

# SAN DIEGO ASSOCIATION OF GEOLOGISTS

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

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## SDAG MEETING ANNOUNCEMENT

**WEDNESDAY, JULY 17, 2013**

### AN UPDATE ON THE MARS SCIENCE LABORATORY PROJECT: CURIOSITY AT ITS BEST!

*Presented by*

**Gillian M. Krezoski, M.Sc.**

- Where:** **The Old Spaghetti Factory**  
111 North Twin Oaks Valley Road  
San Marcos, CA 92069  
(760) 471-0155
- When:** 5:30 pm – Social Hour  
6:30 pm – Dinner  
7:30 pm – Program
- Dinner:** Choice of Meat Lover's Treat, Mizithra Cheese and Brown Butter, or Chicken Marsala.
- Cost:** \$30 per person, \$5 discount for members, STUDENTS: \$15. Add \$5 if you did not make a reservation.

**Reservations:** Make your reservation online at [www.sandiegoeologists.org](http://www.sandiegoeologists.org) no later than noon on **Friday, July 12th.**



**RESERVATIONS CANNOT BE GUARANTEED AFTER FRIDAY AT 12 NOON,  
BUT THEY ARE ALWAYS PREFERRED OVER WALK-INS**

## **SPEAKER ABSTRACT**

**Gillian M. Krezoski, M.Sc.  
MSL Science Team**

### **An Update on the Mars Science Laboratory Project: Curiosity at its Best!**

The Mars Science Laboratory (Curiosity Rover) landed on Mars on the late evening of August 5, 2012 amidst much fanfare. The rover contains the largest scientific payload ever to land successfully on another planet, and boasts the ability for an impressive suite of scientific experiments. Four science cameras built by MSSS are included on the payload and are operated by the local MSSS team. This talk will summarize the project's accomplishments over the first 8 months of successful operations on Mars at a high level, and will examine interesting scientific images taken with the four MSSS cameras... IN 3D!

## **SPEAKER BIO**

Gillian (Jill) Krezoski is a Missions Operations Specialist for the Mars Science Laboratory at Malin Space Science Systems in Sorrento Valley, California. Established in 1990, Malin Space Science Systems (MSSS) designs, builds, and operates space camera systems for government and commercial aerospace customers. Several cameras built by MSSS are currently operating in orbit around Mars and the Moon. An additional deep space camera is on its way to Jupiter (Junocam) and is expected to arrive in October, 2016.

Gillian received her Bachelor's degree in geology at the University of Wisconsin, Eau Claire where she specialized in Mississippian near-shore eolian sedimentology in Pennsylvania. She went on to obtain her Master's degree in Earth Science at McMaster University in Hamilton, Ontario (Canada), where she specialized in Quaternary near-shore marine sedimentology at a geoarcheological site in Turkey called Liman Tepe/Klazomenai. After graduating in 2008, Gillian moved to Pittsburgh where she worked for a geotechnical engineering company completing Environmental Impact Analyses for international nuclear plant sitings. She moved to San Diego in November of 2011 and began work at Malin Space Science Systems, where she coordinates with multitudes of scientists daily and operates the MAHLI, MARDI and Mastcam Science cameras on the Curiosity Rover.



## SDAG MEETING SCHEDULE - Mark Your Calendars!

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

August 21 <sup>st</sup> , 2013	<b>Dr. Tom Rockwell - Rose Canyon Fault</b>
September 25 <sup>th</sup> , 2013	<b>SONGS Update - Joint Meeting with EERI</b>
October 16, 2013	<b>Len Sinfield - A Year in Kandahar</b>
November 20, 2013	<b>Nick Clapp - Mojave Mining History</b>
December 18, 2013	<b>Dr. Tom Demere, San Diego Natural History Museum</b>



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## PRESIDENT'S CORNER

Hello San Diego Association of Geologists Members:

I hope the summer is treating all of you well!

SDAG has had a great season so far! Last month, Dr. Pat Abbott regaled us with his adventures in Hollywood.

This month we have an exciting presentation by Gillian (Jill) Krezoski of Malin Space Science Systems (MSSS). Her talk, entitled *An Update on the Mars Science Laboratory Project: Curiosity at its Best* promises to be a fun one, so be sure to reserve your spot!

