

SAN DIEGO ASSOCIATION OF GEOLOGISTS

www.sandiegogeologists.org

SDAG MEETING ANNOUNCEMENT

WEDNESDAY, January 18th, 2012

“Geo-Aspects of Multidisciplinary Study of Qhapaq Ñan – the Inka Road”

Presented by

Barry Keller, PhD PG CHG

Where: **Emiliano’s Mexican Restaurant** (Overlooking Admiral Baker Golf Course)
6690 Mission Gorge Road, San Diego, CA 92120
(619) 284-2460

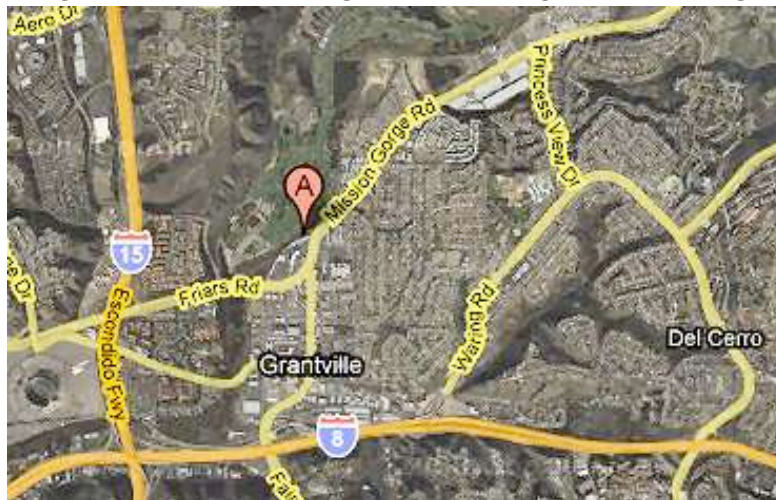
When: 5:30 pm – Social Hour
6:30 pm – Dinner
7:15 pm – Program

Dinner: Mexicano fantastico. Beverage station. Cash bar.

Cost: \$30 per person, \$5 discount for members, STUDENTS: \$20. Add \$5 if you did not make a reservation

Reservations: Make your reservation online at www.sandiegogeologists.org no later than noon, **Monday, January 16th**.

**RESERVATIONS CANNOT BE GUARANTEED AFTER MONDAY AT 12 NOON
BUT THEY ARE ALWAYS PREFERRED OVER WALK INS.**



SPEAKER ABSTRACT

GEO-ASPECTS OF MULTIDISCIPLINARY STUDY OF QHAPAQ ÑAN – THE INKA ROAD

Barry Keller, PhD PG CHG

Prior to the arrival of the Spaniards in 1532, the Inka empire was united by a road called Qhapaq Ñan (Inka Road) that extended north and south from the Inka capital of Cusco (now in Perú). This included various branches and extended as far north as southern Colombia and as far south as central Chile. In the 1400s, this may have been the longest “cultural” feature on the planet. The road was used for foot travel and llama-born cargos, among other things allowing the Inka rulers (called Inkas) to have fresh ocean fish for breakfast! The road construction showed the same amazing precision and consistency as the famed buildings of Cusco and Macchu Pichu.

The study of Qhapaq Ñan is taking place under the auspices of the UNESCO World Heritage Centre. The overall goal of the project is to establish the “dimension the state of conservation of natural and environmental resources” – meaning mainly description. In August, 2009, I participated in the study of sections in northern Chile, along with botanists, zoologists, geographers, ecologists, and some help from archaeologists.

The specific geologic goals were (apparently a standard UNESCO list): Rock type; Geologic formation; Name of rock; Presence of Quaternary deposits; Faults; Diacclasis (fractures); Geomorphologic units; Morphodynamics – mass wastage, erosion, and flooding. The geology of this part of Chile includes active volcanoes, huge ignimbrite sheets, tectonic-convergence related rocks spanning the Phanerozoic, copper deposits that have been mined since Inka times, desert varnish and pavement, and a large historic landslide that locally obliterated the Qhapaq Ñan. The extreme aridity of the Atacama Desert is interrupted by streams from the high peaks, with water quality ranging from potable to 100% salt saturated.

