

# SAN DIEGO ASSOCIATION OF GEOLOGISTS

[www.sandiegogeologists.org](http://www.sandiegogeologists.org)

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## ***SDAG MEETING ANNOUNCEMENT***

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**Wednesday, January 18, 2017**

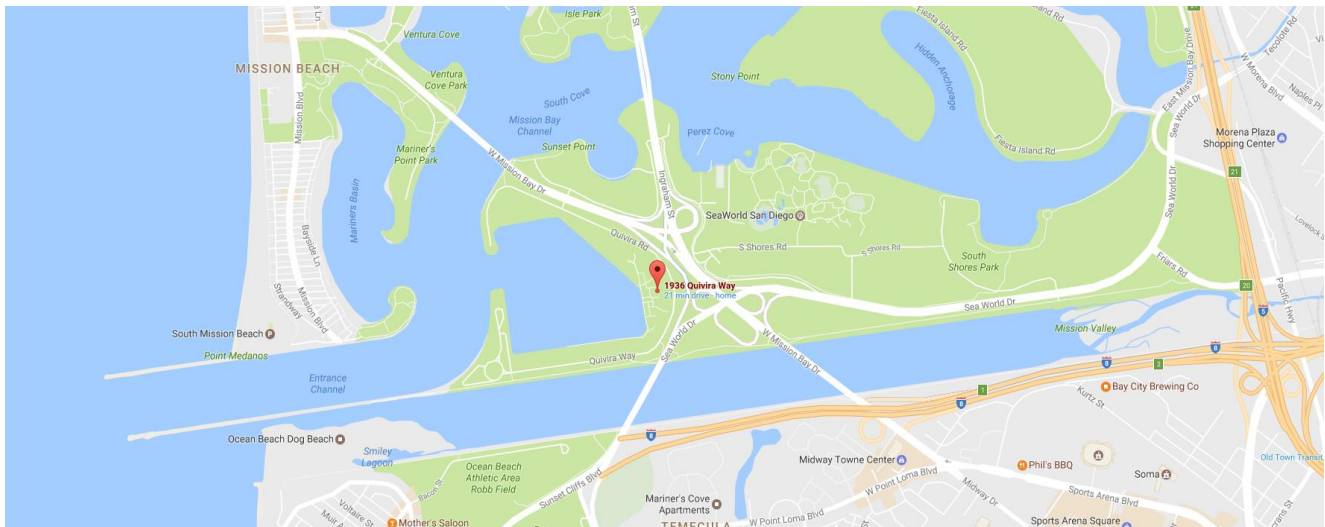
The Human and Geologic History of Patagonia -  
A Beautiful Place at the Bottom of the World

*Presented by:*

***Monte Marshall – Professor Emeritus SDSU***

- Where:** **Marina Village – Catalina Room**  
1936 Quivira Way, San Diego, 92109 (See Map)
- When:** 5:30 pm - Social Hour  
6:30 pm - Dinner  
7:30 pm - Program
- Dinner:** Traditional Buffet – Roast Beef/Chicken/Veg. Cash bar (Walawender Tavern)
- Cost:** \$30 per person, \$5 discount for members, STUDENTS and PROFESSORS: \$15.  
Add \$5 if you did not make a reservation.
- Reservations:** Make your reservation **online** at [www.sandiegogeologists.org](http://www.sandiegogeologists.org) **no later than noon, Monday January 16th**. Reservations cannot be guaranteed after Monday at noon; but are always preferred over walk ins. Reservations well before the deadline are MUCH appreciated.
- Directions:** FROM INTERSTATE 5: Take the SEA WORLD DRIVE exit. From SEA WORLD DRIVE, take WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA ROAD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.
- FROM INTERSTATE 8: Take the WEST MISSION BAY DRIVE exit to the right. You will be on INGRAHAM STREET for a short distance from which you will take the next exit marked WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA ROAD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.

