JOINT MEETING of the Southern California Section & Inland Empire Chapter
February Meeting & Speaker Announcement

“Paleoseismology; Has it Reduced Seismic Hazards, and if not, How Do We Change Course?”

Dr. James P. McCalpin,
GEO-HAZ Consulting, Inc.

Tuesday, February 19, 2013
Cal Poly Pomona, Pomona, CA
RSVP to aeginland@gmail.com by Friday February 15, 2013
See pages 3 - 6 for more meeting details

2013 AEG/GSA
(Association of Environmental & Engineering Geologists/
Geological Society of America)

Jahns Distinguished Lecturer

Dr. James P. McCalpin

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Chair’s Message

The corner has been turned on the holidays and it already feels like 2013 will be a busy and successful year business wise as the recovery in Southern California is in full affect. We had a really strong turnout for our past January meeting where we hosted Dr. Miles Kenny who presented his latest work in the Cheviot Hills. That was probably our most successful meeting in the Temecula area in the past 2 or 3 years and thanks again to all of you who made it to the meeting; we were virtually at standing room only! Many thanks also go out to the CGS for sharing their AP map updates with us, my only regret was being rushed out at 8:55 as the library was closing! As a gentle reminder to those who may not have attended that meeting, AEG is in need for your continuing support as it relates to membership. Many of you practicing geologists do take part in our Chapter and for that we are very thankful, but please do not forget to continue to be a member and pay for your yearly dues.

For our upcoming event in February we are excited to host the 2013 AEG/GSA Jahns Distinguished Lecturer Jim McCalpin on the campus of Cal Poly Pomona. This event will also be held jointly with the Southern California Section of AEG so you might get the chance to mingle with some fellow geo’s you have not crossed paths with in a while. As for the speaker, this will be Jim’s only tour through Southern California this year so don’t miss the opportunity to see the Jahns lecture! Our space is limited for this event so please RSVP early to reserve spot and please inform us as early as possible if you have to cancel so we can add someone to your spot. Jim will also be presenting talks on the campuses of UCR and CSU-SB as well as Pomona over a period of two days in case you miss this AEG sponsored dinner meeting. Alcohol may be excluded from the event on campus but don’t let that stop you from enjoying a really great presentation!

Just to keep you up to date on upcoming events, in March we will host Mr. David Lynch with the USGS Earthquake Science Center in the Rancho Cucamonga area and our annual field trip is tentatively planned for Saturday April 20. Thank you to all the respondents to our short course survey. We have not made a final decision yet but are leaning towards holding a short course in July. As a reminder, the Southern California Section has a seismicity short course planned sometime in May.

This February meeting will be another packed meeting event with other local geo’s from the LA area so please plan well ahead if you want to make this lecture!

Best Regards,

Douglass Johnston,
Chair, AEG Inland Empire Chapter

See you in February at Cal Poly Pomona

See detailed map on page 3
ABSTRACT
Recent deadly earthquakes have shaken public confidence in our methods for assessing seismic hazards, and has earthquake scientists (including paleoseismologists) wonder what we are doing wrong. As a result of the 2009 L’Aquila earthquake in Italy, six scientists were convicted of manslaughter for failing to warn the public before the earthquake. The 2011 Tohoku earthquake in Japan was a full magnitude larger (M9.0) than the design value for the Fukushima Nuclear Power Plant and the local coastal seawalls, resulting in 15,870 deaths and tens of billions of $US in damages. In both countries seismic hazard assessment is considered sophisticated and uses paleoseismic data and Probabilistic Seismic Hazard Assessments (PSHA) to ensure that low-probability earthquakes are adequately considered. Yet despite that fact, we are still experiencing deadly “surprises.” The situation suggests that there is a flaw somewhere in the flow chart of seismic hazards assessment and mitigation.

When modern paleoseismology was developed in the 1970s, it promised to supplement the short historic/instrumental record of earthquakes (50 yrs to a few centuries) by 2-3 orders of magnitude in time. By studying the surface ruptures of Holocene/late Quaternary earthquakes, we could estimate Mmax for each active fault and the return time of Mmax, thus filling in the “missing” large-magnitude part of the earthquake frequency-magnitude curves. The seismic source parameters coming from paleoseismology are these: Mmax, return period of Mmax (recurrence interval), and slip rate.

However, Seismic source characterization is only the first half in Seismic Hazard Assessment; it is followed by Ground Motion Prediction, to create the output of PSHA (a hazard curve of ground motions and their associated probabilities/return periods). Perhaps the failure can be traced to the GMP process, or to the PSHA procedure in general. The ground motions predicted then must be used in engineering design (for new buildings) and retrofits (for existing buildings). But the degree to which design is actually performed is dependent on liability and government regulations.