“27 F” – The Chile $M = 8.8$ Subduction Quake, 27 February 2010. In the Chilean press, “27 F” means that earthquake, similar to how “9-11” is understood in the US to mean the terrorist attacks. This was the world’s 6th biggest earthquake as recorded since 1900, part of a pattern in which 4 of the top 10 have occurred in the past 8 years. The 27 F quake triggered a tsunami that did extensive coastal damage. I was on top of the northern end of the 700 km N-S rupture zone, where very strong motion continued for at least 3 minutes and nearly continuous aftershocks occurred for days (and a couple in the past 2 weeks!). Structural damage was most prominent in old, unreinforced adobe structures. Many roads were also damaged. I will show photos from the Chilean newspapers and compare the motion and effects to other quakes, including Northridge, Haiti, Mexicali, and Japan 2011.

SPEAKER BIO

SPEAKER: DR. BARRY KELLER

Dr. Keller was born in San Diego, and has lived most of his life in California, with intervening stints in Washington State, France, and Chile – where he has a house and experienced the $M_w = 8.8$ “BIG ONE” in February 2010. He has a BS in geology from Caltech, MS in geophysics from University of Washington, and PhD in geophysics from UCSB. At Caltech, he took “Elementary Seismology” from Prof. Charles Richter, the last year that Richter taught classes. As a grad student at UCSB, he operated

the seismograph drums and identified the earthquakes. His PhD topic was seismic and gravity modeling of the Santa Barbara area. He currently works as a consulting hydrogeologist, and is Chair of the Board of Water Commissioners of the City of Santa Barbara. Dr. Keller also works frequently on environmental studies in Chile.

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2012 SDAG MEETING SCHEDULE - Mark your Calendars!

Meetings are usually on the 3rd Wednesday of the month but may change to accommodate speaker and meeting place schedules. Check here for updates!

February 15, 2012	Mike Buga - San Jacinto Fault Work Update - Clark Lake and Hog Lake
March 21, 2012	Dr. Scott Burns - AEG Jahns Lecture on Subduction EQ's - Joint Mtg. with the EERI
April 18, 2012	Geology Student Presentations

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CALL FOR PAPERS FOR THE SDAG 2012 ANNUAL FIELD TRIP GUIDEBOOK *Waiting for Tsunami: Coastal Processes and Geologic Hazards of north San Diego County*

In this trip, we will explore the southern California coastline from La Jolla north to San Clemente. We will tour sites of geologic interest including: tsunami features, active coastal erosion, landslides, a Miocene volcanic plug, estuaries, and efforts to restore brackish water areas.

SDAG seeks new manuscripts based on original work in the broad fields of regional geology, sedimentology, soil, tectonics, hydrogeology, paleontology, engineering geology, petrology, geothermal resources, geomorphology, paleoclimatology, landslides, and related fields. Articles on any facet of the natural or cultural history of northern San Diego County and vicinity are also welcome.

Deadline for submission of abstract: February 29, 2012.

Please submit the following information when submitting abstract:

- Title,
- Authors and affiliation,
- Address, e-mail, and telephone numbers for the corresponding author.

Submit abstract by e-mail to Cari Gomes: cg7783@yahoo.com

PRESIDENT'S CORNER

Welcome to the New Year! As the new President of the San Diego Association of Geologists, I would like to begin by welcoming new officers Cari Gomes (Vice President), Brian J. Olson (Treasurer), and Jennifer Bauer (Secretary). I also want to thank the outgoing president, Chuck Houser, for his four years of dedication and for keeping SDAG strong. Chuck's dry wit, generosity, and broad knowledge of our trade always made meetings interesting and enjoyable.

Our December holiday meeting at the San Diego Natural History Museum was attended by about 130 folks and was a great success. I want to thank everyone involved for their efforts to secure a delightful evening, including Chuck Houser, Dave Bloom, Greg Cranham, Diane and Monte Murbach, Taco Express for great fare, and of course the speaker, Dr. Tom Deméré.

