.50		_____

Optional Chapter Affiliation (to be eligible for chapter voting, choose one)

☐ Elko Chapter

☐ Southern Nevada Chapter

☐ Winnemucca Chapter

Student Dinner Fund

☐ I wish to donate to the GSN Student Dinner Fund _____

GSN Foundation

☐ I wish to donate to the GSN Foundation _____

(Donated funds will be used for unrestricted grants and scholarships unless otherwise specified _____.)

TOTAL DUE $ _____

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