Based on my experience with PSHA and paleoseismic data inputs, I have the following conclusions:
THE MAIN REASONS WHY PSHAs UNDERESTIMATE THE HAZARD
1. Unknown active faults are close to the site and generate unanticipated Mmax earthquakes: 1994, M6.7, Northridge, CA, reverse/blind; 2001, M7.7, Bhuj, India, reverse/blind; 2003 M6.6, Bam, Iran, reverse/blind; 2007, M6.6, Honshu, Japan, reverse/blind (shut down K-K NPP); 2009, M6.3, L’Aquila, Italy, normal/nearly blind; 2010-11, M7.1 and M6.3, Christchurch, NZ, strike-slip
2. Active faults are known close to the site, but their Mmax and recurrence times are correctly known, but the secondary damaging effects are underestimated: Tsunami, 2004, Sumatra, M9.1; Tsunami, 2011, Japan, M9.0
3. Active faults are known close to the site, but their Mmax and recurrence times are correctly known, but the secondary damaging effects are underestimated: Tsunami, 2004, Sumatra, M9.1; Tsunami, 2011, Japan, M9.0
THE MAIN REASONS WHY PSHAs OVERESTIMATE THE HAZARD
1.. Assuming that the recurrence time is shorter than it actually is. This is common when a fault shows a “temporal cluster” of late Quaternary paleoearthquakes with recurrence times much shorter than the long-term average. For the sake of conservatism the PSHA assumes we are still in a cluster today, and the intra-cluster recurrence is heavily weighted in the logic tree, rather than the long-term average or intercluster rate. This is done even when contemporary GPS vectors show that strain rates today (present seismic cycle) are essentially equal to the long-term average rate: Mears Fault, OK, cluster of 2 late Quaternary events, previous event in the Pennsylvanian; Cheraw Fault, CO, cluster of 3 late Quaternary events, but only 3 more in the past 1 Ma; Pajarito Fault, NM, supposed cluster of 3 Holocene events, recurrence of 4 kyr compared to long-term recurrence of 18-20 kyr; Some faults in interior Australia

My observations suggest that paleoseismologists should do the following to better estimate the true hazard:
1. Use new imaging tools (e.g. LiDAR, geophysics) to discover presently-unknown blind faults near cities and critical sites.
2. Increase the precision of measuring the mean recurrence time of a fault and its elapsed time (time since the Most Recent Event). This would included dating long sequences of paleoearthquakes to measure the variability in recurrence and any possible clustering in time, and the causes of clustering (random versus deterministic). 3. Use the new information above to calculate the Conditional Probability of future Mmax ruptures, and put that information into the PSHA.
4. Develop a new comprehensive PSHA that includes all hazards from earthquakes (surface rupture, ground motion, and ground failure). The first two methods already exist, although Probabilistic Fault Displacement Hazard Analysis currently is subject to large uncertainties, due to lack of data on secondary coseismic faulting. There is currently no formal method of PSHA for ground failure, which tends to be very site-specific (i.e., for many sites the probability of ground failure is zero, regardless of the ground motion).

Speaker Biography
Jim earned his BA in Geology from University of Texas ('72) and MS from University of Colorado ('75), specializing in geomorphology, Quaternary geology, and rock climbing. He did postgraduate work at University of Alaska, which led to employment in the Alaska Branch of USGS in 1976, and later the Branch of Western Environmental Geology (Menlo Park) in 1977, where he was first introduced to the “new field” of paleoseismology. In 1977 he imported these paleoseismic methods to Colorado and its Rio Grande rift, while mapping and trenching the Sangre de Cristo fault for his PhD at the Colorado School of Mines. After graduation he served as County Geologist for Jefferson County, Colorado in 1982, and then joined the faculty at Utah State University where he taught geomorphology and engineering geology from 1982-1991. In 1991 he left academia and founded GEO-HAZ Consulting, devoted to applied geological consulting for geologic hazards, primarily seismic and landslide hazards. A related project was publication of the reference book Paleoseismology in 1996, in collaboration with many early US paleoseismologists. The book won the AEG Holdredge Award in 1999 and the GSA Burwell Award in 2000, and is now in its 2nd edition (in English, 2009; in Russian, 2012). In his 20+ years at GEO-HAZ Dr. McCalpin has completed 140 geologic hazard projects in 40 countries, analyzing seismic and other hazards to developments ranging from residential subdivisions to ski areas, from dams to nuclear power plants. Since 2001 he has taught a summer field course in neotectonics and paleoseismology, using the only permanent paleoseismic teaching trench in North America. He enjoys collaborating with international earthquake scientists, and especially with their newer generation of students interested in geologic hazards and in geo-constraints to sustainability and quality of life. McCalpin can be contacted at: GEO-HAZ Consulting, Inc. P. O. Box 837 600 E. Galena Ave., Crestone, CO 81131. Office Phone: 719-256-5228 Email: mccalpin@geohaz.com Website: www.geohaz.com
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The AEG Inland Empire Chapter Newsletter is a monthly publication of the Inland Empire Chapter of the Southern California Section, Association of Environmental and Engineering Geologists. For more information visit the Chapter website: http://www.aegsc.org/chapters/inlandempire.

Submittals: Deadline, 28th of the month. Employment notices, job position announcements, and advertisements can be posted for a minimal fee. Newsletter circulation about 170 in greater inland areas of Southern California, and elsewhere.

E-Mail Address changes: aeginland@gmail.com

AEG-IE February Meeting Details

Date & Time
February 19 (Tuesday)
Social time 5:30 to 6:30
Dinner 6:30 to 7:30
Announcements 7:30 to 7:45
Talk and Q&A 7:45 to 8:45

Location
Cal Poly Pomona Campus, Building 4, Room 2-314 (2nd floor conference room)
(SEE MAP BELOW & CAMPUS MAP ON NEXT PAGE)

Meal
Dinner Menu (catered by Panda Express & will be buffet style):
- Side of: Mixed Vegetables, Chow Mein, or Fried Rice
- 2 entrees from the following selection:
  - Mandarin Chicken, Broccoli Beef, Kung Pao Chicken,
  - Mushroom Chicken
- Non-alcoholic drinks and water included; cash bar will be available
- Fortune Cookies

Cost:
Professionals $25; Students $10

RSVP:
RSVP by COB Friday February 19, 2013; email: aeginland@gmail.com
On RSVP, specify if you are coming ONLY FOR THE TALK or for MEAL + TALK

Directions to Cal Poly Pomona

From Los Angeles:
Take the 10 freeway EAST and exit at Kellogg Drive.

From Orange County:
Take the 57 freeway NORTH to Temple Avenue and exit north (left-hand turn) to the campus.