Map:



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## ABSTRACT

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Patagonia, which comprises the southern five provinces of Argentina, and even less of Chile, is at the bottom of the world, the continent closest to Antarctica. It's geographically asymmetrical, with vast, arid, wind-swept plains on the Atlantic side and a relatively narrow chain of jagged, snow-covered mountains and rain forests on the Pacific. But its remoteness didn't stop the Native Americans from settling there possibly less than a thousand years after the first Americans, from East Asia and Eurasia, made their way across the Bering Straits to Alaska more than 15,000 years ago. During the last glacial maximum at 20 Ka, sea level was 120 m lower than today, and that opened a land path for them that stretched almost from the Aleutian Islands to the Arctic Ocean. The oldest archeological

sites are in North America and are between 15 and 16 Ka. The oldest site in South America found so far is in southern Chile and is dated at 14 Ka. To migrate those thousands of miles so quickly suggests that they came down the west coast, down what has been called the “kelp highway”. They had the Americas for themselves until one day a strange vessel commanded by Ferdinand Magellan sailed into their harbors in 1520. Thus began the “Columbian Exchange”—but a very unbalanced one, since the brutality and greed of the Spanish conquistadors and the smallpox and other diseases brought by them decimated the Native Americans. Almost exactly 300 years later, a young Charles Darwin sailed up the same waters on the HMS Beagle and made some very astute observations about the biology, geology, and people of Patagonia.

Like all continents, most of the basement of South America consists of plutonic and metamorphic rocks of Archean and Proterozoic age. The ancient cratonic shields are in the north, especially in Brazil, and the only exposures of pre-Cambrian rocks in Patagonia are on the westernmost islands of southern Chile. The plains in Argentina comprise large areas of Jurassic to Cenozoic volcanic rocks and deep basins of petroliferous Mesozoic to Neogene sedimentary and volcanic rocks. The geology of the southern/Patagonian Andes is considerably less complicated than that to the north. The majority of the exposed rocks are Juro-Cretaceous and range from plutonic and metamorphic to volcanic and sedimentary. These Mesozoic rocks are bordered along the Chilean coast in northern Patagonia, and divided in southern Patagonia, by elongate regions of Paleozoic plutonic and metamorphic rocks. Whereas many of the mountains in southern South America are high enough to have glaciers, the cold moist air from the south Pacific has formed several ice fields that feed glaciers that pour down the high valleys on both sides of the Patagonian Andes. Together they form the third largest ice field/cap in the world, after Antarctica and Greenland.

The andesitic volcanoes are one of the most famous features of the Andes and their cause and distribution bring us to the main plate tectonic feature of western South America—active subduction along the entire 7,000 km length of the continent. There are three pieces of the southeast Pacific seafloor diving beneath South America—a fraction of the Cocos Plate on the north, the entire Nazca Plate in the center, and a fraction of the Antarctic Plate on the south. But there are three intervals where there are no currently active volcanoes. The study of earthquake hypocenters shows that the dip of the subducting oceanic lithosphere in these three stretches is only about 5 degrees. Under the active volcanoes it ranges from 20 to 30 degrees. The regions of shallow dip are associated with unusually thick oceanic crust, like the Nazca Ridge and Chile Rise. The central Patagonian Andes has one of these volcanic gaps, as does most of southern Patagonia, including Tierra del Fuego.

Probably the most famous tourist attraction in Patagonia is the row of 3,000 m high granite towers in Torres del Paine Park. They are the erosional remnants of a 13 Ma, dome-shaped intrusion (laccolith) of granitic magma into black, Cretaceous flysch (shales and turbidites), that was more than 2,000m thick and was 2-3 km beneath the surface. Erosion has removed all the flysch overlying some of the spires, but some have brilliant white bases with black caps. The laccolith extends for almost 20 km in a N-S direction, and 10 km E-W.

This talk will have many beautiful pictures of the Torres, whales mating, calving glaciers, sheep-herding, wild llamas, Ushuaia (the southernmost city in the world), fantastically folded strata, and penguins in a pear tree!

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## **SPEAKER BIO**

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### ***Dr. Monte Marshall*** ***Professor Emeritus of Geology and Geophysics SDSU***

When I was born in 1939 at Mercy Hospital, San Diego was a pretty small town. Mission Valley was full of dairy farms, not shopping centers. I grew up in University Heights on a canyon that was full of eucalyptus trees—at least until I got my first Boy Scout axe. I loved that canyon! I built tree houses/forts, dug tunnels in the SD formation, hunted for scorpions and trap-door spiders, and got so sick from hiking through the poison oak that I could miss days of school. My canyon led to another that led to where Hwy. 163 is now, and from there we could descend into Mission Valley to catch pollywogs in the SD River. On our first hike we had to pass over a long strip of dirt that giant machines with steel sheep's feet were compacting—that turned out to be the foundation for I-8! At St. Augustine's High School, my priest/physics teacher became my role model, and so off I went to Villanova U to major in philosophy, with a minor in math and physics. After two years of theology, I decided to return to SD and study physics and astronomy. But my uncle, who was the Professor of Meteorology at State, introduced me to Baylor Brooks, founder of the geology department. I took his intro geo class, went on field trips, and quickly found that geologists have more fun than astrophysicists—and was hooked for the rest of my life!

