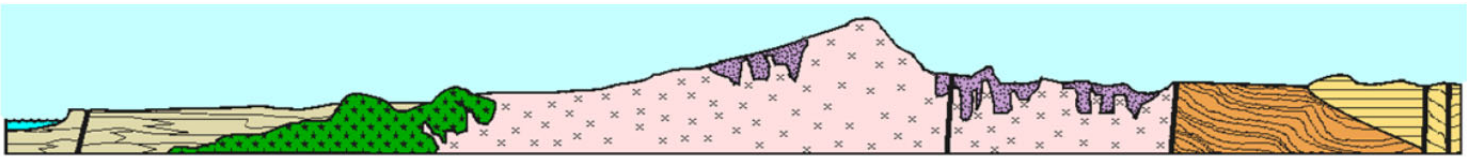


SAN DIEGO ASSOCIATION OF GEOLOGISTS

http://www.sandiegogeologists.org

SDAG MEETING ANNOUNCEMENT

Wednesday, November 14, 2018 *2nd Wednesday*

Student Presenations:

"Instability of Thermoremanence and the Problem of Paleointensity Estimation" – Christeanne Santos

"Constraining the Nature of Electrum From Low-Sulfidation Epithermal Deposits in the Northern Nevada Rift" – Jennifer Maria-Benavides

Where: **Best Western Seven Seas**
411 Hotel Circle South, San Diego, CA 92108 (See Map)

When: 5:30 pm – Social Hour
6:30 pm – Dinner
7:30 pm – Presentation

Dinner: Pot Roast, Roast Pork, Red Potatoes, Salad, Mixed Veggies, Desert

Cost: $30 Member, $35 Non-Member, $20 Students.

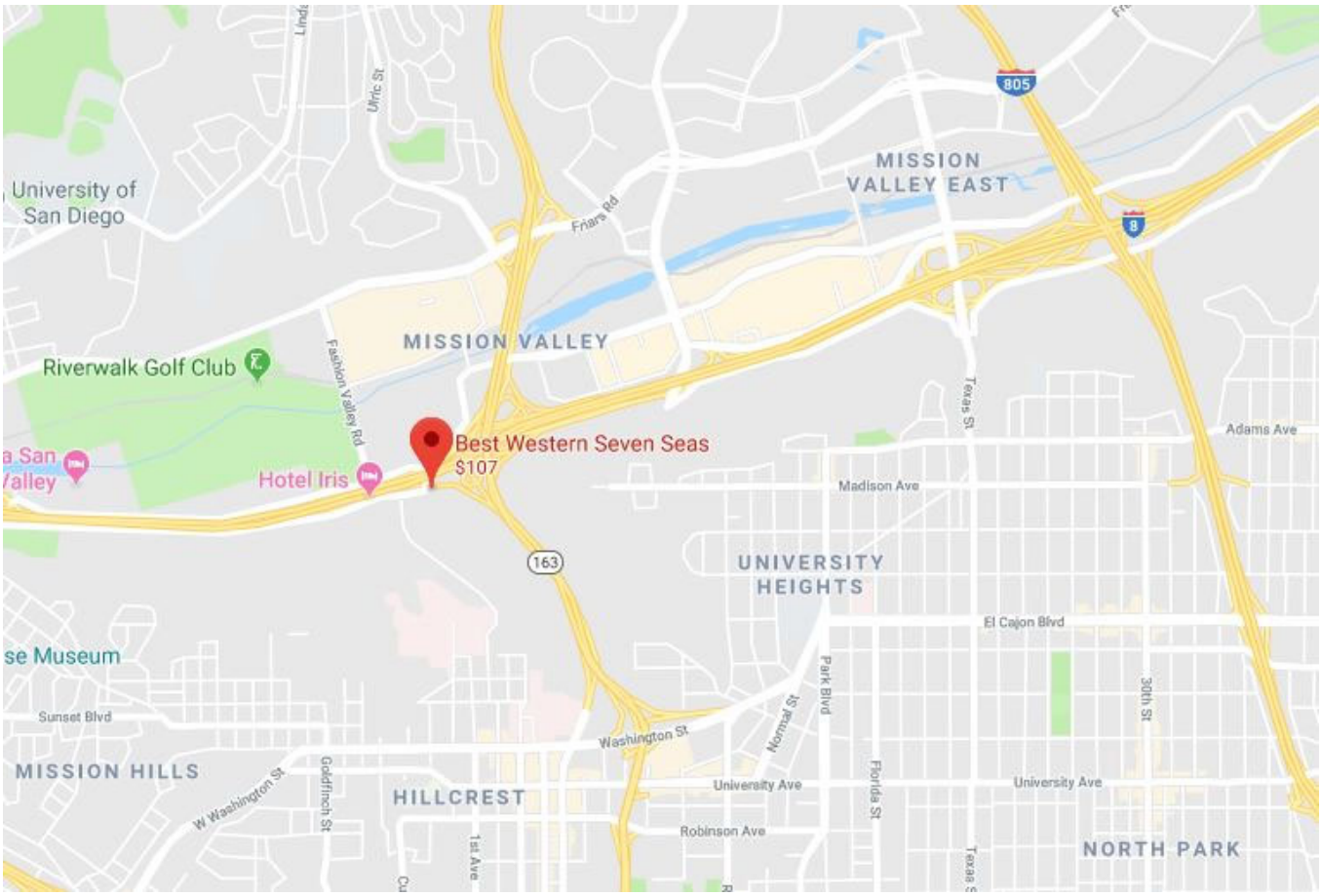
Reservations: Make your reservation **online** at http://www.sandiegogeologists.org/Meetings.html later than noon, Monday, November 12th. Reservations cannot be guaranteed after Monday at noon, but are always preferred over walk-ins. **EARLY reservations well before the deadline are MUCH appreciated.**