From The Inland Empire:
Take the 10 freeway WEST and exit at Kellogg Drive.

From the Pasadena area:
Take the 210 freeway EAST to 57 Freeway SOUTH. Exit on Temple Avenue and turn north (right-hand turn) to the campus.
Parking Instructions
Park in Lot J. As you drive up the hill into J lot, look for a little ticket dispenser machine on the right, third row up. Don't park in the faculty spaces, rows 1 and 2 on the right. Anywhere else in J lot is fine.

AEG meeting is in Building 4, Room 2-314 (2nd floor conference room)
Jahns Lecture Talks At Universities
Dr. McCalpin is giving the following talks to students at Inland Universities; these are open to the public:

**Monday February 18**
1:00 - 2:00 pm: CSU-San Bernardino – lecturing in Joan Fryxell’s Structural Geology class (Location: BI-117 and map is available at this link: [http://www.csusb.edu/mapsDirections/index.html](http://www.csusb.edu/mapsDirections/index.html))

**Paleoseismology: Has it Reduced Seismic Hazards, and if not, How Do We Change Course?**

Tuesday February 19
11:00 – 12:00: Cal Poly Pomona – lecturing in Jon Nourse’s Optical Mineralogy class

**LiDAR Reveals the Bare Earth: LiDAR Geomorphology and its Applications to Engineering Geology**
3:00 – 4:00 pm: UC Riverside – Location: Science Bldg, Room 301 (the Science Bldg joins the Geology Bldg via connected walkways and can be accessed from the 3rd floor; a map is available at this link: [http://campusmap.ucr.edu/imap/index.html](http://campusmap.ucr.edu/imap/index.html))

**The Mountains Are Falling Apart; A Spectrum of Mass Failures from Landslides through Deep-Seated Gravitational Spreading (Sackung), to “Unfolding” of Folds**

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**ABSTRACTS FOR THE OTHER 2 TALKS**

*LiDAR Reveals the Bare Earth: LiDAR Geomorphology and its Applications to Engineering Geology*

Bare-earth DEMs produced by LiDAR, with grid size of 1 m to 6 m, are an engineering geologist’s dream-come-true. In the field of GEOLOGIC HAZARDS, the DEMs can be used to analyze: 1- active faults, 2-tsunamis, 3-landslides, 4- debris flows, 5-rockfalls, 6-floods, 7-sinkholes, 8-dams, and 9-coastal change. In the field of GEOLOGIC MAPPING, LiDAR-based DEMs greatly increase the recognition of surficial and bedrock map units, and the accuracy of geologic contacts drawn. At scales of 1:24,000 and larger, these DEMS will revolutionize geologic mapping.

Using LiDAR, many unknown active faults have been discovered, both in forested and unforested areas. MATLAB and ArcGIS scripts have been written to automatically measure fault offsets of geomorphic features, with results comparable to field measurements. For tsunami hazard mapping accurate ground elevations are needed. Landslide inventories based on LiDAR have mapped 2 to 4 times more landslides than previously recognized on stereo airphotos. Oregon DOGAMI additionally assigns 18 geomorphic and geologic attributes to each mapped landslide, something difficult without LiDAR. LiDAR assists in identifying debris-slide source areas and debris-flow deposition zones. However, its real contribution is to increase the accuracy of debris-flow susceptibility maps, which rely heavily on accurate slope angles and slope curvatures to identify source zones. Similarly, rockfall trajectories are very sensitive to microtopography in the runout zone. Predictions of runout distance, rockfall bounce heights, and velocities differ drastically between 10-20 m DEMs and 1-m LiDAR DEMs. Mapping of the 100-yr and 500-yr flood boundaries, and the water depths associated with them, can be accomplished from 1-m LiDAR without the need for extensive field surveying. Sinkholes are quite easy to spot on LiDAR imagery, even in forested areas and cleared fields. LiDAR mapping in Iowa identified 2.5 times more sinkholes in an area than an earlier NRCS study had mapped using stereo airphotos. LiDAR DEMs are particularly useful for multi-hazard assessments needed for critical facilities such as dams.

Geologic mapping at scales of 1:24,000 and larger, based on LiDAR, promises to be the “next generation” of geologic maps. Especially for surficial (Quaternary) geologic map units, and all map units in forested areas, LiDAR-based geologic maps will exceed the detail and accuracy of all previously published geologic maps. In addition, with LiDAR’s 1-2 m resolution, it can be enlarged to site scale (1:1200, 1:2400) and still remain useful. No longer will consultants make geologic maps of their sites by simply enlarging a tiny part of a 7.5’ USGS geologic quad map, with its 20- to 40’ contours that are decades old. Despite all this promise, LiDAR is only a tool, like a rock hammer or a Brunton compass. It will show you the your bare face of the Earth, but its up to you to interpret it. LiDAR’s utility in any study depends on the experience of the investigator, particularly in geomorphology, Quaternary geology, and structural geology. If you are an expert in photogeologic mapping using stereopairs, then you already have all the skills needed to interpret LiDAR for mapping and hazard studies. As in many endeavors in life, what you get out of it depends on what you bring to it.

The talk ends with an interactive demo of 1-m and 3-m LiDAR from Colorado, featuring alluvial fans, active faults, landslides, and how to optimize their appearance by changing the DEM visualization parameters (sun azimuth, sun elevation, ambient light, vertical exaggeration, etc.)