After getting my PhD in geology and geophysics at Stanford and working at the USGS in Menlo Park, I returned to SDSU in 1975. My main courses were geophysics, structure, petroleum geology, and paleomagnetism and plate tectonics. My main research projects were applying paleomagnetism to SOCAL tectonics and detailed gravity studies of metropolitan SD faults. I theoretically retired in 2005, but still loving learning and teaching, I have been immersed in geologic community service ever since.

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## ***UPCOMING MEETINGS***

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

February 15, 2017	Geoff Cromwell, Scott Rugh, Wes Danskin (USGS) Using Well Data to create 3D Geologic Model of SD-Tijuana Area
March 15, 2017	Student Presentations
April 19, 2017	John Minch <u>1995 Kobe Earthquake</u>

## **2017 SDAG EXECUTIVE COMMITTEE**

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**VICE PRESIDENT** - Chris Livesey, [liveseychris@yahoo.com](mailto:liveseychris@yahoo.com)

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**PUBLICATIONS** – Lowell Lindsay; *Sunbelt Publications*; Ph: (619) 258-4911, x111; fax:(619) 258-4916;  
[llindsay@sunbeltpub.com](mailto:llindsay@sunbeltpub.com)

**WEBMASTER** – Carolyn Glockhoff; *Caro-Lion Enterprises*, Ph: (858) 549-3396; [carolyn@caro-lion.com](mailto:carolyn@caro-lion.com)

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## ***SDAG PRESIDENT'S CORNER***

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Greetings and salutations esteemed SDAG members!

I hope that everyone had a pleasant and restful holiday break and that everyone is now back in action to tackle the challenges of the New Year! First and foremost, I would like to thank Randy Wagner again for his service and dedication to SDAG over the last three years. Although one could argue that he benefitted by missing one year in the four year officer rotation, he took over the Vice Presidency at a moment's notice, a year early, and led an excellent field trip to the Coyote Mountains in 2015. He then followed up with a highly enjoyable series of meetings and presentations last year, and so we thank him for his service to SDAG and wish him well as he transitions into the 'Past Presidents Club'!

Now that Chris Livesey, Ken Haase, and I have moved up in the batting order, the treasurer spot must be filled. Although this is usually done by ballot during the Christmas/December meeting, selection this year was performed via a phone call to a single volunteer who was not able to attend last month's meeting. Thus, we thank Adam Avakian from AECOM for taking the call and volunteering to serve as our new treasurer, pending ratification at our upcoming meeting!

For 2017, I am working hard to line up another year's worth of outstanding speakers. Kicking off the proceedings this month is the venerable Dr. Monte Marshall, who will regale us with details of his most recent expedition to Patagonia. Our friends at the USGS, Wes Danskin and Geoff Cromwell, and the SDAG student scholarship recipients will round out our guest speakers for the first quarter of the year. Details to follow later for the remainder of the year!

Please feel free to contact me at [adams@geoconinc.com](mailto:adams@geoconinc.com) if you have questions, suggestions etc. regarding all matters SDAG related. I welcome comments, announcements, job postings and photographs for inclusion in the monthly newsletter and for discussion at the meetings as well. Please don't forget our upcoming January field events, including a one or two day trip back to the Coyote Mountains this coming weekend, as well as an opportunity to see the drilling and installation of a new multiple completion monitoring well in Chula Vista, which begins on the 23<sup>rd</sup> of this month.....details to follow at our meeting on the 18<sup>th</sup>...see you all at Marina Village!

Regards,



**Rupert Adams PG, CEG** | *Sr. Project Geologist/SDAG President*

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## *ANNOUNCEMENTS*

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### **Call for Papers, Speakers, and Spectators**

### **SDAG Fall 2017 Fieldtrip led by Chris Livesey**

San Diego is a county with abundant points of interest. There is active faulting, landslides, great weather, and mountains that over look majestic landscapes. Julian, California encompasses all of these traits and more! The 2017 fieldtrip will focus on points of interest in the region, including gold mining and faulting; however the trip is in the early stages of planning and is subject to change in direction and core focus. Thus, submit your abstracts, articles, and ideas early!