I had a lot of fun (and a little anxiety!) putting together last November's field trip at Picacho State Recreation Area and the Mesquite mine. During our tour of Picacho's outcrops I had intended to take lots of photos, but I didn't take one, I was just so relieved that the trip was unfolding so nicely. Happily, Carol and John Teasley provided me with a bunch, thank you! One lingering item, some of you may recall, is that Picacho SRA is one of dozens of State Parks slated for closure this summer. Picacho park rangers have taken "a two-pronged approach" to resolve the park's budget problems by reducing operating costs and increasing revenue (it's still cheap!). At the same time, they are pursuing alternative energy sources to power the park, and are seeking donations and partnerships to help keep the park open to the public. If you are interested or have ideas, you can contact Ranger Robin Greene at (760) 996-2963 or rgreene@parks.ca.gov.

A facebook site has been set up to act as a discussion arena, <http://www.facebook.com/savepicachostaterecreationarea>. Just by clicking "like this" will add to a tally that can be used as a tool to keep the park open. Another way to help: go to www.leginfo.ca.gov to contact your assembly members and senator: click on 'your legislature' at the bottom, type in your zip code and your state representatives will be shown. Call or mail a letter to them, tell them how you use and enjoy the park, ask what Sacramento plans for Picacho - we need to let them know that that the various resources the park has to offer (existing facilities, wildlife, historical, cultural.... geological!) will be in danger of vandalism, etc., if the public is kept away from visiting the park. The competition for State Park preservation is fierce; other grass-roots "Save (your park name here) Park" attempts have been established for other facilities. My advice: go visit, enjoy, and participate!

Todd Wirths
President



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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.

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Dave Bloom



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ANNOUNCEMENTS:

**Plan to share your research with a presentation or a poster
2012 Desert Symposium**

Presentation Theme: Life in the Desert: Adaptations to Environmental Extremes

Field Trip Theme: Search for the Pliocene: Southern Exposures

Desert Studies Center, Field Trip April 21- 23, 2012 Zzyzx, California Additional information to follow. Please forward this information to other interested individuals and invite them to send their email addresses to wpresch@fullerton.edu. California State University, Fullerton



Ricardo Breceda | Accidental Artist

at

theNAT

SAN DIEGO NATURAL HISTORY MUSEUM

Presentation by

Author Diana Lindsay & Artist Ricardo Breceda

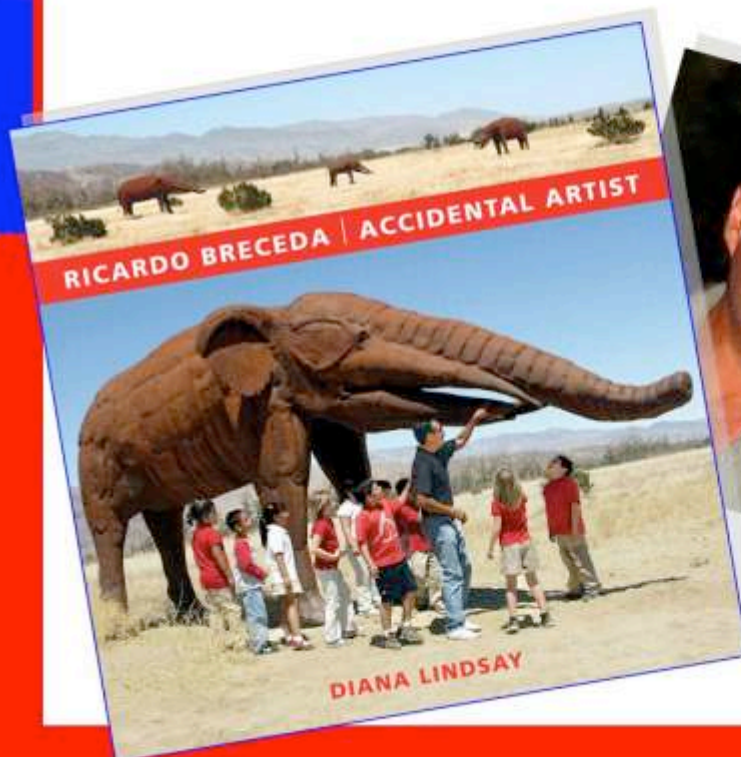
Sunday, January 22, 2012, 4:00 pm

Book signing immediately following presentation

FREE EVENT | Book available at museum store

Visit www.sdnhm.org or call 619-255-0210 for more info

Join Ricardo and Diana for a no-host reception after the signing at The Prado Restaurant in Balboa Park