*The Mountains Are Falling Apart; A Spectrum of Mass Failures from Landslides through Deep-Seated Gravitational Spreading (Sackung), to “Unfolding” of Folds*  

By James P. McCalpin, GEO-HAZ Consulting, Inc., Crestone CO 81131

All engineering geologists can recognize obvious, young landslides from their sharp, distinct geomorphic elements (headscarp, lateral margins, toe thrust, hummocky topography). However, we often see isolated elements without the others and are unsure of their exact origin and engineering significance. Recent geologic mapping in mountainous areas of Alaska, California, Colorado, and Utah, supplemented by LiDAR DEMs, has revealed an abundance of young scarps, graben, bulges, and other geomorphic anomalies. Some landforms are sackungen formed by deep-seated gravitational spreading (called by Doug Morton of USGS “half-a-landslide”). Gravitational spreading results in detachment of large masses of bedrock from mountain flanks, causing lateral bulging and vertical collapse of the crest. Detached blocks do not display hummocky topography because they are not rubble, as are landslide deposits. Instead, stratigraphy and structure within the blocks is relatively undisturbed, so geologic maps show these areas as unfailed bedrock, and do not hint that the block margins are sites of recent deformation with engineering signific
McCalpin Abstract (continued)

ance. As local relief in mountains increases (often due to valley glaciation in the Pleistocene) and active tectonism increases, the types of different failure styles and number of failures increase. In southern Alaska the combination of high relief and seismic shaking has even led to the Quaternary “toppling-unfolding” of pre-Quaternary folds, due to gravitational spreading and development of extensional flexural-slip faults. Lower-relief areas in Colorado show similar swarms of young scarps related to unfolding of Cretaceous folds by evaporite dissolution in underlying rocks. Taken together, the landforms now known represent a nearly-continuous spectrum of mass failures, ranging in scale from small landslides that we would all be able to recognize, to incipient landslides, to large detached parts of mountains, to deep-seated gravitational spreading that looks almost tectonic in nature. In mountain areas that contain active faults, it is difficult to separate the tectonic-seismogenic structures from the gravitational-nonseismogenic structures, but these two types have different hazard significance for engineering geologists. Two recent conferences in Europe on “Slope Tectonics” explore this topic, which has not yet been recognized in the USA (1st in Lausanne, Feb. 2008, pub. as Geol. Soc. London., Spec. Pub. 351; 2nd in Vienna, Sept. 2011). This talk is based on my research into sackungs since 1994, and on trenching evaporite scarps since 2010. The talk draws on sackungs in Colorado ski areas; my 2-year NSF project trenching classic sackungs in Europe (the type locality); a 2-year mapping and trenching project of sackungs in California’s San Gabriel Mountains with Earl Hart (won the AEG Holdredge Award in 2005); 3 years of mapping and trenching landslides and gravitationally-reactivated scarps in Utah, 2 years of trenching sackung scarps in Alaska; and trenching evaporite scarps in Spain and the USA.

ANNOUNCEMENTS

New Alquist-Priolo Zoning - Sierra Madre and Whittier Faults

The California Geological Survey is developing recommendations for the establishment of new Alquist-Priolo regulatory zones around strands of the Sierra Madre and related faults in the Azusa quadrangle (Jerry Treiman) and revised zoning of the Whittier Fault in the Yorba Linda quadrangle (Janis Hernandez). If you have any information with regard to the location and activity of fault traces in these areas Jerry and Janis would be interested in hearing from you. They will be attending our February meeting to receive feedback before or after the talk. If you cannot attend you can contact them at the Los Angeles office of CGS:

Jerry - 213-239-0889 or Jerry.Treiman@conservation.ca.gov
Janis - 213-239-0893 or Janis.Hernandez@conservation.ca.gov

Short Course: February 11-12 (Monday – Tuesday). The American Ground Water Trust and Association of Ground Water Agencies are hosting a conference on ALTERNATIVE WATER RESOURCES FOR SOUTHERN CALIFORNIA on February 11 and 12 in Ontario, CA.

Brochure is attached at the end of this Newsletter.
Last month the Chapter sent out a survey on potential short course topics. Forty-five (45) people responded and the results are shown on the 3D histogram below. The Building code update showed to be the most popular topic; the SWPP plans was the least popular and erosion and built environment were in middle. The Chapter officers are considering the feasibility of holding a Building Code course in the summer. More on this later.
OTHER MEETINGS

AEG-Southern California Section: February 12, 2013 (Tuesday):
“Geotechnical/Environmental/Hydrogeologic Investigation for LA Metro Westside Subway Extension Project; Speaker: S. V. (Jag) Jagannath, Ph. D, GE., AMEC. Location: Stevens Steak House, Commerce, CA. For more information visit: http://www.aegsc.org/


IGS: Date, Topic, & Speaker: TBD. For more info visit http://www.inlandgeo.org/.

LABGS: Date, Topic, & Speaker: TBD. For more info visit: http://www.labgs.org/.


SDAG: February 27, 2013 (Wednesday). Topic: “Writing and Revising: The Evolution of an Oceanography Textbook.” Speaker: Al Trujillo, Distinguished Teaching Professor of Oceanography, Department of Earth, Space, and Aviation Sciences, Palomar College. For more info visit: http://www.sandiegogeologists.org/

NOTE: Brian J. Olsen, this year’s SDAG Vice-President notified us that SDAG is soliciting speakers for their FALL 2013 Annual Field Trip: (their brochure is attached to this newsletter).