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#### **Coyote Mountains One Stop Wonders January 7<sup>th</sup> and 8<sup>th</sup>, 2017**

When & What: 8:00 Saturday January 7<sup>th</sup>: Eastern Coyote Mountains Painted Gorge Area  
8:00 Sunday January 8<sup>th</sup>: West-Central Coyote Mountains Domelands Hike

Where: **Saturday January 7<sup>th</sup>:** Meet at the Intersection of Old Highway 8 and Painted Gorge Road, (GPS coordinate 32° 45.760' N, 115° 55.886' W) Approximately 4.1 miles east of Ocotillo, Imperial Valley

**Sunday January 8<sup>th</sup>:** Meet at the Domelands Trailhead, (GPS coordinate 32° 48.294' N, 116° 04.460' W) or at the Intersection of Highway 8 and the trailhead dirt road (GPS coordinate 32° 46.740' N, 116° 05.391' W) Approximately 7 to 9 miles northwest of Ocotillo, Imperial Valley

Both days will be led by Dr. Ann Bykerk-Kauffman of Chico State University who has spent many days' field mapping in the Coyote Mountains.

**Saturday** will consist of several stops near the mouth of Painted Gorge looking at both the Paint Gorge and Painted Gorge Wash Faults and the geologic units (including the Alverson Volcanics) in the area. Saturday will also include a 3- to 4-mile hike starting at the locked gate in Painted Gorge. The hike should be moderately easy and will mainly consist of walking along the canyon bottom. A geologic map of the area is attached (and some copies available on the day of the fieldtrip).

**Sunday** will consist of an approximately 8 mile moderately difficult hike starting at the Domelands Trailhead in the west-central Coyote Mountains. The hike will head up the south flank of the mountain range continuing to the northeast past the Domelands area and ultimately to the top of a faulted inclined ridgeline with an awesome view of the northern flank of the Coyote Mountains and the northward tilted beds on the side of the mountains few people have seen.

The hike will include traversing moderately difficult terrain including some scrambling over rocks in some of the small canyons and hiking up a relatively-steep 150-foot tall slope comprised of mudstone. For those who went on last year's One-Stop Wonder in January 2016, this hike will be considerably less arduous and, hopefully, without any serious incidents).

The particulars:

Location/Starting Point: Both days will start at 8:00 (see the attached maps for the location of the meeting places relative to the City of Ocotillo) and we plan on being back at the vehicles well before sunset.

Food: You will be responsible for providing your own food and water.

Camping: For those planning on attending both days, we will probably dry camp at the Domelands Trailhead or people can make arrangements at one of the nearby motels. The restrooms at the Ocotillo Community Park (site of the 2015 SDAG Fieldtrip camp site) will be available but camping at the community park is not allowed.

Weather Conditions: The anticipated weather should be partly cloudy with light winds and in the high 60's during the day and mid 50's during the night.

