

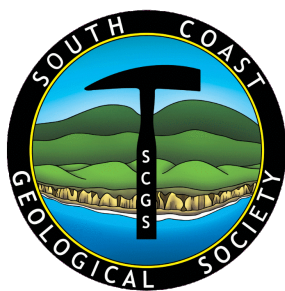
South Coast Geological Society Newsletter

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# THE RECORD

OFFICIAL NEWSLETTER OF THE

## South Coast Geological Society



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### MEETING INFORMATION

#### Time:

**Social Hour: 6:00 PM****Dinner: 6:30 PM****Talk: 7:30 PM*****Meeting Date: Wednesday, August 22nd******Guest Speaker: Dr. Jeff Marshall******Topic: Sizing up the subduction beast: A tale of earthquakes and ancient shorelines in Costa Rica and New Zealand***

#### **Abstract:**

The seismic hazards of subduction zones are substantial, as exemplified by the 2004 Sumatra (Mw 9.2) and 2010 Japan (Mw 9.0) megathrust earthquakes and tsunamis, which killed more than a quarter-million people. Convergent plate margins account for more than 80% of global seismic moment release, and recent research has revealed a broad spectrum of slip behavior on megathrust faults, ranging from stick-slip earthquakes to tremor and slow-slip. This talk will explore ongoing geomorphic and paleoseismic investigations along the coastlines of Costa Rica and New Zealand that provide new insights into megathrust fault segmentation and rupture behavior over multiple seismic cycles.

The Nicoya Peninsula, Costa Rica forms a prominent morphologic high along the Middle America forearc, where the Cocos plate subducts beneath the Caribbean plate at 90 mm/yr. This emergent coastal landmass overlies the megathrust along a seismogenic zone that produces frequent major earthquakes, as well as periodic slow slip events. Quaternary marine and fluvial terraces record a net uplift pattern consistent with the peninsula's overall topographic form.

**Student/Prof. \$15**



The Hikurangi subduction margin along North Island, New Zealand accommodates oblique convergence of the Pacific Plate beneath the Australian plate at 45 mm/yr. Along the southern margin, pronounced frontal accretion and forearc uplift occur inboard of the subducting Hikurangi plateau, in an area of strong interface locking and deep slow slip. In the north, subduction erosion and serrated coastal uplift occur inboard of subducting seamounts on the plateau flank, in an area of weaker locking and shallow slow slip. Emergent

marine terraces and paleo-shorelines along the Hikurangi margin record tectonic uplift over two time scales: 1) short-term episodic uplift events during the Holocene (0-10 ky), and 2) long-term net deformation during the Pleistocene (10-500 ky). Along the Wairarapa segment in the south, a narrow coastal lowland preserves uplifted Holocene terraces and beach ridges that record up to seven prehistoric earthquakes. LiDAR imagery allows for correlation of paleo-shorelines and field sites where  $^{14}\text{C}$  ages constrain paleo-earthquake timing. Up to four higher elevation Pleistocene marine terraces in this area characterize long-term uplift and margin-parallel folding, with OSL ages constraining deformation rates. Along the southern Hawke's Bay segment (central Hikurangi margin), up to three Holocene terraces record paleo-earthquakes near Cape Kidnappers. LiDAR mapping, field surveying, and  $^{14}\text{C}$  dating constrain the timing and magnitude of coseismic uplift events. Several higher Pleistocene terraces characterize long-term uplift and deformation along the Kidnappers anticline. Along the northern Hawke's Bay segment, a continuous flight of Holocene and Pleistocene marine terraces at Mahia Peninsula record outer forearc uplift and tilting above the upper-plate Lachlan thrust. Five steps within the Holocene terrace are interpreted as discrete coseismic uplift events. Along the Raukumara segment in the north, localized Pleistocene terraces and Holocene platforms occur at varying elevations, recording differential coastal uplift and paleo-earthquake events. Along the Hikurangi margin as a whole, tectonic uplift is a product of complex interactions between deep megathrust slip and shallow upper-plate faulting. Uplifted Holocene paleo-shorelines record single coseismic uplift events, while Pleistocene terraces characterize net deformation patterns. Continued mapping, field surveying, and age dating along strike of the Hikurangi margin will help differentiate between very large margin-wide megathrust ruptures (M8.0-9.0+) and smaller, more localized, upper-plate thrust events (M7.0-8.0). Both earthquake types pose a significant seismic and tsunami hazard for New Zealand residents.