CHANNEL ISLANDS RESTORATION: March 14 – 18 (Thursday – Monday). Since the Inland Empire Chapter was interested in forwarding info about our trip to the White Mountains last year, we thought you might also like to tell people about our upcoming Trip to Death Valley National Park! Tanya Atwater will be co-leading this trip. Thanks, Ken Owen Channel Islands Restoration. More info at: http://www.cirweb.org/dv/ SEE ATTACHED BROCHURE
FIRST MEETING OF THE CALIFORNIA EARTHQUAKE CLEARINGHOUSE

When: Wednesday, February 20th, 2013 10:00 a.m.– 2:00 p.m.
Where: Cal EMA offices - 3650 Schriever Ave., Mather, CA
Or
Participate via the web (Information TBD)

For directions, please visit
https://maps.google.com/maps?safe=active&ie=UTF-8&q=3650+schriever+ave,+mather,+ca&hl=en&gl=us&ei=dqjvTc2YEYL4sAPu5ICABw&oi=local_result&ved=0CBoQnwIwAA

The Clearinghouse is a location where, after a damaging earthquake, engineers, geologists, seismologists, sociologists, economists, and other professionals who arrive in the affected area to investigate such things as ground failure, structural damage, social or financial impacts of devastation, or simply to lend a hand can become part of a larger, temporary organization (the Clearinghouse) to facilitate the gathering of information, maximize its availability, and better use the talents of those present.

A full agenda will be provided in the next few weeks, however, the meeting will include information about the upcoming May 2013 Golden Guardian exercise planned for the Bay Area, as well as an update of our efforts to implement the Unified Incident Command & Decision Support (UICDS) data sharing middleware in support of a virtual Clearinghouse. To learn more, please visit http://www.eqclearinghouse.org/CA/

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Short Courses on Geotechnical Earthquake Engineering

1-DAY SHORT COURSE

“SITE RESPONSE, LIQUEFACTION AND USER-FRIENDLY COMPUTER PROGRAMS”

Instructors
Prof. Ahmed Elgamal (University of California, San Diego)
Michael Fraser, PhD, PE (Naval Facilities Engineering Command Southwest)
Jorge Meneses, PhD, PE, D.GE, F.ASCE (GEI Consultants Inc., Carlsbad)

Date
Thursday, March 7, 2013

Program
8:00 am – 5:00 pm

Venue
University of California San Diego (UCSD) Extension, University City Center
6256 Greenwich Dr., San Diego, CA 92122
http://extension.ucsd.edu/pdf/student/uccDirections.pdf

Content
This course is developed and offered by an integrated team combining academia and practice. All lectures include illustrative case histories and practical applications

1. Evaluation and Assessment of Site and Material Properties
   - Design of site investigation program and agency specific minimum requirement;
   - Site investigation techniques (SPT, CPT, SASW, ...);
   - Best practices and practical considerations;
   - Empirical correlations based on SPT, CPT, and Vs (shear modulus reduction and damping curves);
   - Determination and significance of VS30;
   - Soil stress-strain response (equivalent linear and nonlinear response, cyclic degradation of soil stiffness and strength).

2. Liquefaction: Site Investigation, Assessment, and Mitigation
   - Methods of analysis/assessment; uncertainties associated with the various assessment stages;
   - Numerical tools for automated assessments based on SPT, SPT, and Vs;
   - Liquefaction consequences and automated evaluation (settlement and lateral spreading);
   - Liquefaction mitigation countermeasures;
   - Uncertainties and best practices;
   - Standards of practice and Quality control;
   - Case histories.

3. Seismic Design Codes and Procedures
   - Geotechnical seismic design considerations in current codes including ASCE 7-05, ASCE 7-10, 2012 IBC, AASHTO, and Caltrans.
   - Evaluation of seismic hazard and ground motions, generic and site-specific procedures;
   - On-line available tools for evaluation of site seismic vulnerability (MCE, MCER, PGA, Design Spectra, Ss and S1, ...)

4. Hands-on Implementation and case studies
   - Practical hands-on demonstrations using available equivalent linear and fully nonlinear computer programs;
   - Solved illustrative examples;
   - Ranges of applicability;
   - Limitations and ranges of uncertainty.

Registration fees:
- Fee includes lunch, refreshments for morning and afternoon breaks, notebook of lecture notes, and computer programs.
  - Members of EERI: $ 225
  - Non-Members: $ 300
  - Students: $ 125

7 Professional Development Hours available.
8:00 – 8:30 am  Registration  
8:30 – 10:00 am Site characterization and seismic response  
10:00 – 10:15 am Morning break  
10:15 – 11:45 am Liquefaction: Site Investigation, Assessment, and Mitigation  
11:45 – 1:00pm LUNCH  
1:00 – 2:30 pm Seismic Design Codes and Procedures  
2:30 – 2:45 pm Afternoon break (Sponsor)  
2:45 – 4:15 pm Hands-on Implementation and case studies  
4:15 – 5:00 pm Discussion, Q&A  

Instructors:  
Professor Ahmed Elgamal, University of California, San Diego  
Since 1997, Prof. Elgamal (PhD 1984, Princeton University) has been serving as Professor of Geotechnical Engineering at the University of California, San Diego (UCSD). Earlier, he held academic appointments at the California Institute of Technology (Post Doctor and Lecturer, Pasadena, CA), Rensselaer Polytechnic Institute (Assistant Associate Professor and Technical Director of RPI Centrifuge Testing Facility, Troy, NY), and Columbia University (Associate Professor, New York, NY). He chaired the UCSD Department of Structural Engineering from 2003 to 2007. Professor Elgamal’s research has been focused on seismic experimental and computational analysis and modeling of geotechnical and SSI systems (site response, liquefaction and mitigation, earth and rockfill dams, ....). In his published studies, he developed/employed data sets from centrifuge and large-scale shake table testing, and earthquake downhole geotechnical arrays worldwide. Based on this experimentation background, he has developed nonlinear computational analysis techniques that are now available via the open-source computational framework (e.g., http://opensees.berkeley.edu, http://cyclic.ucsd.edu, http://cyclic.ucsd.edu/openseespl). He is author and co-author of over 250 publications.  