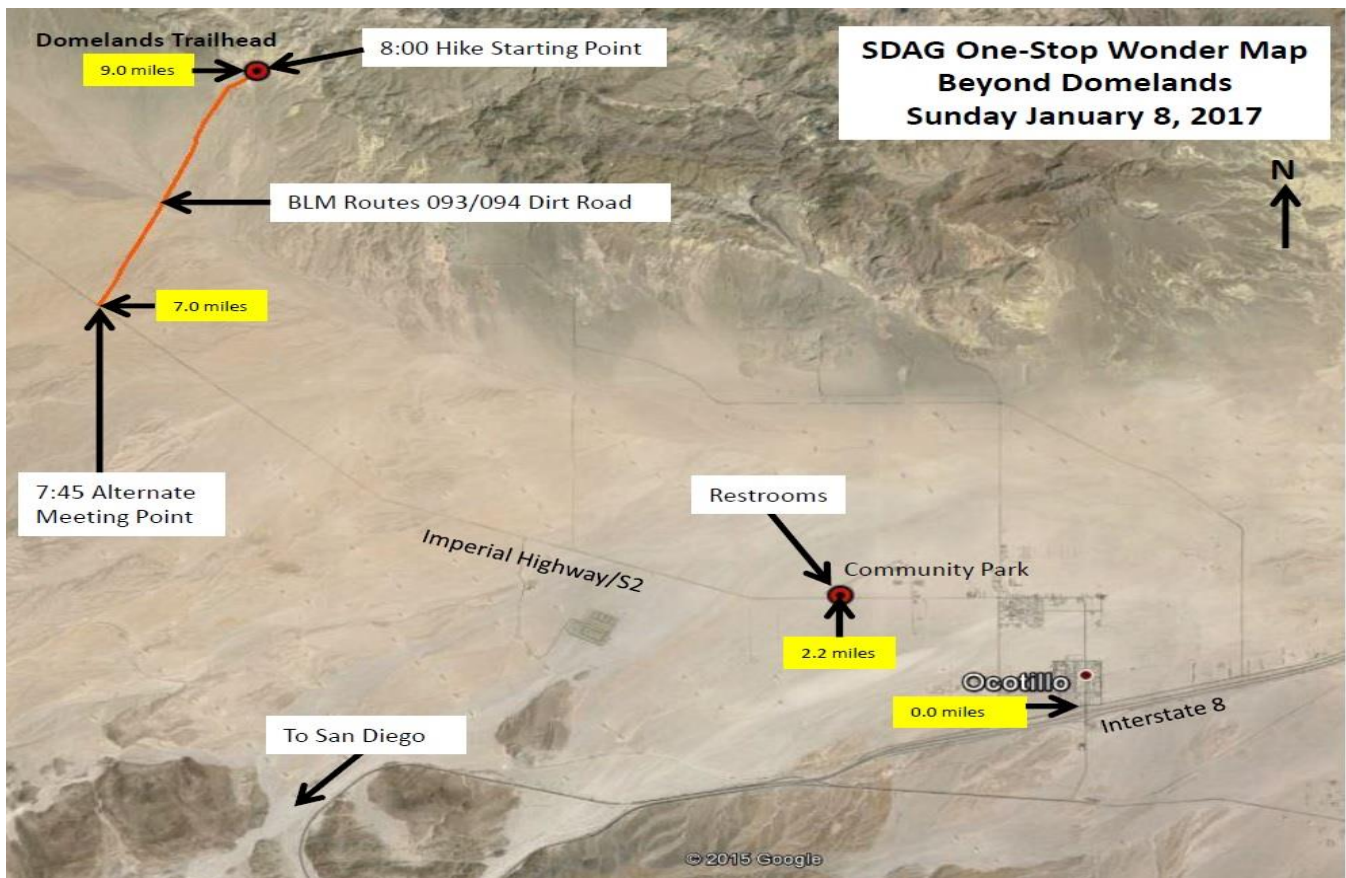
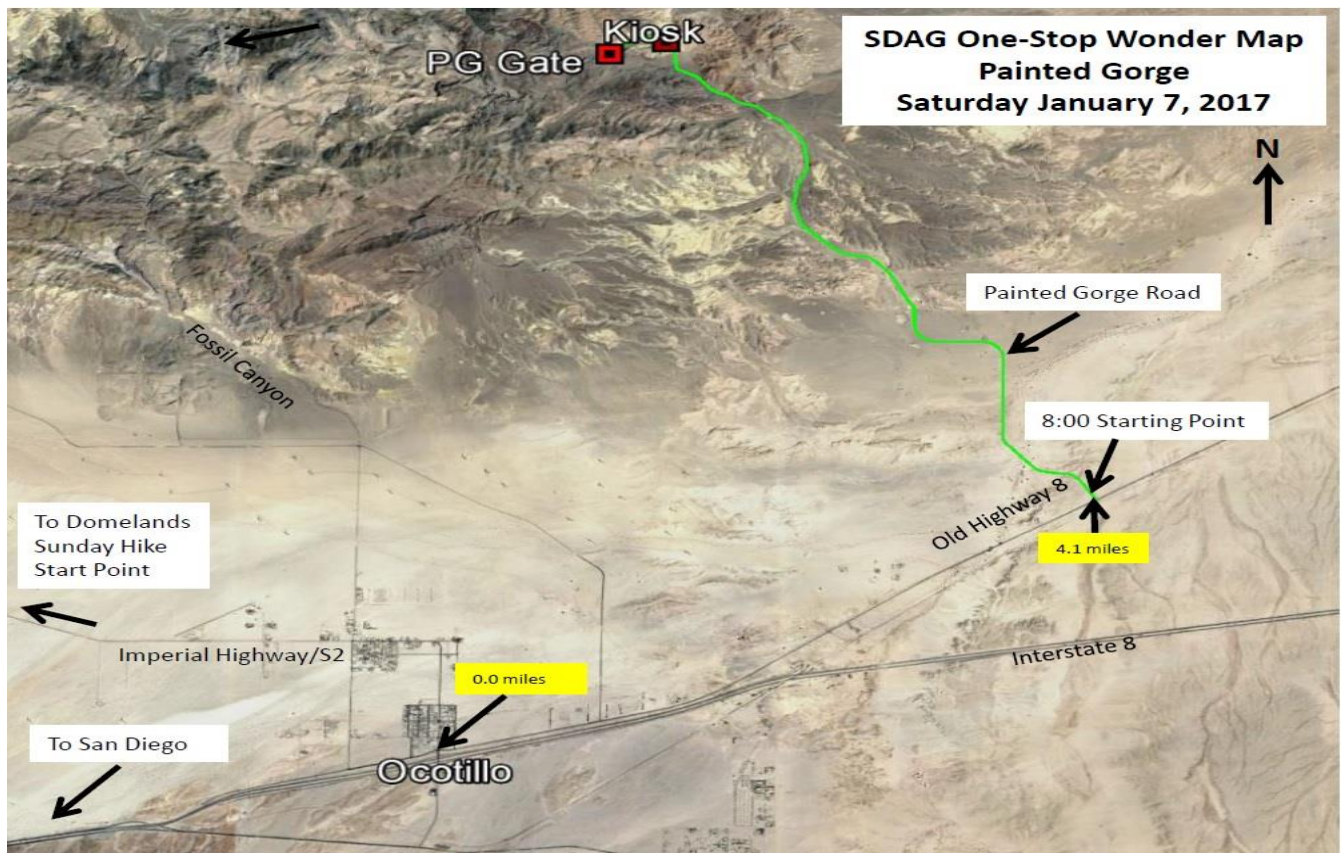
Miscellaneous: Layered clothing is recommended, as well as, sturdy hiking boots.