Sincerely,  
Cari Gomes  
2013 SDAG President



## GEOLOGY PHOTO OF THE MONTH



Yardangs of the Anza Borrego Desert. This is a view of the leeward end of an approximately 10 ft. high (max. ht.) and 45 to 50 ft long yardang near Pole Line Road just east of the San Diego County line. The Yardangs occur in two large fields that each contain a few hundred of the wind-sculpted features. Their shapes have been described as resembling an overturned boat hull and less poetically as an engine nacelle of an aircraft. They are formed in gently east-dipping siltstone and fine sandstone of the Palm Spring Group. The intervening low points between the yardangs are filled with dune sand. Yardangs are common to many desert areas but only occur in a few places in the western deserts of the U.S. including the Rodgers dry lake of the Mojave and in White Sands National Monument of New Mexico. These features are extremely unique in that there appears to be no other localities in southern California where similar features are found that are of similar size and development.

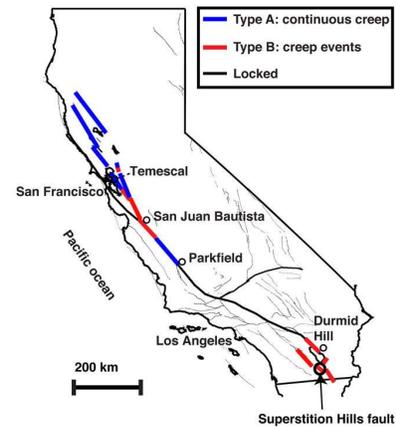
*Submitted by Mike Hart*

# GEOLOGY IN THE NEWS

Reprinted from: Woods Hole Oceanographic Institution (2013, June 3). New explanation for slow earthquakes on San Andreas. Retrieved July 8, 2013, from [http://www.whoi.edu/news-release/creep\\_events](http://www.whoi.edu/news-release/creep_events)

New Zealand’s geologic hazards agency reported this week an ongoing, “silent” earthquake that began in January is still going strong. Though it is releasing the energy equivalent of a 7.0 earthquake, New Zealanders can’t feel it because its energy is being released over a long period of time, therefore slow, rather than a few short seconds.

These so-called “slow slip events” are common at subduction zone faults – where an oceanic plate meets a continental plate and dives beneath it. They also occur on continents along strike-slip faults like California’s San Andreas, where two plates move horizontally in opposite directions. Occurring close to the surface, in the upper 3-5 kilometers (km) of the fault, this slow, silent movement is referred to as “creep events.”



In a study published this week in *Nature Geoscience*, scientists from Woods Hole Oceanographic Institution (WHOI), McGill University, and GNS Science New Zealand provide a new model for understanding the geological source of silent earthquakes, or “creep events” along California’s San Andreas fault. The new study shows creep events originate closer to the surface, a much shallower source along the fault.

“The observation that faults creep in different ways at different places and times in the earthquake cycle has been around for 40 years without a mechanical model that can explain this variability,” says WHOI geologist and co-author Jeff McGuire. “Creep is a basic feature of how faults work that we now understand better.”

Fault creep occurs in shallow portions of the fault and is not considered a seismic event. There are two types of creep. In one form, creep occurs as a continuous stable sliding of unlocked portions of the fault, and can account for approximately 25 millimeters of motion along the fault per year. The other type is called a “creep event,” sudden slow movement, lasting only a few hours, and accommodating approximately 3 centimeters of slip per event. Creep events are separated by long intervals of slow continuous creep.

“Normal earthquakes happen when the locked portions of the fault rupture under the strain of accumulated stress and the plates move or slip along the fault,” says the study’s lead author, WHOI postdoctoral scholar Matt Wei. “This kind of activity is only a portion of the total fault movement per year. However, a significant fraction of the total slip can be attributed to fault creep.”

Scientists have mapped out the segments of the San Andreas fault that experience these different kinds of creep, and which segments are totally “locked,” experiencing no movement at all until an earthquake rupture. They know the source of earthquakes is a layer of unstable rock at about 5- 15 km depth along the fault. But have only recently begun to understand the source of fault creep.

For nearly two decades, geologists have accepted and relied upon a mechanical model to explain the geologic source of fault creep. This model explains that continuous creep is generated in the uppermost “stable” sediment layer of the fault plane and episodic creep events originate in a “conditionally

stable” layer of rock sandwiched between the sediment and the unstable layer of rock (the seismogenic zone, where earthquakes originate) below it.

But when Wei and his colleagues tried to use this mechanical model to reproduce the geodetic data after a 1987 earthquake in southern California’s Superstition Hills fault, they found it is impossible to match the observations.

