

# Inland Geological Society

Newsletter of the Inland Geological Society

Volume 22 No. 3

**This Meeting:**  
**Thursday**  
**March 2<sup>nd</sup>**  
Joint Meeting  
with SME and AEG

**Time:**  
Social Hour:  
5:30pm- 6:30 pm  
Meeting Opening:  
6:30pm-6:45pm  
Dinner (\$23):  
6:45pm -7:30pm  
Speaker  
Presentation:  
7:30pm-8:45pm

**Location:**  
Marie Calendar's  
Restaurant,  
2149 Convention  
Center Way  
Ontario, Ca.  
(909) 937-0214

**RSVP by Feb 23**  
**E-mail**  
[rick.gundry@verizon.net](mailto:rick.gundry@verizon.net)  
or call  
(951) 924-6756  
leave message

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## **March Speaker**

### **Jason Saleeby,**

Professor of Geology, Division of Geological and Planetary Sciences,  
California Institute of Technology

## **Talk Title:**

### **EVOLUTION OF THE DEEP CRUST AND UPPER MANTLE BENEATH THE SOUTHERN CALIFORNIA REGION**

Deep-level basement exposures (30-35 km) into the Cretaceous magmatic arc of the SW Cordillera are preserved in the southernmost Sierra Nevada, Santa Lucia Range (Salinia), central Mojave Desert and eastern San Gabriel Mountains areas. Lower crust-upper mantle xenoliths that were entrained in late Cenozoic lavas are widespread in the southern Sierra Nevada, Owens Valley and Mojave Desert regions. Integration of regional structural and petrogenetic data on the deep-level exposures, and petrogenetic data on the xenoliths offer an opportunity to reconstruct the evolution of the southern California arc-generated lithosphere. Further integration with regional geophysical data bring to focus the current evolutionary state of the lithosphere, and further reveal a complex tectonic history during which structural inheritance in the basement plays a crucial role. The xenolith data in conjunction with batholith petrogenetic data record the production of a high-density mantle lithosphere beneath the batholithic belt generated within the mantle wedge environment in conjunction with arc magmatism.

LITHOSPHERE, continued on Page 2

**LITHOSPHERE, Continued from Pg. 1**

A full 35-40 km thick section of felsic crust was generated along the batholithic belt above this mantle lithosphere section during the Cretaceous. It thus appears that the batholithic belt represents the products of complete lithosphere reconstitution above the subducting Farallon plate. The main residue assemblage created during felsic melt production in the batholith was rich in eclogitic assemblages, which when added to the hosting mantle wedge peridotites, rendered the sub-batholithic uppermost mantle gravitationally metastable. In the Late Cretaceous such mantle lithosphere was sheared off beneath the southernmost Sierra, Mojave/Salinia (restored) and San Gabriel Mountains (restored) regions by an anomalously low-dipping segment in the Farallon plate. During this regime of low-angle subduction the lower crust was reconstructed by the tectonic underplating of Franciscan-affinity subduction accretion assemblages. Xenolith data in the Mojave Desert region record further reconstitution of the mantle lithosphere by the subduction underplating of Farallon plate abyssal peridotites, and by the subsequent inflow of sub-continental asthenosphere. By use of relative plate motions, palinspastic restorations and structural chronology this low-angle subduction regime can be tracked eastward into the North American plate interior as the latest Cretaceous-Paleogene Laramide orogeny.

The residual sub-batholithic mantle lithosphere segments that survived the Laramide regime remained metastable beneath the greater Sierra Nevada and northern Peninsular Ranges through much of the Cenozoic. However, they have been recently mobilized as critical elements of the Pliocene-Quaternary deformational regime of southern California. As a result of Neogene slab window migration beneath the southern Sierra, and possibly high magnitude extension immediately to the east (Death Valley corridor), the Sierran residual mantle lithosphere was mobilized westward as a high-density drip structure. Replacement by buoyant asthenosphere has resulted in the current phase of accelerated Sierra Nevada uplift. As the Peninsular Ranges have moved northward along the San Andreas fault, and impinged on the western Mojave-southern Sierra region, its mantle lithosphere appears to have delaminated and descended northward deeper into the mantle as a second drip-like structure centered beneath the eastern Transverse Ranges. The question posed by these regional relations is: could the "big bend" in the San Andreas fault and the related Transverse Ranges convergence zone be the result of the plate juncture deforming in response to the impingement of these second order upper mantle (drip) structures.

**2006 IGS OFFICER CONTACT INFO****President**

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## Inland Geological Society Seeks Speaker Topics and Speakers

Informative and interesting talk topics and speakers on subjects in the earth sciences have always been a highlight and purpose of regular monthly meetings of the Inland Geological Society for over 20 years. Local and regional topics and speaker programs are essential for a group that meets monthly, for the most part that is comprised of local or regional residents or employees, professional or interested parties alike.

Currently, IGS is seeking suggestions for future talk topics and suggestions for potential speakers. Your suggestions and ideas are very important, so that we can cover a cross-section of subjects and interests

IGS is soliciting your suggestions for topics for throughout the year and suggested speakers, as follows:

- Request a Topic
- Suggest the reason for the Topic
- Suggest a Speaker
- Suggest Speaker contact information
- Suggest Other Topics/Speakers
- Other requests

Please forward your ideas and suggestions to [Phuong Chau](#) and/or [Rick Gundry](#).