Directions:

FROM INTERSTATE 5: If you are heading south on the I-5 take the I-8 east for 2.2 miles. Take the Hotel Circle E exit. Turn left on Hotel Circle. The Best Western will be on your right just before you cross under the freeway.

FROM INTERSTATE 8: Take the I-8 West to exit 4B for Hotel Circle W. Turn right onto Hotel Circle N which has you heading back east. Slight right onto Hotel Circle S. Best Western will be on your left just past the freeway bridge.

Map:



"Instability of Thermoremanence and the Problem of Paleointensity Estimation," by Christeanne Santos

Information gathered from studies of Earth's magnetic field has been integral to advancing many aspects of the geosciences. As a vector quantity, both direction and intensity data can provide considerable insight into the complex processes of the earth, such as models of the dynamic liquid outer core and descriptions of Earth's intricate geological history. Even more relevant to us, the geomagnetic field can affect the functioning of the electrical grid and it also protects us by deflecting harmful radiation from the sun back into space. Directional information is relatively simple to retrieve and analyze, however, intensity estimation requires intricate methodology and broad assumptions. Magnetic minerals within a cooling unit of lava essentially act as a compass and align themselves with the ambient magnetic field of the Earth, gaining a thermal remanent magnetization (TRM). As the rock cools past a critical temperature, that TRM remains stable over geologically significant periods of time, thus providing a snapshot of the magnetic field in which it formed. Stepwise thermal laboratory experiments are favored among paleomagnetists for their robust approach to obtaining measures of this remanent magnetization. These types of experiments result in a simple linear problem to produce an accurate intensity estimate, however, only for samples that are considered "ideal." Complications arise in the theory and method when non-ideal, large-grain magnetic recorders are used, which make up a significant portion of the natural magnetic material sampled in the field for experimental use. These thermal experiments are founded on the ideas that the thermal magnetic history of a sample is entirely reproducible in the laboratory and that acquired remanent magnetization remains stable for long spans of time. Empirical observation from a previous study showed a violation of these fundamental ideas and that the theory does not hold true for non-ideal magnetic recorders. The samples showed growth in their magnetic moments and that their original plots were not able to be reproduced. As an experimental continuation, in this study we used natural samples from previous, unrelated experiments and followed the same experimental protocol of this previous study. We gave a known, laboratory-controlled total remanent magnetization to see if its given laboratory intensity could be accurately reproduced from a typical thermal experiment. These samples were also "aged" over a two-year period to test the assumption of magnetic stability over time. The reason for these changes is not explained by the theory. In the future, we will use sophisticated numerical models of the micromagnetic structures to explore solutions to this problem.