Sunbelt Publications Inc.
(800) 626-6579
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SME So Cal Field Trip

Date: Saturday, January 28, 2012

Time: 9 AM Sharp at the Visitor Center

Place: Borax Visitor Center

Field Trip leader is Brandon Griffiths - Rio Tinto - Borax

Antelope Valley Directions: Golden State Freeway (5) to

Antelope Valley Freeway (14 North) to Highway 58 East, Exit Borax Road. Go left and follow the signs

Peter Jahn

Society of Mining Engineers Southern California Mining Section

South Coast Geological Society - 2012 is almost here and you are invited to join us on a special night for our first meeting of the year, TUESDAY January 10th. You read that correctly, we have moved the first meeting of the year to a Tuesday evening. The meeting will be held at our usual meeting place, the Club Doubletree in Santa Ana. Dr. Jeff Knott of California State University Fullerton has stepped up to be our first speaker of 2012. He will be presenting a talk titled "Reconstructing Late Pliocene To Middle Pleistocene Death Valley Lakes And River Systems As A Test Of Pupfish (Cyprinodontidae) Dispersal Hypotheses."

Remember to sign up by Friday January 6th at noon to avoid a \$5 late fee. Don't forget, the meeting is TUESDAY JANUARY 10th! <http://www.southcoastgeo.org/meetings.shtml>

SEEKING JOB OPPORTUNITIES

Seeking a Career in Southern California - Motivated and enthusiastic mid-level geotechnical project engineer with 4 years of experience in linear, underground and maritime infrastructures, seeking to leverage her diverse project experiences to continue her technical career development in a dynamic growing firm. Knowledge of geotechnical calculations and numerical simulations to study the behavior of the interaction of soil-structure with 2D and 3D software, to design the foundation in the safest and most economical manner. Wide experience in preparing and writing proposals and technical reports. Experience in leading and conducting geological and geotechnical field work. Used to working in a team environment to successfully deliver projects. Interested in informational interviews as well employment opportunities. Contact: Carme Cervantes, carmecervantes@hotmail.com, 4250 4th Avenue, San Diego 92103, C.A. (858) 888-3716

Qualifications Summary and Objective: I have 14 years experience directing surface water quality monitoring programs with a proven record of excelling in monitoring plan implementation, quality control, public notification and continuous improvement in operational effectiveness and efficiency. I have built and maintained relationships with key staff in academia, industry, and all levels of government in San Diego and California. I have a widely applicable skill set which includes: analytical thinking, communication and writing skills, data analysis and management, inter and intra- agency project

coordination, and staff supervision and training. My objective is to obtain a career position with an industry leader where I can contribute my skills to build the success of my employer as well grow professionally. Detailed work experience, education and more at www.linkedin.com/in/cbclifton2010. Email cbc2006@cox.net or 619-964-1776. Contact: Clay Clifton

"ENGINEERING GEOLOGIST- MS in Geology, 13 years of the industry experience (CA, NY/NJ, overseas), California P.G., proficient in methods of subsurface exploration and geotechnical hazard evaluations, geophysical surveys, construction quality control, geotechnical engineering analyses, special interest in earthquake-hazard and seismic design related applications, strong problem solving and organizational skills, enjoy being challenged. I worked in San Diego in 1998-2004 and would love to move back. Detailed resume available upon request. Anna Fyodorova, Afyodorova103@gmail.com ."

JOB OPENINGS!

Hargis + Associates, Inc is looking for a motivated entry level hydrogeologist with relevant course work in hydrogeology, geochemistry, and environmental sciences to join our San Diego office. <http://www.hargis.com/jobs-hydrogeologist.html>. We are also seeking an engineer with extensive experience in the mining industry for a position in our Tucson office. This position is well suited to a self starting individual with strong ambitions for success and promotion within Hargis + Associates. <http://www.hargis.com/jobs-senior-staff-engineer-mining.html>.