“Superstition Hills was a very large earthquake. Immediately following the quake, the US Geologic Survey installed creepmeters to measure the post-seismic deformation. The result is a unique data set that shows both afterslip and creep events,” says Wei.

The researchers could only match the real world data set and on-the-ground observations by embedding an additional unstable layer within the top sediment layer of the model. “This layer may result from fine-scale lithological heterogeneities within the stable zone —frictional behavior varies with lithology, generating the instability,” the authors write. “Our model suggests that the displacement of and interval between creep events are dependent on the thickness, stress, and frictional properties of the shallow, unstable layer.”

There are major strike-slip faults like the San Andreas around the world, but the extent of creep events along those faults is something of a mystery. “Part of the reason is that we don’t have creepmeters along these faults, which are often in sparsely populated areas. It takes money and effort, so a lot of these faults are not covered [with instruments]. We can use remote sensing to know if they are creeping, but we don’t know if it’s from continuous creep or creep events,” says Wei.

Simulating faults to better understand how stress, strain, and earthquakes work is inherently difficult because of the depth at which the important processes happen. Recovering drill cores and installing instruments at significant depths within the earth is very expensive and still relatively rare. “Rarely are the friction tests done on real cores,” says Wei. “Most of the friction tests are done on synthetic cores. Scientists will grind rocks into powder to simulate the fault.” Decades of these experiments have provided an empirical framework to understand how stress and slip evolve on faults, but geologists are still a long way from having numerical models tailored to the parameters that hold for particular faults in the earth.

McGuire says the new research is an important step in ground-truthing those lab simulations. “This work has shown that the application of the friction laws derived from the lab can accurately describe some first order variations that we observe with geodesy between different faults in the real world,” he says. “This is an important validation of the scaling up of the lab results to large crustal faults.”

For the scientists, this knowledge is a new beginning for further research into understanding fault motion and the events that trigger them. Creep events are important because they are shallow and release stress, but are still an unknown factor in understanding earthquake behavior. “There’s much we still don’t know. For example, it’s possible that the shallow layer source of creep events could magnify an earthquake as it propagates through these layers,” says Wei.

Additionally, the findings can help understand the slow slip events happening along subduction zones, like the ongoing event in New Zealand. “By validating the friction models with shallow creep events that have very precise data, we can have more confidence in the mechanical implications of the deep subduction zone events,” McGuire says.

*Originally published: June 3, 2013*

## ANNOUNCEMENTS

**ECOLOGICAL ISLANDS, JULY 13 – 16, 2013** Channel Islands Restoration is hosting their fourth exploration of the White Mountains of Eastern California. Space is still available; for more information please visit their website: <http://www.cirweb.org/whites>

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**AESE ANNUAL MEETING REGISTRATION IS OPEN; ABSTRACTS ARE DUE** Meeting registration and hotel reservations are now open and abstracts are being accepted for the 47th annual meeting of the Association of Earth Science Editors (AESE), “Native Resources: Building on the Bedrock of Geoscience Editing,” to be held **October 10–13, 2013**, in Tulsa, Oklahoma. AESE will meet in the top-rated Courtyard by Marriott Tulsa Downtown, 415 South Boston Avenue, the recently renovated historic Atlas Life Insurance building in the Art Deco district of “America’s Most Beautiful City.” Tulsa was the “Oil Capital of the World” for several decades and a center of development for petroleum geoscience.

The meeting will include an opening reception, technical talks, field trips, freelancers’ breakfast, survey editors’ breakfast, business luncheon, awards dinner with entertainment, and optional free-time activities. The board will meet at 1 p.m. October 10 and 9 a.m. October 14.

Meeting registration fees will increase after September 1. Hotel reservations are due by September 26. Be sure to ask for the AESE room rate of \$89 per night.

Abstracts for technical talks are due **August 1**. Technical sessions will be held on October 11 and the morning of October 12. Potential topics include Web and Wiki editing, journal and book management systems, launching a journal, indexing, abstracting, geoarchaeology publishing, geohazard education, georeferencing, permissions, the development of geoscience publishing, naming of geographic and geologic features, and “the scientist as author and editor.” Other topics are also welcome.

The field trips will focus on “Exploring our Black Gold Legacy: The Geology, Art, and Architecture of Oklahoma Oil Men.”