Dr. Michael Fraser, Naval Facilities Engineering Command Southwest  
During the last six years, Dr. Michael Fraser has been working for Naval Facilities Engineering Command Southwest in San Diego. He has been involved in the geologic/seismic hazard assessment and mitigation for numerous projects in the southwestern United States. He has extensive experience with analyzing the seismic risk as well as identifying and evaluating suitable foundation systems (including pile-supported foundations and ground improvement techniques). His firsthand experience with such difficult site conditions provides real-world insight into the current seismic design codes, criteria, and standards-of-practice. He earned his Masters and Ph.D. degrees at the University of California, San Diego (UCSD).  

Dr. Jorge Meneses, GEI Consultants Inc., Carlsbad  
Jorge Meneses has more than 25 years of experience in geotechnical engineering with emphases on geotechnical earthquake engineering, foundation engineering, numerical modeling, and advanced geotechnical testing. His experience includes consultancy for major companies, and research and teaching in major universities in the U.S., Japan, and Peru. Jorge has published over 50 technical publications in technical journals and conferences, is a frequent peer reviewer of journal and conferences papers, and has been invited as a guest speaker for national and international conferences. His expertise includes probabilistic and deterministic seismic hazard evaluation, liquefaction and lateral spread analysis, numerical modeling of dynamic behavior of earth works, seismic soil-structure interaction, seismic design of foundations, shallow and deep foundation design, site response and site characterization, seismic slope stability, and development of earthquake ground motion for dynamic analyses. In addition, he has worked diligently to reduce global seismic vulnerability in Costa Rica, Mexico, Venezuela, Peru and India. He has developed rapid screening methods to evaluate seismic vulnerability specific to school buildings and community-based earthquake mitigation programs. He is a part-time lecturer in the Graduate School of San Diego State University, and University of California, San Diego Extension. Jorge is the founder and current president of the EERI San Diego Chapter, one of the most active regional chapters. He was also chair of the planning committee of the 2011 EERI Annual Meeting in San Diego, a member of the SEAOC Subcommittee on Strong Ground Motion, honorary chairman of the Geo-Institute San Diego Chapter, and is leader of the Local Organizing Committee for the Geo-Congress 2013 to be held in San Diego. Jorge is a Diplomate, Geotechnical Engineer, member of the Academy of Geo-Professionals, and is a Fellow of the American Society of Civil Engineers. He earned his Masters and Ph.D. degrees at the University of Tokyo, Japan, under the supervision of Professor Kenji Ishihara.
San Diego Association of Geologists announces

Call for Papers

FOR THE SDAG 2013 ANNUAL FIELD TRIP GUIDEBOOK

ALTERNATIVE ROCKS: The Geology and Natural Resources Above and Below the San Luis Rey River Valley, Northern San Diego County, California

In this trip, we will explore the multitude of geologic and associated natural processes that have shaped the San Luis Rey river valley of north-central San Diego County. We hope to tour a variety of sites of geologic interest, demonstrating the:

- Mineral wealth, from precious gemstones to concrete aggregate,
- Geomorphic diversity, like landslides, terraces and maybe even a fault trace or two.
- Anything else our knowledgeable SDAG constituency can come up with....

As always, SDAG seeks new manuscripts based on original work in the broad fields of regional geology, sedimentology, soil, tectonics, hydrogeology, paleontology, engineering geology, petrology, geomorphology, paleoclimatology, landslides, and related fields. Given the locale, articles on the rich Native American history of the area are also welcome.

Deadline for submission of abstract: Sunday March 17, 2013 (Saint Patrick’s Day).

Please submit the following information when submitting abstract:

- Title,
- Author(s) and affiliation,
- Address, e-mail, and telephone numbers for the corresponding author.

Submit abstract by e-mail to Brian J. Olson: bolson@fsengineering.com (858) 750-9243
Monday, February 11 and Tuesday, February 12, 2013
Ontario Airport Hotel, Ontario, California

American Ground Water Trust
Association of Ground Water Agencies

in cooperation with:
CalDesal
Groundwater Resources Association of California
California Groundwater Coalition
Southern California Water Utilities Association
IAH Commission – Groundwater for Decision-Makers

Register now - www.agwt.org

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Monday, February 11

8:45 – 9:45  REGISTRATION, SIGN-IN AND EXHIBITOR SET-UP
9:45 – 10:00  WELCOME, OPENING REMARKS
10:00 – 10:30  OPENING KEYNOTE PRESENTATION

How much Colorado River Water is in California’s Water Supply Future?
Presenter from Bureau of Reclamation (invited)

10:30 – 12:30  Session 1– ENHANCING STORMWATER CAPTURE
In an era of ever increasing concerns about the impacts of climate change and the reliability of the State Water Project and Colorado River supplies, storm water capture is becoming increasingly important. In this session speakers will be highlighting the importance of storm water capture and dual purpose collection systems as a reliable non-traditional supply.

Moderator: Dan Arrighi, Secretary, San Gabriel Valley Water Company and Board member of Main San Gabriel Basin Watermaster, Azusa, CA

10:30 – 11:00  Southern California Water Committee Storm Water Capture Opportunities
Richard W. Atwater, Executive Director, Southern California Water Committee, Studio City, CA