“**Constraining the Nature of Electrum From Low-Sulfidation Epithermal Deposits in the Northern Nevada Rift,**” by Jennifer Maria-Benavides

Gold is a noble metal that has fueled mineral resource exploration in the Northern Great Basin and profoundly affected the national economy. The origin of the gold deposits has been at the center of basic and applied research, with the goal to develop refined exploration models. For the first time, I am able to unambiguously constrain the nature of electrum from a low-sulfidation epithermal deposit in the Northern Nevada Rift. In this study, the highly siderophile elements (HSE; Os, Ir, Ru, Rh, Pt, Pd, Re and Au) serve as an innovative tracing tool due to the inherent relationship between the HSE and Au that can be used to trace the origin of electrum directly. Coupled precise $^{187}Os/^{188}Os$ compositions and isotope dilution HSE abundance data are reported for electrum grains from the Fire Creek Mine, as well as for a suite of host rocks that encompass the bimodal basalt-rhyolite volcanism of northern Nevada. The mid-Miocene bimodal host-rocks have Os isotope compositions consistent with crustal contamination observed in the Columbia River Flood Basalt (CRFB) province. The host rocks are isotopically similar to the CRFB Wannapum, Grande Ronde, and Imnaha basalt formations. Highly siderophile element concentrations are heavily fractionated for the host rocks but are less fractionated for the electrum. Rhenium-Osmium isotope analysis of electrum yields a relatively unradiogenic initial $^{187}Os/^{188}Os$ of 0.1588, demonstrating a source distinct from the crust and that can only be of mantle origin. From this, I estimate that as much as 96% of the gold in the Fire Creek deposit is of mantle origin, in contrast to evidence for much larger crustal contributions from proxy measurements.

UPCOMING MEETINGS

Meetings are usually held on the 3rd Wednesday of the month may change to accommodate the speaker and meeting place schedules. Check the SDAG website for updates

December, 2018	Tom Demere – Natural History Museum
January 16, 2019, Green Dragon Tavern	Matt Burgess, Ken Hudnut and Diane and Monte Murbach – Kilauea Volcano
February, 2019	TBD

2018 SDAG EXECUTIVE COMMITTEE

PRESIDENT:	**Chris Livesey; liveseychris@yahoo.com**
VICE PRESIDENT:	**Ken Haase; haase@geoconinc.com**
SECRETARY:	**Adam Avakian; adam.avakian@aecom.com**
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SDAG PRESIDENT'S CORNER

Hello SDAG!

I would like to extend my heartfelt thanks to everyone involved with the 2018 Field Trip. We had about 50 people come along and explore the geology of the Mojave Desert. This trip was almost 11 months in the making and it went off without a hitch (maybe a little rain). Thank you to my trip co-leaders Dr. Mario Caputo and Dr. Monte Marshall who's endless geologic knowledge surely made this trip infinitely more interesting than I could have on my own. Dr. Norrie Robbins who unfortunately couldn't make the trip (feel better soon!) but provided great insight into the human history of the Mojave. Thanks to Brian Papurello and crew for setting up the camp kitchen and keeping our bellies full. A big thanks to the SDAG officers, Chris Livesey, Adam Avakian and Heather Reynolds who have been such great help before and during the trip. As always, Diane and Monte Murbach provided the Hawaiian theme and margarita drinks each evening so thanks to them and SDGS board members. Geocon, my employer was gracious enough to provide the beer kegs which kept people more than happy. And thanks to everyone who came on the trip to make it so special! We are working on preparing the volume for the trip, hopefully to be published in 2019. It has been a humbling experience and I thank everyone for their kind words on their enjoyment of the trip. Can't wait to see what our 2019 VP Adam Avakian has in store for us next year.

Keep exploring and see you out there!

Ken Haase, 2018 SDAG Vice President (2019 President)
haase@geoconinc.com

ONE-STOP WONDER CHALLENGE!

ONE OSW A MONTH IN 2018!

BE A PART OF SDAG HISTORY!

Have an idea for a one-day or half-day field trip?

Want to share your favorite aspect of San Diego geology?

Contact SDAG to schedule your One-Stop Wonder!

Your OSW may be chosen to be included in SDAG's One Stop Wonder Guidebook!