AESE members are involved in editing and publication of material pertaining to the earth sciences. AESE provides a forum for the interchange of ideas for more effective dissemination of earth-science information to the scientific community, educators and students, and the public.

For details about the meeting, see the registration form and call for abstracts. For more information, contact Rowena Mills, host chair, [hrmills777@yahoo.com](mailto:hrmills777@yahoo.com), visit [www.aese.org](http://www.aese.org).

## Call for Abstracts by August 1, 2013

### Association of Earth Science Editors 47th Annual Meeting “Native Resources: Building on the Bedrock of Geoscience Editing” Courtyard by Marriott Downtown, 415 South Boston Avenue, Tulsa, Oklahoma October 10–13, 2013

“Native Resources: Building on the Bedrock of Geoscience Editing” is the theme for the 47th Annual Meeting of the Association of Earth Science Editors, to be held at the Courtyard by Marriott Downtown Hotel (historic Atlas Life Building), 415 South Boston Avenue, Tulsa, Oklahoma, on October 10–13, 2013. **Technical talks will be held on October 11–12.** AESE members and other interested persons are encouraged to give a talk, chair a session, or participate in a panel discussion based on the meeting theme or other earth-science themes.

**Abstracts for talks are due by August 1, 2013.** Abstracts must be **one-paragraph double-spaced Word (.doc) or text (.txt) files**, with special characters noted. Be sure to include your contact information. **Further instructions can be found below.** Please send abstracts to Rowena Mills, AESE *Blueline* editor, at [hrmills777@yahoo.com](mailto:hrmills777@yahoo.com), by August 1.

**Possible session topics include:** Web and Wiki editing, journal and book management systems, launching a journal, indexing, abstracting, geoarchaeology publishing, geohazard education, georeferencing, permissions, the development of geoscience publishing, naming of geographic and geologic features, and “the scientist as author and editor.” **Suggestions for other topics are welcome. Individual talks within a session will be 20 minutes maximum.**

### Abstract guidelines

The abstract should be no more than **one paragraph** (approximately 200 words) and should be self-contained. New or unfamiliar terminology should be defined. We discourage the use of commercial names or parenthetical statements.

The abstract should not simply list the topics covered in the talk but should (1) state the scope and principal objectives, (2) describe the methods used, (3) summarize the results, and (4) state the principal conclusions. **Do not refer to the paper itself in the abstract, such as by saying, “In this presentation, I will discuss...”**

**The abstract should stand alone as a very short version of the talk rather than as a description of the contents.**

If you have questions, please contact Jane Eggleston, AESE vice president/technical program chairman, at [jegg@nettally.com](mailto:jegg@nettally.com), or Rowena Mills, AESE editor and host chairman, at [hrmills777@yahoo.com](mailto:hrmills777@yahoo.com).

**AESE REGISTRATION FORM**  
**Association of Earth Science Editors 47th Annual Meeting**  
**Tulsa, Oklahoma, October 10–13, 2013**

Full name \_\_\_\_\_  
 First name for badge \_\_\_\_\_  
 Affiliation for badge \_\_\_\_\_  
 Address \_\_\_\_\_  
 City/state (province)/ZIP (postal code) \_\_\_\_\_ Country \_\_\_\_\_  
 Telephone (\_\_\_\_\_) \_\_\_\_\_ Fax (\_\_\_\_\_) \_\_\_\_\_  
 E-mail (for registration confirmation) \_\_\_\_\_

**REGISTRATION**

**Full registration fees cover admission to all sessions, opening reception, business lunch, awards banquet, and field trips.**

**AESE members**

Full meeting	On or before September 1	\$295	After September 1	\$345	\$ _____
One day	On or before September 1	\$125	After September 1	\$150	\$ _____

**Nonmembers**

Full meeting	On or before September 1	\$345	After September 1	\$395	\$ _____
One day	On or before September 1	\$150	After September 1	\$175	\$ _____

**Nonmember registration includes membership for the remainder of AESE's fiscal year.**

**Guest registration** (includes opening reception, awards banquet, one half-day field trip, one full-day field trip)

\$150 (U.S.) each for \_\_\_\_\_ person(s) \$ \_\_\_\_\_

If guest wishes to attend the business luncheon on Friday, October 11, please add \$25 \$ \_\_\_\_\_

Guest name(s) \_\_\_\_\_

**Optional events**

State, provincial, and national surveys editors' breakfast (Friday, October 11)	\$20	\$ _____
Freelancers' breakfast (Saturday, October 12)	\$20	\$ _____