**If you plan on attending, please RSVP me.** If you have any questions you can contact me via e-mail or phone. Look forward to seeing you on Saturday, January 7<sup>th</sup> or Sunday, January 8<sup>th</sup>.

Randy Wagner, SDAG 2016 President  
(760) 215-5540  
rwagner@lgcvalley.com

**SEE AREA MAP ON NEXT PAGE**





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## **Presentation**

### **Picacho and the Cargo Muchachos**

Presented by: Todd Wirths at the Imperial Valley Desert Museum

Our very own Todd Wirths will be presenting at the Imperial Valley Desert Museum located in Ocotillo, CA on the evening of **Saturday January 21, 2017**. The talk will cover Picacho and Cargo Muchachos and highlight the SDAG/Sunbelt published *Picacho and The Cargo Muchachos: Gold, Guns, and Geology of Eastern Imperial County, California*

The talk will take place from 6 to 9 pm. There are 25 seats available at \$35 per person. RSVP to (760) 358-7016 or [ivdmuseum@gmail.com](mailto:ivdmuseum@gmail.com)

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## **One Stop Wonder**

**Wes Danskin is hosting SDAG at the USGS deep well site on February 4<sup>th</sup> and 5<sup>th</sup>!**

The USGS is installing a deep multiple-depth, monitoring-well on Lagoon Drive just west of Interstate 5 in Chula Vista. With their \$2 million rig they plan to drill 2000 feet, collect spot corings, onsite paleontology, run geophysical logs, and install 5 – 6 wells at selected depths. Wes Danskin has graciously agreed to host a One Stop Wonder on Saturday February 4<sup>th</sup> and Sunday February 5<sup>th</sup> at 9 AM. More info will be provided at the next SDAG meeting. RSVP is greatly appreciated.



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# **31<sup>st</sup> Annual Desert Symposium and Field Trip**

## **Eastern California Shear Zone (ECSZ) Changes in Altitude**

Symposium: April 14 – 15, 2017

Field Trip: April 16 – 17, 2017 (This year the field trip will return to Desert Studies Center each night)

Share your desert research through an oral presentation or poster. The Desert Symposium is open to research presentations related to any area of desert studies. Students are especially encouraged to present and compete for the Adams Best Student Presentation Awards.