Contact Monte Murbach for scheduling!

montemurbach@gmail.com

2019 SDAG Annual Field Trip – Owens Valley, CA

Hi SDAG memebers. My name is Adam Avakian. I am the current secretary and future 2019 vice president for SDAG. I am very excited to be tasked with pulling together the annual field trip for 2019 and have some big shoes to fill after attending our latest trip out to the Mojave Desert (thanks to Ken and everyone involved for an amazing trip, and what an awesome group photo!). I am planning on taking us to Owens Valley / Eastern Sierras. I have a few stops in mind already but could definitely use some help on more stop suggestions and ***especially any enthusiastic speakers*** who have some knowledge and a love for the geology of Owens Valley. Here is a sneak peek at next year's trip:

- Owens Valley Fault - 1872 Earthquake Fault Scarp - Lone Pine.
- Alabama Hills – I was recommended a very interesting geological feature to look at here, also potential campground
- Poverty Hills Geology - Owens Valley Fault Pressure Ridge and beautiful fault scarps preserved in basalt flows - Tinemaha Dam – Big Pine
- Crowley Columns – Lake Crowley
- Bishop Tuff – Ideas??
- More ideas (basalt flows, glacial moraines etc.??)

Because it's a long drive and there is a lot to see I would like to try to start the trip Friday morning which would require participants to either get up extremely early Friday morning to drive or to camp out with the group Thursday night (my preferred option) or you can join the group midday on Friday. The bulk of the trip would be completed Friday and Saturday. I think I will plan for a half day of stops on Sunday and try to make them on the way back south towards home. Sunday would also be optional if anyone wants to get home earlier they can head out Sunday morning and skip the stops. Any help or advice would be much appreciated. Like I said, speakers are more than welcome. I'm planning to speak at Tinemaha Dam as my company has done work there but that's all I've got so far! Please send responses to adam.avakian@aecom.com.

Cheers!

Adam

San Diego Geo-Institute Meeting – Tuesday Nov. 13th

Tuesday, November 13th, 6:00 PM to 8:30 PM

Join the San Diego Geo-Institute on Tuesday, November 13th for Technical Presentation. This month's speaker is Mr. Zhangwei Ning, Ph.D., P.E., with Sixense. The presentation is about Multiple Roles of Satellite Technologies in Geotechnical Instrumentation and Monitoring. The meeting will be held at 2nd floor of Rock Bottom Restaurant (8980 La Jolla Village Dr, La Jolla, CA 92037).

Registration Link :
http://events.r20.constantcontact.com/register/event?oeidk=a07efrpzlrg4fecc9f1&llr=n8ruf8oab

For registration questions, contact:
Matteo Montesi (Matteo.Montesi@wsp.com<mailto:Matteo.Montesi@wsp.com>) or
Congpu Yao (congpuy@groupdelta.com<mailto:congpuy@groupdelta.com>)

Free Back Issues of California Geology

Free back issues of California Geology will be brought forth at this month's meeting. Several years are organized in binders, going back as early as 1967! Also, some paleontology texts, yours for the taking. See Todd Wirths at the meeting. Rock on!!

Software Info From Woody Higdon's September Talk

Hi All. For those of you who were not at the September meeting, Woody Higdon discussed his methods and programs he uses for taking amazingly detailed photos in stereo and with gps coordinate attachments. He showed us examples of his from the 2018 debris flows in Montecito. Below are links to free software where one can do more than get their toes wet in this type of work. Thanks again to Woody for the interesting talk!

The GIS software can be found at qgis.org

The canon file display software is called Canon Map Utility and is available on the Canon Camera site.

The image viewing program is called Stereo Photo Maker, and available at stereo.jpn.org/eng/.

WOODROW HIGDON

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woody@geo-tech-imagery.com

California Board for Professional Engineers, Land Surveyors, and Geologists
California Specific Exam Occupational Analysis Survey

The California Board for Professional Engineers, Land Surveyors, and Geologists (BPELSG) is undertaking a comprehensive research project of the professional geology profession referred to as an Occupational Analysis. You are invited to participate in an online survey that will validate the tasks and knowledge that are important to the work performed by geology professionals as it applies to the definition of geology and the authority to practice in California.