Seeking a Career in Southern Vice President Environmental Services (VPES)? Seeking a successful VPES (seller/doer) to help grow an environmental consulting company in San Diego, CA. The main focus is new client sales and client retention. Other duties will include technical direction and management for client projects. The primary focus for sales and technical project management are in the areas of air quality, CEQA permitting, water discharge, stormwater permitting, regulatory compliance, hazardous materials and waste management, and environmental mitigation management. 5+ years of experience, minimum Bachelor's Degree, and the ability to bring in and retain a large book of business is required. Candidates from the Orange County, CA, area will also be considered. Inquiries and resumes to: resumes@proconnectweb.com

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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 at our San Diego Association of Geologists (SDAG) The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: <http://www.sandiegoeologists.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.sandiegoeologists.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

Parting Lineation...On July 1, 1862, Congress passes the Pacific Railroad Act during the Civil War. The legislation authorizes the construction of a transcontinental railroad. The act provides for loans of \$16,000 a mile for construction over flatland and \$48,000 per mile for construction in the Sierra Nevada. An 1863 survey conducted by the California State Geologist will conclude that the Sierra Nevada begins on the first low rise seven miles east of Sacramento - 20+ miles west of where the steeper Sierra Nevada grades actually start. This curious decision will net the Central Pacific Railroad more than \$1 million in additional federal construction loans. Letter from State Geologist J.D. Whitney to California Governor Leland Stanford

OFFICE OF THE GEOLOGICAL SURVEY OF CALIFORNIA,
San Francisco, March 23, 1863.

SIR: In reply to your favor of March 7, requesting me to give my views with regard to the position of the western base of the Sierra Nevadas, and to fix the point where, in my opinion, the line of the Central Pacific Railroad intersects said base, I beg leave to submit the following:

The "base" of a mountain, as seems apparent from the meaning of the word as applied to other things, where it is susceptible of a precise definition, is the lowest point of the mountain or the point where the ascent commences. As applied popularly, however, the term "base" appears to be used generally to signify the point where the rise of the mountain begins to be sufficiently steep to present a marked appearance to the eye, or to become a decidedly perceptible obstacle to progression.

That the scientific or precise idea of a mountain base is somewhat different from the popular one may be inferred and illustrated by a consideration of the Rocky Mountain chain; and I will use the words of the highest geological authority in this country, Professor Dana, who says, speaking of the Rocky Mountains: "The mountain mass, therefore, is not a narrow barrier between the East and the West, as might be inferred from the ordinary maps, but a vast but gentle swell of the surface, having a base 1,000 miles in breadth." He says further: "The average eastern slope of the Rocky Mountains seldom exceeds 10 feet in a mile, which is about 1 foot in 500, equal to an angle of only seven minutes."

It is evident from the above that Professor Dana considers that on scientific principles the eastern base of the Rocky Mountains is to be placed several hundred miles east of where it would be located according to the popular idea.

So, with regard to the Sierra Nevada, it would seem that a strictly accurate determination of the position of its western base would place it where the upward rise of the surface commences, without reference to the popular idea of the greater or less steepness of ascent.

The intention of the act of Congress, by which three times the usual amount of money is given to aid in the construction of the 150 miles, "beginning at the western base of the Sierra Nevada," seems to be clearly indicated in the words "most mountainous and difficult of construction," which specify the portion of the road which is to receive additional aid beyond that given for other portions.

If, therefore, a distance of 150 miles, measured east from the point in the Sacramento Valley where the ascent commences, will clear the most difficult and mountainous portion of the Sierra Nevada and reach the valley on the eastern slope, then it seems reasonable that the base of the Sierra Nevada should be taken as beginning at that point.

In case that is not done, the location of the position of the western base of the Sierra will be more or less a matter of uncertainty, as there is no other position which can be assigned which does not depend more or less on circumstances and conditions which are not capable of being fixed with precision.

I would suggest, therefore, that the point where the line of the Central Pacific Railroad crosses Arcade Creek may with propriety be taken as the base of the Sierra, as from there commences a regular and continuous ascent, and in a distance of 150 miles from that point the most difficult and mountainous portion of the route will have been traversed.

I am, with high respect, your obedient servant,

J. W. WHITNEY,
State Geologist.

To his Excellency Governor STANFORD,
President C. P. R. R. Co., Sacramento.