Abstract deadline for presentations is January 20, 2017

Manuscript Deadline for 2017 Symposium Volume is February 20, 2017. Examples of manuscript format can be viewed in the 2016 Symposium volume at:

<http://goo.gl/vBjXbW>

Or see instructions for Authors on the DSD website. Additional information can be found by visiting California State University Fullerton

For expedited updates contact [desertstudiescenter@fullerton.edu](mailto:desertstudiescenter@fullerton.edu) to join the email distribution list

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### **NEW Interactive Fault Map for San Diego**

As part of the update for the San Diego-Tijuana Earthquake Planning Scenario, Working Group No. 1's "Fault Map Subcommittee" has completed the first publicly available bi-national active and potentially active fault map. This interactive GIS map includes the first publicly available active and potentially fault map locations from the City of San Diego. The City of San Diego fault locations and activity of faults are based chiefly on interpretation of information contained in geologic reports by private consultants. The City of San Diego identifies active faults as Holocene ( $\leq 11,000$ yr) and potentially active as Quaternary (up to 1.6my). City of San Diego fault investigations are ongoing that may require future revision of this map. This map is not a substitute for a site specific fault investigation. The map also includes an updated fault map layer from the State CGS. CGS suggests users defer to the City of San Diego fault data, where marked, for increased accuracy. The map also integrated the faults south of the border for a bi-national cross border view. You can expand the map legend on the left side to see the fault ages and sources for each layer that can be turned on or off for the map view. You can select from 1 of 12 base maps. You can click on the fault line on the map to



see the meta-data source. This map includes the yellow dashed SURFACE FAULT RUPTURE location layer that will be used for the infrastructure, social, and economic impacts and emergency response for the update to the Earthquake Scenario. In addition, active and potentially active fault investigation locations from private companies are planned to be added to this map as a resource. This map is an on-going project and resource as our knowledge increases about local active and potentially active faults.

The link is available at: [http://www.sandiegogeologists.org/Faults\\_map.html](http://www.sandiegogeologists.org/Faults_map.html)

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](mailto: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](http://www.murbachgeotech.com)

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The Earthquake Engineering Research Institute (EERI) San Diego Chapter, the University of California San Diego (UCSD) Extension and the GeoInstitute San Diego Chapter are organizing the 2nd Workshop on Geotechnical Earthquake Engineering with the topic "Dealing with the Consequences of Liquefaction" on Wednesday-Thursday, March 29-30, 2017 in UCSD campus, San Diego, California. As you may remember, the first workshop in 2014 was a success with almost 300 attendees (<https://sandiego.eeri.org/?p=203>).

The second workshop will honor the lifetime achievements and contributions of Prof. Kenji Ishihara to the field of geotechnical earthquake engineering. The afternoon session of the second day of the workshop ([Thursday, March 30, 2017](#)) will be entirely devoted to honor Prof. Ishihara and the session will be hosted by Prof. I.M. Idriss. We will have distinguished speakers from US, Japan, New Zealand, Europe and South America sharing with us their experiences with liquefaction mitigation, recent major earthquakes and highlighting the contributions of Prof. Kenji Ishihara. We are in the process on preparing the final program and the website for the workshop. A one-day short course before the workshop on Tuesday, March 28 is also in the plans.

We would much appreciate your participation in this workshop. Please mark your calendars and save the dates.

Hope you will be able to join us and be part of this big event.

If you have any question, feedback or wish to sponsor this event, please feel free to contact the Chair of the Organizing Committee, Dr. Jorge Meneses, at [jmenesesl@gmail.com](mailto:jmenesesl@gmail.com)

Thanks and looking forward to seeing all of you in beautiful San Diego,  
Jorge

President, EERI San Diego Chapter

**PROF.**  
**KENJI ISHIHARA**



### Bio of Professor Kenji Ishihara

Prof. Kenji Ishihara was born in Chiba, Japan in 1934. He started his studies in Civil Engineering at the University of Tokyo, obtaining BS-degree in 1957, MS-degree in 1959, and Ph.D-degree in 1963. During one-year period from 1966 to 1967, he was a Visiting Research Associate at the University of Illinois in Urbana, U.S.A. under the guidance of late Professor R. B. Peck. He has been affiliated with the University of Tokyo since then, taking the position of professorship in geotechnical engineering since 1977. On his retirement from the University of Tokyo in 1995 he took up the position of Professor of Geotechnical Engineering at the Tokyo University of Science and then at Chuo University in 2001.