Before his appointment to the Southern California Water Committee, Mr. Atwater was Chief Executive Officer and General Manager of the Inland Empire Utilities Agency. He is the only water agency manager in California to receive the prestigious Governor’s Award for Environmental and Economic Balance three times. He has testified extensively before the U.S. Congress and the California Legislature on water policy issues. In 1994 Secretary of the Interior, Bruce Babbitt awarded Mr. Atwater the Conservation Service Award, the highest citizen award for natural resources management.
reduce reliance on the Sacramento
agencies are looking at seawater desalination
seawater desalination is beginning to pencil out in some coastal areas that rely on imported water supplies. Many local water
intensive as it was a decade ago. A
water supply portfolio. Thanks to recent advances in technology, turning ocean water into drinking water is not as energy
Once dismissed as too expensive, seawater desalination is seen today as an increasingly important element of California’s
supply portfolio. Thanks to recent advances in technology, turning ocean water into drinking water is not as energy-intensive as it was a decade ago. And as the cost of treating and conveying water from other sources continues to rise, seawater desalination is beginning to pencil out in some coastal areas that rely on imported water supplies. Many local water agencies are looking at seawater desalination as a way to provide a more reliable supply of water during droughts and to reduce reliance on the Sacramento-San Joaquin Delta leaving water in the system for others.
Moderator: Ron Davis, Executive Director, CalDesal, Sacramento, CA

3:30 – 4:15
International Seawater Desalination – The Australian Experience
Gary Crisp, Global Business Leader, GHD, Houston, TX (invited)
Gary is highly regarded throughout Australia as one of the industry’s foremost desalination practitioners. He was instrumental in the delivery of Australia’s first major seawater desalination plant for public water supply. Prior to joining GHD, Gary served as the Perth Water Corporation’s Principal Engineer, Desalination. He has also worked in an advisory capacity to a range of clients planning major desalination projects and has been a member and presenter on a range of international committees and conferences involving desalination.

4:15 - 5:15
Seawater Desalination in California – The Carlsbad Project
Panel Discussion: The challenges that the Carlsbad Project faced throughout the permitting process, regulatory and legal hurdles as well as operational and financial issues.

Bob Yamada, Water Resources Manager, San Diego County Water Authority, San Diego, CA
Mr. Yamada has been with the San Diego County Water Authority since 1992. Prior to that, he worked as a civil engineering consultant for 8 years. He holds bachelor’s and master’s degrees in Civil Engineering from San Diego State University, and is a registered civil engineer in California. Mr. Yamada is the immediate past president of the American Membrane Technology Association (AMTA), a national organization dedicated to advancing the use of membrane technology for water treatment.

Peter MacLaggan, Senior Vice President for Corporate Development, Poseidon Resources
MacLaggan has over 30 years of experience in water resources planning and management including development of large-scale seawater desalination projects in California. Prior to joining Poseidon, he served as Executive Director of the California Water Reuse Association, Director of Water Resources at the San Diego County Water Authority and an independent water resources consultant. Mr. MacLaggan holds a B.S. in Civil Engineering from San Diego State University and a J. D. from the University of San Diego School of Law. He is a registered civil engineer and a member of the California State Bar

5:15 – 6:45
RECEPTION - CASH-BAR

Tuesday, February 12

8:00 – 10:15
Session 4 – BRACKISH WATER AS A SUPPLY SOURCE
Brackish water resources offer the potential to augment water supply sources in many geographic and hydrogeologic settings. As treatment technologies associated with brackish water treatment have become more cost effective, this water resource is gaining acceptance as a key component of water supply portfolios. Several organizations in Southern California have direct experience with the implementation and long-term maintenance of desalting infrastructure associated with brackish water. Others are looking to build upon the experiences of those organizations as they start the planning, design, and ultimately the implementation phases of their own brackish water programs. This session will provide an update on the status of brackish water treatment technologies, as well as insight from experienced brackish water program operators and those in the initial phases of their programs.

Moderator: Tony Morgan, Groundwater Dept. Manager, United Water Conservation District, Santa Paula, CA

8:00 – 8:30
Overview Of Brackish Water Treatment Technologies
Brandon C. Yallaly, Associate Vice President, Carollo Engineers, Inc. Boise ID
Mr. Yallaly is an Associate Vice President and member of Carollo Engineers’ desalination group. He holds BS and MS degrees in civil and environmental engineering and is a registered professional engineer in Texas, Florida, and Idaho. Mr. Yallaly’s career has been focused solely on the testing, design, and commissioning of membrane systems and their supporting processes. Mr. Yallaly’s projects cover the areas of surface water desalting, brackish groundwater desalting, membrane softening and color removal, energy recovery, dual-membrane systems, and concentrate disposal, including zero-liquid-discharge systems. He has served as the lead design engineer for desalination facilities in Texas, Florida, and California and has performed numerous studies, pilot and demonstration tests, facility startups, and operational audits.

8:30 – 9:00
Regional Brackish Water Development Programs In Inland Areas
Jack Safely, Director of Water Resources, Western Municipal Water District, Riverside, CA
Jack Safely is responsible to ensure an adequate supply of high quality water for Western’s service area. His duties include responsibility for the long-term planning and management of the water within the District. Mr. Safely is charged with development of Western’s Integrated Regional Water Management Plan and Water Use Efficiency Master Plan efforts. These regional planning efforts set Western’s long-term supply strategy. He also develops additional water supply resource projects and is the program manager for the Chino Basin Desalter Authority’s Chino Desalter Phase 3 Expansion. Mr. Safely also coordinates groundwater management efforts for the Western service area

9:00 – 9:30
Development of Brackish Groundwater Resources in Ventura County
9:30 – 10:15  
**Zero Discharge Desalination Technology**  
*Emily Gilbert, Membrane Product Manager, Kruger, Las Vegas, NV*

Zero Discharge Desalination (ZDD) is a desalination technology unparalleled in its ability to achieve high water recovery and thus sustain water resources. ZDD can be applied to reduce or eliminate the need for more costly disposal options such as deep well injection, large evaporation ponds, waste hauling or brine-line fees. ZDD is particularly suited for inland brackish groundwater treatment for potable or industrial water uses. ZDD has been evaluated at several locations including New Mexico, Texas, California and Florida. In the ZDD process, the concentrated salts rejected by a conventional RO or NF system are fed to an electrodialysis metathesis (EDM) stack comprised of ion exchange membranes, separated by thin solution compartments. The EDM acts as a “kidney,” removing salts by “metathesizing,” or “switching-partners,” between the ions in the RO/NF waste brine and a feed sodium chloride stream.