In accordance with §7841 (d) of the Geologist and Geophysicist Act, the California Specific Exam is one of three exams required to obtain the California Professional Geologist practice authority license. As you take this survey, please keep in mind that the California Specific Exam is a SUPPLEMENT to the National Association of State Boards of Geology (ASBOG) Fundamentals of Geology (FG) and Practice of Geology (PG) exams. The California Specific Exam is intended to address the areas of geologic practice that are specific to the State of California, and therefore not addressed by the ASBOG exams. The California Specific Exam IS NOT intended to duplicate general geologic practice tasks common to all geologists nationwide that are covered by the national ASBOG FG and PG license exams.

The results of the study will be used to update the Geology California Specific Exam and will also provide BPELSG with valuable information regarding the work performed by geology professionals. The Occupational Analysis is completed every five to seven years and is the source for determining the content of the licensing exams. This analysis is an essential step in keeping the California Specific Exam current and practice-related.

Your participation is critical to ensuring the success of the study. As part of this study, we need your assistance in completing an online survey. Please consider filling out the survey that takes approximately 45 minutes to complete and can be saved and completed in multiple sessions.

INSTRUCTIONS FOR PARTICIPATION:

If you previously signed up for the Occupational Analysis email list, we thank you. In order to avoid duplication, licensed geologists on the email list are encouraged to use the link sent via email. If you did not sign up or receive an email, you are invited to participate the in online survey using the link provided below.

https://www.prometricsurvey.com/se/123C457B2D2B599601

The following contact information is provided if you encounter any technical difficulties with completing the survey online or have questions regarding the survey content. Please be sure to identify the survey you are taking (Geology California Specific Exam Occupational Analysis 2018). Email: julie.morby@prometric.com or Telephone: (801) 541-9738. You will receive a response within 24 hours, Monday through Friday (except holidays).

Your completed survey should be submitted on/by October 31, 2018 (11:59 PM PST).

Thank you in advance for your participation in this survey and ongoing support of the program.

Regards,

The Board for Professional Engineers, Land Surveyors, and Geologists and Prometric

Professional Geologists Needed-Occupational Analysis Task Force Committee for BPELSG Exam Update

We need your help...

The Board for Professional Engineers, Land Surveyors, and Geologists is conducting an occupational analysis regarding the profession of geology.

We are inviting California professional geologists to participate in an online survey to identify the tasks and knowledge that are relevant to the profession of California geology.

The purpose of the occupational analysis is to obtain feedback from a representative group of licensees and use the results to update the California Specific Exam for Professional Geologists.

This online survey is an essential step to ensure that the exam is current, relevant, and practice-related.

This is your chance for your voice to be heard.

If you would like to participate, please provide your email address and name to Erin LaPerle at (916) 263-1848 or by email to Erin.LaPerle@dca.ca.gov.

We anticipate releasing the survey in summer 2018.

Board for Professional Engineers, Land Surveyors, and Geologists
2535 Capitol Oaks Drive, Suite 300
Sacramento, CA 95833

phone: (916) 263-1848
email: Erin.LaPerle@dca.ca.gov
www.bpelsg.ca.gov

Yonder Dynamics – UC San Diego Student Robotics Organization

Allison Kubo is the Science lead for Yonder Dynamics a university rover team at UC San Diego and an Earth Science student at Scripps. She reached out to SDAG looking for sponsors for their rover this year. Part of the competition is an analysis of the geologic settings of the area and soil retrieved by the rover which incorporates soil moisture, conductivity, and chemical testing.

She would be happy to partner with SDAG or anyone interested in the project.

Here are links to the team's website and sponsorship package:
Yonder Dynamics
Yonder Dynamics Sponsorship Package

SDAG Research Tool

SDAG RESEARCH TOOL - A comprehensive listing of all papers published by SDAG, whether as annual field trip guidebooks or special publications, is now available on our website. Entries are sorted by primary author, or chronologically by date of publication, starting with our first guidebook in 1972, from Coast to Cactus in 2014, and finally on the Julian 'Road to Gold' in 2017. These can be accessed or downloaded as .pdf files. They are fully searchable in Adobe Reader or Acrobat, so if you are researching a topic, "oikocryst" for example, you can search for that keyword. This listing will be updated as new books are published. Thanks to Greg Peterson and Hargis + Associates, Inc., for making this possible. See the links below:

http://www.sandiegogeologists.org/SDAG_Pubs_authors.pdf

http://www.sandiegogeologists.org/SDAG_Pubs_chronological.pdf

Interactive Fault Map for San Diego - Tijuana

As part of the update for the San Diego-Tijuana Earthquake Planning Scenario, Working Group No. 1's "Fault Map Subcommittee" completed the first publicly available bi-national active and potentially active fault map (http://sandiego.eeri.org/?page_id=265). This interactive GIS map includes the first publicly available active and potentially fault map locations from the City of San Diego. The map also integrated the faults south of the border for a bi-national cross border view. This map is an on-going project as our knowledge increases about local active and potentially active faults.