He served for ISSMFE as secretary of the Japanese National Committee for the period of 7 years between 1970 and 1976 during which time he attended the Executive Committee meeting of ISSMFE in Sydney, 1971 as a voting member representing the Japanese National Society. Since then, he often represented Japan in several Executive Committee Meetings of ISSMFE and those of Asian region. He acted as Vice-President of Asian region of ISSMFE during the period of 1989-1993.

His major research interest covers problems in soil dynamics associated with earthquakes, such as liquefaction of sandy deposits, and seismic stability of slopes and earth structures. He wrote about 250 papers on the these subjects.

He has served on various occasions as consultant or adviser to UNESCO projects (Balkan region, India) and UNDP project (Chile, India, Iran). He has participated in the geotechnical investigations of earthquakes worldwide such as those in Romania (1977), Yugoslavia (1979), Chile (1985), Mexico (1985), Ecuador (1986), Soviet Armenia (1988), Soviet Tajik (1989), Philippines (1991) and Iran (1991). He is the author of the book "Fundamentals of Soil Dynamics" (1974) and the textbook "Soil Mechanics" (1988) both in Japanese. He recently published from Oxford Press an English book entitled "Soil Behaviour in Earthquake Geotechnics"

He has received the honor by being assigned on many occasions to deliver lectures worldwide including the theme lecture in the 11th ICSMFE in San Francisco and the 33rd Rankine Lecture of the British Geotechnical Society in 1993. He acted as chairman of the Technical Committee TC4 on

Earthquake Geotechnical Engineering in ISSMFE for the two tenures of office from 1985 to 1993. His incessant endeavor in TC4 has led to the periodical holding of the International Conference on Earthquake Geotechnical Engineering of which the first in a series was held in Tokyo in 1995 and the second in Lisbon in 1999. He has also received honor by being awarded the H. B. Seed Gold Medal in 1998 from the American Society of Civil Engineers. For his significant contribution, title of Honorary Doctorate was given to him from Technical University of Bucharest, Romania in 1995 and from Istanbul Technical University, Turkey in 1999. In 2000, he was honored by being bestowed the most prestigious Japan Academy Prize. In 2010, he was elected to Foreign Associate of the United States Academy of Engineering.

In commemoration of his long-time contribution to the profession, the International Conference on Earthquake Geotechnical Engineering held in Istanbul by the efforts of Professors A. Ansal and M. Sakr, published two volumes of selected papers containing major publications by Prof. Kenji Ishihara.

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Jorge F. Meneses, PhD, PE, GE, [D.GE](#), F.ASCE

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## ***CALL FOR ARTICLES***

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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.

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## ***SDAG RESEARCH TOOL***

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**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, from our first guidebook in 1972, up the San Luis Rey River in 2013, from Coast to Cactus in 2014, and finally over the edge to the Coyote Mountains in 2015. 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, "tsunami" 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_authors.pdf)

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## ***REQUEST for 2017 SDAG/SDGS and PUBLICATION SPONSORS***

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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 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.



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*Contact: Dr. David R. Hargis*

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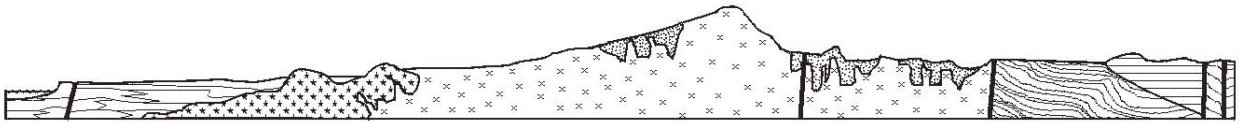


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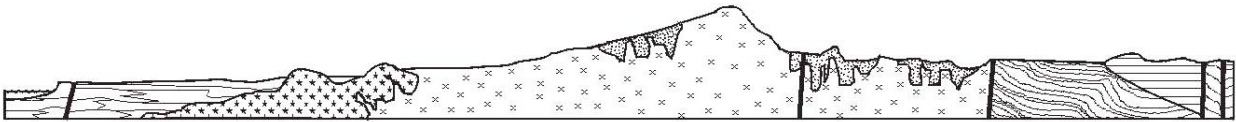
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