**TOTAL FEES ENCLOSED** \$ \_\_\_\_\_

**Board:** First board meeting 1 p.m. October 10; second board meeting 9 a.m. October 14. Plan your travel accordingly.

I plan to attend:

- |   |   |
|---|---|
| <input type="checkbox"/> Opening reception (Thursday evening) | <input type="checkbox"/> AESE business luncheon (Friday)          |
| <input type="checkbox"/> Awards banquet (Saturday evening)    | <input type="checkbox"/> Half-day field trip (Saturday afternoon) |
| <input type="checkbox"/> Survey editors' breakfast (Friday)   | <input type="checkbox"/> Full-day field trip (Sunday)             |
| <input type="checkbox"/> Freelancers' breakfast (Saturday)    |   |

**Dietary and/or transportation restrictions** \_\_\_\_\_ (Add extra page if needed.)

For further information about the meeting, e-mail  
 Rowena Mills, host chairman  
 hrmills777@yahoo.com

Pay by credit card or PayPal at  
<http://www.aese.org/paypal.html>

\*All checks must be electronically transferable to a U.S. bank that is imprinted on the check and includes the nine-digit routing number between "smiley faces." Checks without the nine-digit routing number will be returned.

Mail registration form and check\* or money order payable to AESE in U.S. funds to

Mary Ann Schmidt  
 554 Chess Street  
 Pittsburgh PA 15205-3212  
 (412) 268-4708  
[maryanns@andrew.cmu.edu](mailto:maryanns@andrew.cmu.edu)

**HOTEL DEADLINE SEPTEMBER 26**  
 Call the Courtyard by Marriott Downtown, 415 S. Boston Ave., Tulsa, at 918-508-7400 or 877-894-2809. **Ask for the AESE rate of \$89 per night by Sept. 26.**

## ANNOUNCEMENTS

**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.

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**CALL FOR PHOTOS!** SDAG invites members to submit photographs of an interesting geologic feature for publication in the Geology Photo of the Month section of the newsletter. Please submit your photo along with a caption to the SDAG secretary via email.

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**VINTAGE SDAG GUIDEBOOKS NOW AVAILABLE FOR FREE DOWNLOAD!** If you want to complete your collection, or just see what SDAG was up to in the 1970s, check out our website's publication page, and scroll all the way down: <http://www.sandiegogeologists.org/Publications.html> In addition to our very first publication in 1972, a field trip to Otay Mesa, you'll find our 1973 *Geology and Hazards of San Diego* volume, the first of two guidebooks to the Coronado Islands, in 1978, and our 1987 field guide to the gold mines of Julian. Happy reading!

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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 available on our website. Entries are sorted by primary author, or chronologically by date of publication, from our first guidebook in 1972 to all things Picacho in 2011. 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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## SEEKING JOB OPPORTUNITIES

**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](http://www.linkedin.com/in/cbclifton2010). Email [cbc2006@cox.net](mailto:cbc2006@cox.net) or 619-964-1776.

Contact: Clay Clifton

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**ENGINEERING GEOLOGIST-** California PG, MS Geology, over 13 years of applied geotechnical experience, proficient in geotechnical investigations, hazard evaluations, geophysical surveys, construction management and quality control, engineering analyses, special interest in earthquake-hazard and seismic design related applications, strong problem-solving and organizational skills. Detailed resume upon request: Anna, 201-407-7461, [Afyodorova103@gmail.com](mailto:Afyodorova103@gmail.com)

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**ENTRY-LEVEL ENVIRONMENTAL SCIENTIST** - I am a recent UCSB graduate with a double major in Environmental Studies (BS) and Geology (BS, Earth Systems emphasis) who is looking to begin a career in environmental consulting. I have prior lab experience in both professional and academic settings. I am looking to establish myself with a passionate and hard working environmental firm in the San Diego region. For further information about my credentials and work experience please contact Georgi Chertkov at [georgichertkov@gmail.com](mailto:georgichertkov@gmail.com) or call me at 505-412-3107.

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## **Request for Sponsors: 2013 SDAG/SDGS and Publication SPONSORS**

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- Sally & Dennis Avery
- [Dr. Richard Berry](#) - SDSU Prof. of Geology and Geophysics, Emeritus
- Curtis Burdett
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- David and Jan Steller ("two-fer" - thanks )
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