You can expand the map legend on the left side to select layers that can be turned on or off for the map view. You can also select from 1 of 12 base maps at the base map icon. You can click on the fault line in your map layer view to see the meta-data source. In addition, the City of San Diego Seismic Safety Study Geologic Hazards & Faults Maps are available in the layer titled "GeoHaz SD City." Please note that the City "Zone 12 Potentially Active" fault layers was not included in this data, therefore you will need to use the City Maps to find Zone 12.

The Fault Map link is available at: http://www.sandiegogeologists.org/Faults_map.html

Please contact Diane Murbach (dianemurbach@gmail.com 619-865-4333), Chair for the SDTJ Earthquake Scenario Working Group #1 - Earth Science, if you have any questions, or see any errors on this new fault map.

I would like to thank Carolyn Glockhoff for her endless GIS work, Jim Quinn and the City for providing their data and time, Jerry Treiman with CGS for his time preparing the Surface Rupture and providing their new State fault data layer, and Luis Mendoza at CICESE for providing the faults south of the border. Please contact Diane Murbach (dianemurbach@gmail.com), Chair for the SD-TJ Earthquake Scenario Working Group #1 - Earth Science, if you have any questions, or see any errors on this new fault map.

Diane Murbach (619) 865-4333

Engineering Geologist, C.E.G.

www.murbachgeotech.com

Request for 2018 SDAG/SDGS Publication Sponsors

On behalf of the San Diego Geological Society, Inc. (SDGS), a public benefit 501(c)3 nonprofit educational corporation, we would like to request tax deductible Donations for our San Diego Association of Geologists (SDAG) group. The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: http://www.sandiegogeologists.org/Sponsors.html.

Your donation will further the SDGS mission to promote geology and related fields in the greater San Diego region, operating through the San Diego Association of Geologists (SDAG), a committee of SDGS. To achieve our primary educational objective, we organize frequent field trips and maintain a program of monthly meetings featuring speakers on current geological topics. We also publish field trip guidebooks and other publications related to geology and natural history. We encourage scholarship and research by awarding scholarships from the elementary through graduate levels. With your $100 "EMERALD" donation, your name/business will be listed as a sponsor on the SDAG web site (http://www.sandiegogeologists.org/) and in the monthly SDAG meeting newsletters. With your $500 "RUBY" or $1,000 or more "DIAMOND" level donation, your business card will also be included on the SDAG web site and in the monthly SDAG meeting newsletters. In addition, as a "$1,000 or more DIAMOND" level donation you will be presented with a thank you plaque.

Should you have any questions regarding a Sponsorship, please contact our non-profit SDGS Secretary (Diane Murbach) at 619-865-4333.

Call for Articles

SDAG invites members to submit articles on their current research or an interesting project they are working on for publication in the monthly newsletter. The article should be no more than 1 page in length. Photos are welcomed; too. Please submit articles to the SDAG secretary via email.

Geo Job Listings

Trevet is an Environmental and Engineering Consulting Firm headquartered in San Diego, CA. We are seeking a **full-time staff level Geologist or Environmental Scientist**. Two to five years of experience preferred. At a minimum a bachelor's degree in geology, engineering, or a related scientific discipline is required. Must be eligible to work in the United States, and on Department of Defense installations. Ability to travel for extended duration (2 to 3 weeks) is required. The ideal candidate will possess great attention to detail, excellent written and verbal communication skills, and ability to work independently and within a team.

Duties will include a combination of field and office related tasks.

Field experience should include:

- Installation of soil borings using multiple drilling methods
- Describing soil using the USCS and ASTM classification systems
- Installing and abandoning groundwater monitoring wells
- Field sampling of groundwater, soil, and soil gas
- Remediation system operation and sampling

Field work may be performed at project sites with environmental media (e.g., soil, sediment, groundwater, surface water, etc.) that has been impacted with hazardous substances and/or hazardous wastes.