**Dr. Jeff Marshall is a Professor of Geological Sciences at Cal Poly Pomona University**

**Speaker Information:**

Dr. Jeff Marshall is a Professor of Geological Sciences at Cal Poly Pomona University and an adjunct professor with the Lyle Center for Regenerative Studies. He is a geomorphologist with research and teaching expertise in neotectonics, geologic hazards, coastal processes, fluvial geomorphology, and watershed restoration. Much of his research has focused on the tectonics and earthquake hazards of active plate margins, with multiple publications in peer-reviewed journals, and over 30 years of experience conducting field research in California, Central America, Mexico,

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and New Zealand. His fieldwork has included studies of active tectonics and landscape evolution, forearc deformation and seismic-cycle uplift, fault structure and kinematics, coastal geomorphology and sedimentology, volcanic stratigraphy, landslide hazards, and Quaternary geochronology. He maintains long-standing research collaborations with many U.S. and international colleagues, including the Costa Rican Volcanologic and Seismologic Observatory (OVSICORI-UNA) and the New Zealand Geological Survey (GNS Science). For the past 20 years, Dr. Marshall has been involved in the research and education efforts of the National Science Foundation MARGINS and GeoPRISMS Programs including funded coastal tectonics research in Costa Rica and New Zealand, serving on the GeoPRISMS Education Advisory Committee, and leading field trips, workshops, and student research symposia in Costa Rica, Nicaragua, New Zealand, and the U.S. He has substantial experience mentoring international undergraduate field research with both the Keck Geology Consortium and his own NSF REU projects. Dr. Marshall is a five-term Geosciences Councilor with the national Council on Undergraduate Research (CUR) and former University Coordinator for Undergraduate Research at Cal Poly Pomona. He also serves on the California State University Council on Ocean Affairs, Science, and Technology (COAST) and is a member of the Water Resources and Policy Initiative (WRPI). In 2018, he received the Ralph W. Ames Distinguished Research Award from the Cal Poly Pomona College of Science. Dr. Marshall studied geology and earth surface processes at UC Santa Barbara (BA), UC Santa Cruz (MS), and Penn State (PhD).

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## Presidents Corner

Hello South Coasters,

What a summer it has been! Thanks to everyone who came out to see our local Phil Hughes share his unique Alaskan field excursion with us. Also, this weekend concluded our first round of Hike and Brews. Thank you all who made it out and I especially thank those that put them together including Allison Bieda, Jenifer Leidelmeijer, and Garrett Mottle.

This Wednesday is our joint AEG Meeting held at Dave & Busters in Orange with a talk from Dr. Jeff Marshall of Cal Poly Pomona about earthquakes and ancient shorelines in Costa Rica and New Zealand. We haven't even gotten to the talk and I've already learned something really interesting from the abstract "Convergent plate margins account for more than 80% of global seismic moment release." That's so

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cool to think about.

On Tuesday (8/21) the Orange County Geo-Institutue Chapter (part of ASCE) is hosting a talk in Costa Mesa by Dr. Marty Hudson, PE, GE, and Ms. Rosalind Munro, PG, CEG of Wood Group, on the design challenges of a mid-rise hotel cantilevered over an active fault in Hollywood. Information is in a link below.

Work to revise and approve the Bylaws is continuing the a schedule that will take us get us there by the end of the year. Below are links to the draft bylaws and also a summary presentation. The process is anticipated to be:

- Discuss the changes at the August 22nd meeting
- Take comments to the draft bylaws
- Nominate Board of Directors
- Send out official ballots in October
- Vote on the Bylaws and Board of Directors at the November 5th meeting
- Announce results of the voting at the December 3rd meeting
- Start 2019 with a Board of Directors and New Officers

And I saved the best for last, I know you're excited about the Southern Cascades Field Trip which is in six weeks. A registration link is included below and on our website. The trip will cost \$145 for members, \$190 for non-members, \$95 for students (first 10, \$145 thereafter). The fee includes the road log, a digital guidebook, t-shirt, porta-pottys, and meals and beverages from Friday dinner to Sunday lunch.