### **Inland Geological Society Upcoming Talks**

#### **Wednesday, April 2<sup>nd</sup>**

Riverside Metropolitan Museum  
*"Dealing with Uncertainty Regarding the  
 Chemistry of Drinking Water Wells – an  
 Example from the City of Riverside"*  
 Dr. Matt Werner, Sr. Project Director, Earth  
 Tech, Long Beach, California

#### **Tuesday, May 16<sup>th</sup>**

Geology Department, California State  
 University, San Bernardino  
 Dr. Erik Melchiorre, hosting  
*"Student Talks and Poster Sessions", and  
 Preview of Summer expedition to Broken Hill  
 Australia"*  
 Joint meeting with Southern California  
 Section, Society of Mining,  
 Metallurgy and Exploration (SME).

#### **Wednesday, June 7<sup>th</sup>**

Riverside Metropolitan Museum  
*Aquifer Testing – Title TBA*  
 Tom Perina, CH2M HILL

### **Other Announcements**

#### **Field Trip**

Barstow Fossil Beds and Rainbow Basin  
 With San Bernardino County Museum Senior  
 Curator Kathleen Springer, and Curator of  
 Paleontology Eric Scott,  
 and Curator of Geology J. Chris Sagebiel  
 Saturday, February 25, 2006  
 7:00 a.m. to 6:00 p.m.

[http://www.co.san-bernardino.ca.us/museum/membership/pdf/FieldTrip\\_Fossil-Beds\\_0206.pdf](http://www.co.san-bernardino.ca.us/museum/membership/pdf/FieldTrip_Fossil-Beds_0206.pdf)

#### **Short Course**

GIS Applications in Geology and  
 Groundwater Studies  
 March 4, 2006

Dr. Tien-Chang Lee

More Info Available at:

[http://www.inlandgeo.org/news/gis\\_shortcourse.pdf](http://www.inlandgeo.org/news/gis_shortcourse.pdf)

## Other Announcements (Continued)

### **Employment Opportunity**

Petra Geotechnical is currently seeking experienced engineering geologists for our Costa Mesa, Ontario and Palm Desert offices. We offer competitive salaries and excellent benefits. Please contact Linda Becker, Human Resources Manager, at 714/549-8921 or submit your resume by email to [lbecker@petra-inc.com](mailto:lbecker@petra-inc.com)

### **Short Course**

Principles of Groundwater Flow and Transport Modeling  
March 8-10, 2006  
Groundwater Resources Assoc.  
UC Irvine Learning Center  
To Register:  
<http://www.grac.org/modreg.html>

### **Conference**

2006 Ground Water Summit,  
April 23-26, 2006, [www.ngwa.com](http://www.ngwa.com)  
San Antonio, Texas

### **Short Course**

Long Beach (March 6)  
and San Diego (March 7)

*"The Latest Developments in Environmental and Geotechnical In-Situ Testing"*

Dr. Peter Robertson

Covers the latest developments in the use of in-situ testing with emphasis on cone penetration testing (CPT) in environmental and geotechnical site investigations. Emphasis will be given to recent advances and regulatory requirements in the area of liquefaction potential determination and remedial design considerations.

(562) 427-6899, [www.greggdrilling.com](http://www.greggdrilling.com)



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



### **MARCH MEETING**

Marie Calendar's Restaurant,  
2149 Convention Center Way  
Ontario, Ca.  
(909) 937-0214

Getting to this location just north of Ontario Airport is a little tricky. IGS advises checking Mapquest or your Thomas Guide for the best route.

## Inland Geological Society

**2006 MEMBERSHIP DUES****PLEASE REMIT THIS FORM WITH DUES PAYMENT**

Name: \_\_\_\_\_

Job Title / Company: \_\_\_\_\_

E-mail address: \_\_\_\_\_

 Home address: \_\_\_\_\_

\_\_\_\_\_

Phone Number: (        ) \_\_\_\_\_

 Business address (if different than above):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone Number: (        ) \_\_\_\_\_

**MEMBERSHIP DUES:**           **\$15.00 for e-mail newsletter (best deal in town)**           **\$20.00 for paper newsletter.** If you opt to receive a paper newsletter, please indicate which address you prefer to receive your newsletter by checking the appropriate box.           **\$ 5.00 for Students****Please indicate: \_\_\_\_\_ New \_\_\_\_\_ Renewal \_\_\_\_\_ Educational Org/Sister Society**

Payment for dues and/or T-shirts may be made by cash, check or money order.

Please make your check or money order out to: INLAND GEOLOGICAL SOCIETY

T-SHIRT ORDER: \$15.00 Please indicate size:

    Medium     Large     X-Large     XXL     XXXL

(Note: Dues are required to receive a monthly newsletter and are renewable in January of each calendar year. New regular members may pay pro-rata for remaining months of the year: \$20.00/12 months x the number of remaining months in the year). Dues may be paid at the monthly meetings, or send your payment and this membership form to: STEVE MAINS, IGS MEMBERSHIP CHAIR, 6447 JAGUAR DRIVE, RIVERSIDE, CA 92506-4651 (951) 780-5636 or [Watermains@aol.com](mailto:Watermains@aol.com)

**Inland Geological Society**

Geomatrix Consultants, Inc.



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