Office experience should include:

- Field data collection, analysis, and interpretation
- Preparation of data in visual, graphical, and tabular formats
- Technical report writing

Other Requirements

Familiarity with CERCLA/RCRA requirements

OSHA 40-Hour HAZWOPER Training with current 8-hour refresher class preferred.

Trevet is an Equal Opportunity Employer

Please apply at

http://www.trevetinc.com/

HARGIS+ASSOCIATES, INC.
HYDROGEOLOGY • ENGINEERING

Entry-Staff Hydrogeologist

OVERVIEW:

Hargis + Associates, Inc. (H+A) is an environmental consulting and engineering firm founded in 1979 with a commitment to providing high-quality, cost-effective services for our clients. We are headquartered in San Diego and have offices in Sacramento, CA, and Phoenix and Tucson, AZ. Our practice focuses on large facility investigation and remediation projects for Fortune 500 clients where we provide responsive, practical and innovative solutions for the treatment of soil, vapor and groundwater contamination. H+A also provides hydrogeologic and engineering services for groundwater resources assessment, stormwater management, and environmental regulatory and litigation support. H+A employs a staff of approximately 60 hydrogeologists, geologists, engineers, industrial hygienist, and project support personnel.

We are currently seeking an entry-staff level hydrogeologist to join our San Diego office supporting environmental investigation and remediation projects located throughout Southern California. These projects are primarily focused on the characterization and remediation of soil, vapors, and groundwater impacts at large industrial sites. In addition to implementing fieldwork for site investigations, the position will also involve data entry, interpretation, and technical report writing for various soil and groundwater monitoring programs.

RESPONSIBILITIES:

- Implement/and support field investigations for soil sampling, groundwater sampling, borehole drilling, and well installations.
- Complete tasks requiring utilization of critical-thinking skills, scientific, geologic, and engineering analytical techniques.
- Assist in the preparation of reports, work plans, sampling and analysis plans, remedial investigation reports, and groundwater monitoring reports under the direction and guidance of a Senior Geologist/Engineer/Scientist.
- Follow corporate health and safety and quality management plan standards.

REQUIREMENTS:

- BS degree in geology, hydrogeology or related technical discipline is required.
- 1-3 years of field experience in environmental consulting is preferred.
- Experience with geologic, engineering, scientific, or general environmental projects and data interpretation.
- Field experience with drilling, sampling (soil and groundwater), and well installations is a plus.
- OSHA 40-hr. HAZWOPER, current refresher preferred; training provided.
- General computer knowledge (Microsoft Office, Email); GIS and other environmental software experience is a plus.
- Excellent organizational and sound written/oral communication skills.
- Local candidates only; must be eligible to work in the United States.

PHYSICAL DEMANDS:

- Ability to drive, travel and/or perform field work approximately 50% of the time; some overnight and extended travel.
- Ability to lift 45 pounds.
- Must be able to perform the following actions while conducting fieldwork: stooping/kneeling/crouching, standing for long periods of time, pulling/pushing and lifting equipment and supplies, walking on uneven terrain.
- Ability to work in outdoor environments and hot/arid conditions.
- Ability and willingness to work long hours and in proximity to loud noises and hazards (i.e., proximity to moving mechanical parts, moving vehicles, and exposure to chemicals, fumes, odors, dusts, and gases).

Those who seek to apply may submit a cover letter and resume via email to hargisinfo@hargis.com

All qualified applicants will receive consideration for employment without regard to race, color, national origin, ancestry, sex, gender, gender identity, gender expression, age, sexual orientation, religious creed, physical or mental disability, medical condition, genetic information, marital status, veteran status, or any other classification protected by applicable federal, state, or local law.

Geologist Wanted in Corona, CA

GeoTek in Corona is looking for a geologist to prepare reports, Contact Chris Livesey (clivesey@geotekusa.com).

MP Materials, Mountain Pass, CA

Seeking Industrial Hygienist/Radiation Safety Officer

Please contact:

Chris Baker

Senior Environmental Specialist

m: 562.331.4507

cbaker@mpmaterials.com | www.mpmaterials.com

PHOTO OF THE MONTH

If you would like to submit a photo, email them to secretary@sandiegogeologists.org and I will try and put them in the newsletter. Provide a short description of the picture.