The camping location is Harris Spring Campground (41.457, -121.785) on USFS land outside of McCloud. Attendees are responsible for their own transportation but we'd like to facilitate options. The main options are:

Drive/carpool, 12 hours each way, \$150 in gas per car (up and back)

SCGS will have a rental van for up to 10 people that will leave Friday and return Monday. Costs will be shared evenly by those who take it (~\$60).

Fly, 6 hours each way (check-in, rental car, drive), \$100-\$200 for the flights (Southwest from Long Beach looks the best) and \$200-\$500 per rental car (sedan is fine; \$60 in gas)

As part of registration we would like you to report your choice in a google document so that you can coordinate with others. I know this trip may be a tough one to get to but it will be worth it!



See you Wednesday!

Ben Lewis

SCGS President, 2018

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### **2018 Draft of Updated SCGS Bylaws**

#### **Bylaws Draft Presentation**

**OC Geo-Institute: Design Challenges of a Mid-Rise Hotel on an Active Fault**



**Ben Lewis, SCGS President**

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## **2018 SCGS Field Trip**

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***Southern Cascades of California:  
featuring Mount Shasta, Medicine Lake Volcano, Lava Beds National  
Monument, and more!***

South Coast Geological Society is heading to the Southern Cascades for our 45th Annual Field Trip on September 28th to October 1st, 2018! The field trip is being led by Dr. Brandon Browne, Humboldt State University and Ben Lewis, President, South Coast Geological Society.

The camping location is Harris Spring Campground (41.457, -121.785) on USFS land outside of McCloud. Attendees are responsible for their own transportation but we'd like to facilitate options.

The main options are:

- 1) Drive/carpool, 12 hours each way, \$150 in gas per car (up and back).
- 2) SCGS will have a rental van for up to 12 people that will leave Friday at 6AM and return Monday around 8PM. Costs will be shared evenly by those who take it (~\$60). SCGS Officer will be the designated driver.
- 3) Fly, 6 hours travel time each way (check-in, rental car), \$100-\$200 for the flights (Southwest from Long Beach to Sacramento) and \$200-\$500 per rental car (sedan is fine; \$60 in gas).

As part of registration we would like you to report your transportation choice in a google document so that you can coordinate with others.

**Itinerary Details:**

Friday: Arrive to Harris Springs Campground (Travel Day)

Saturday: Medicine Lake Volcano and Lava Beds National Monument (glass mountain, lava tubes, recent volcanic deposits)

Sunday: Mount Shasta tour-around (various volcanic deposits, landslide deposits)

Monday: Depart to home (Travel Day)

**Costs:**

The Fees for the 2018 South Coast Geological Society Field Trip are as follows:

Regular Member: **\$145**

Student Member: **\$95** (First 10 students); **\$145** thereafter pending sponsorship availability.

Non-Member: **\$190**



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The cost includes camp site fees, food from dinner on Friday night to lunch on Sunday and everything in between (6 meals total), field trip t-shirt, beverages (beer, wine, water, soda), port-a-potty's, a printed Road Log book, and digital 2017 Field Trip Guidebook.

## Fieldtrip Registration Form

## Visit the SCGS Fieldtrip Webpage

# 2018 SCGS Field Trip Student Sponsorship

*We are grateful for the members who are so supportive and encouraging through their generosity. Your generous contributions have provided several students with the opportunity to attend our annual field trips to network, learn, and become involved with the society*

*A donation of \$100 supports 2 student attendees.*

*Please email SCGS if you are interested in sponsoring students to attend the field trip. In addition, Sponsors will be recognized according to our sponsorship tiers. South Coast Geological Society is a 501(c)(3) nonprofit organization which makes all donations tax deductible.*

## Contact SCGS to become a Student Sponsor

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## MEMBERSHIP

Your membership in 2017 allowed SCGS to host stellar field trips, provide over \$2,000 in student scholarships, and improve the society in many ways. South Coast Geological Society raises our

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annual budget through private contributions, so your membership is essential for us to continue the society, make improvements, provide phenomenal meetings, host field trips, and award student scholarships. To support the goals of SCGS we are asking for your membership renewal for 2018.

A membership to South Coast Geological Society has many benefits including discounted meeting and field trip costs, exclusive field trips and events, and more!

We welcome you to join SCGS, one of the largest, most active Geological Societies in Southern California.

**Membership Costs:**

Professionals: \$35 / year

Students: Free

**[Click Here for the Membership Form!](#)**

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## **South Coast Geological Society Corporate Sponsorship**

SCGS greatly appreciates our Corporate Sponsors! Corporate sponsorship allows SCGS to host stellar field trips, provide annual scholarships, and publish guidebooks. There are four Corporate Sponsorship Levels: DIAMOND (\$1,000+), GOLD (\$500+), SILVER (\$250+), and BRONZE (\$100+).

# **THANK YOU 2018 SPONSORS!**

# DIAMOND (\$1,000+)

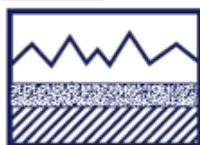
Your COMPANY LOGO here

**NEW!**

## GOLD (\$500+)



Mr. William (Bill) Elliott



NMG



**ALBUS-KEEFE  
& ASSOCIATES, INC**  
GEOTECHNICAL CONSULTANTS

## SILVER (\$250+)

**REDFIN**



## BRONZE (\$100+)



**GEOCON**

Rob Hawk

Jeff Miller

**Click Here to Become a Corporate Sponsor!**

## MEETING HIGHLIGHTS

We want to thank all the members who travelled near and far distancing to join us for a fantastic evening with Mr. Phil Hughes.

Mr. Hughes, provided us with an exceptional presentation titled: *Too Hot to Handle, Too Cold to Hold: An Undergraduate Field Research Program by Santa Ana College and the University of Alaska Fairbanks.*



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## UPCOMING EVENTS

September/October: 45th Annual Field Trip

November: 24th Annual Poster Session

December: Annual Holiday Party and Raffle

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South Coast Geological Society Hike+Brew: Whiting Ranch Red Rock Canyon



South Coast Geological Society Hike+Brew: Portuguese Bend Reserve

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## ADDITIONAL LINKS

Association of Environmental & Engineering Geologists - So. California

**Association for Women Geoscientists - LA/OC Chapter**

**American Society of Civil Engineers**

**Coast Geological Society**

**Groundwater Resources Association of California - So. California**

**Inland Geological Society**

**Los Angeles Basin Geological Society**

**San Diego Association of Geologists**

**San Joaquin Geological Society**

**Southern California Paleontological Society**

**GEOLOGY FUN**

	To warm my head
	To warm my feet
	To warm my hands
	To warm my heart

**Why should you never fight a dinosaur?**

Because you'll get jurasskicked.



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## SUPPORT US



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Help us every time you shop on Amazon, please select SCGS as your preferred charity:

***South Coast Geological Society, Inc.***

AmazonSmile is a website operated by Amazon with the same products, prices, and shopping features as Amazon.com. The difference is that when you shop on AmazonSmile, the AmazonSmile Foundation will donate 0.5% of the purchase price of eligible products to the charitable organization of your choice.

**Visit AmazonSmile**

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## Harold's Car Donation

*Helping People Help Charities Since 1997*

When you donate your car, half the proceeds are donated to

***South Coast Geological Society***

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**Call us now to donate**



**(800) 310-5274**

Serving Los Angeles, San Francisco and everywhere between

Harold's Car Donation will handle everything from start to finish, from FREE Towing of your vehicle to ensuring ALL DMV paperwork is properly filed and handled, getting you the most out of your donation.

Your tax deduction is the price at which the car or vehicle sells. You get rid of an unwanted car and the satisfaction of helping others, and you pay less income tax.

We accept all Cars, Trucks, Vans, Boats, Motor-homes, Junk Cars, Disabled cars, and

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Wrecked cars. No Title? Failed Smog Check? No Problem!

## Visit Harold's Car Donation

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