SEISMITE IN FONT'S POINT WASH, ANZA-BORREGO DESERT STATE PARK

Mike Hart, mwHart40@gmail.com

What is a seismite? As described by Moretti and Van Loon (2018), and Van Loon (2014) a seismite is a sedimentary bed deformed as a result of horizontal motion and liquefaction caused by earthquakes. The seismic shaking results in liquefaction of silty sands underlying the seismite. That same horizontal motion also triggers translation of the seismite bed on the liquefied layer down gradients that can be less than one degree. The intense deformation likely occurs as the sliding bed of soft sediment finally comes to a halt and the beds react by folding like a skidding carpet.

As previously undescribed (I think) seismite was found on the east bank of Font's Point Wash in the Anza- Borrego Desert State Park approximately 0.7 miles south of Highway S22. In the Font's Point wash exposure the four feet thick seismite was symmetrically deformed into a series of synclinal and anticlinal folds along the once liquefied substrate. As can be seen in the photograph, the tops of the folds have been truncated by the overlying undeformed sediments of the Ocotillo Formation. This indicates that the folded beds were at or very near the water sediment interface at the time of deformation. Since similar soft sediment deformation structures (SSDS) can be formed by other than seismic triggering, most seismite experts agree that no truly diagnostic features exist. Even so, several authors have come up with criteria (listed below) to distinguish seismites from SSDS caused by other mechanisms (Van Loon, 2014);

1. The SSDS must be laterally extensive
2. They must occur in a seismically active region
3. The SSDS are largely restricted to specific stratigraphic horizon
4. They can be traced over a large area
5. There must be no evidence of slope movement (*by this they apparently mean no evidence of subaerial landsliding).*

The Font's Point Wash seismite located only two miles west of the San Jacinto Fault meets all of these criteria with the exception that it can only be traced laterally for a few hundred feet.

References;

A.J. Van Loon, 2014, The life cycle of Seismite research, Geologos 20, 2 (2014): 61-66.

Moretti, M, Van Loon, A.J., 2014, Restrictions to the application of diagnostic criteria for recognizing ancient seismites, Journal of Palaeogeography, 3(2): 162-173.

HARGIS+ASSOCIATES, INC.
HYDROGEOLOGY • ENGINEERING

Hargis + Associates, Inc. is an environmental consulting firm specializing in hydrogeology and engineering. We are headquartered in San Diego, California and have offices in Mesa and Tucson, Arizona. Our practice areas include all aspects of hydrogeology and engineering.

As a client service organization, we pride ourselves in being attentive and efficient in meeting our client's needs and solving their problems. In addition to our technical expertise, communication and responsive coordination are hallmarks of our reputation.

We invite you to explore our website to learn more about our firm and the services we provide. We welcome the opportunity to discuss our consulting expertise directly with you.
Contact: ***Dr. David R. Hargis***

H&P Mobile Geochemistry Inc.

H&P Mobile Geochemistry is an industry-leading provider of environmental lab services. With ten mobile labs and five direct push sampling trucks and unparalleled experience, H&P's repertoire of environmental lab services includes many forms of environmental lab sampling techniques all the way to on site field analysis services. H&P has successfully and accurately performed environmental lab services delivering quality results to our clients for over 16 years.
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(800) 834-9888

Contact: Louise Adams or Suzie Nawikas

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Tetra Tech is a leading provider of consulting, engineering, and technical services worldwide. We are a diverse company, including individuals with expertise in science, research, engineering, construction, and information technology. Our strength is in collectively providing integrated services—delivering the best solutions to meet our clients' needs.
http://www.tetratech.com

Contact: **Rupert Adams, CEG**

Geocon Incorporated
6960 Flanders Drive, San Diego, CA 92121
P| 858.558.6900

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DEMOLITION, BREAKERS

Atlas Excavating & Breakers has been providing operated equipment rentals and excavating services to contractors & geologists in San Diego and Riverside counties sine 1991. We offer Mini Ex., 4x4 Backhoe & large excavators up to 75,000 pounds. "40 hour Haz Whopper" trained operator. Asphalt/concrete removal & replacement.

Contact: Barry Anderson **760-754-1337**

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