Emily Gilbert:  
Emily has been with Veolia since 2002, working in both their Kruger US and Birmingham UK offices on the Hydrotech Discfilter product and the Kruger Membrane products. Kruger is the municipal branch of Veolia Water Solutions & Technologies for the United States. Emily is a graduate of Chemical Engineering from Texas A&M University.

10:15 – 10:30  **BREAK**

10:30 - 12:30  **Session 5 – MANAGEMENT FLEXIBILITY TO MAXIMIZE ENVIRONMENTAL AND SOURCE WATER NEEDS**

How will environmental regulation (such as Endangered Species Act) ultimately factor in to water management decisions when determining the long-range reliability of sources for direct aquifer recharge and surface spreading going forward? Session participants will share various experiences when implementing environmental requirements into real-world water management circumstances.  
*Moderator: Tony Zampiello, Main San Gabriel Basin Watermaster, Raymond Basin Management Board, Azusa, CA*

10:30 – 11:00  
**Regional Storm Water Recharge in Santa Ana Watershed**  
*Greg Woodside, Executive Director of Planning and Natural Resources, Orange County Water District, Fountain Valley, CA*

Greg Woodside oversees the Planning and Watershed Management Department and the Natural Resources Department at the Orange County Water District. He has a MS in hydrology from New Mexico Tech, and a BS from California State University, Fullerton in geology. Woodside has over 20 years of experience in water resources management and hydrogeology, including groundwater recharge, modeling, and water quality projects. Woodside is a registered geologist and certified hydrogeologist in California.

11:00 – 11:30  
**The Endangered Species Act and Seven Oaks Dam**  
*Douglas Headrick, General Manager, San Bernardino Valley Municipal Water District, San Bernardino, CA*

Mr. Headrick has been involved in California water for over 20 years starting with the Santa Ana Watershed Project Authority where he administered a variety of regional water supply and computerized mapping projects. He has also managed a regional groundwater recharge operation and provided the primary technical support for the Big Bear Watermaster and San Bernardino Valley Engineering Investigation. In addition, he managed the Water and Wastewater Divisions for the City of Redlands for 7 years prior to coming to Valley District. This included the administration and operation of two surface water treatment plants and a state-of-the-art recycled water plant, which is the largest of its kind in the Western United States.

11:30 – 12:00  
**Impact of Endangered Species Act and Environmental Regulation on Recharge Operations in Los Angeles County**  
*Patricia Wood, Senior Civil Engineer, County of Los Angeles Department of Public Works, Water Resources Division*

Patricia Wood oversees the Facilities Section of Public Works’ Water Resources Division. Part of her duties is overseeing staff who coordinate compliance with Federal, State and local environmental regulations and environmental permit acquisition for Public Works’ dams, reservoir, and water conservation facility projects. Her staff’s work also includes navigating changing environmental regulations, endeavoring to comply with increasing regulatory requirements while meeting the oftentimes conflicting goal of supporting the ongoing flood protection and water supply needs of Los Angeles County’s 10 million residents. Ms. Wood is a licensed Professional Engineer in Civil Engineering and a Los Angeles County native and resident. She has been working for Public Works since 1985 and has over 20 years of experience in environmental compliance.

12:00 – 12:30
Watershed Management approach to Discharge Regulations
David Kimbrough, Water Quality Manager, Pasadena Water & Power, Pasadena, CA
Dr. Kimbrough has a BS in Biology from California State University, Los Angeles and his MS and Ph.D. from the UCLA School of Public Health. He has worked for the South Coast Air Quality Management District, California Department of Health Services, Cal-OSHA, and California Department of Toxic Substances Control. He has served on committees for professional organizations such as the American Water Works Association and the Association of California Water Agencies. He chairs the Laboratory Accreditation Work Group.

12:30 – 1:30  LUNCH

1:30 – 3:30  Session 6 – INNOVATIONS IN WATER RECYCLING
Recycled water is recognized as a growing, reliable alternative water resource in southern California. While it is a reliable resource for supply, it presents many challenges for maximizing its potential. These challenges, which include public perception, new and changing regulatory requirements, and need for advanced treatment, are being met with unique and innovative approaches and management efforts that exceed the norm of industry standards in practice. This session will provide information on several efforts including how to address the public perception issues, meeting and influencing transforming regulatory requests, and provide some examples of how advanced treatment has moved forward the ability to serve recycled water to meet certain demands.

Moderator: Tim Parker, Parker Groundwater, Sacramento, CA

1:30 – 2:00  Public Perception of Recycled Water - Building Trust
Gina DePinto, Principal Communications Specialist, OCWD, Fountain Valley, CA
Gina DePinto is the Principal Communications Specialist for the Orange County Water District supporting the Director of Public Affairs by managing public and media relations efforts, and community outreach programs. Prior to joining OCWD, DePinto managed her own firm, Bylines Public Relations and Marketing.

2:00 – 2:30  Recycling Water – Beating Mother Nature at Her Own Game
Cathy Chang, Water Quality Program Manager, Water Replenishment District of Southern California, Lakewood, CA
Dr. Cathy Chang is the Water Quality Program Manager at the Water Replenishment District of Southern California. She oversees the water quality program and works on projects related to: recycled water reuse, seawater intrusion, spreading grounds, stormwater capture & recharge, and regulatory compliance. Her prior professional experiences include: the Los Angeles Regional Water Quality Control Board, Santa Monica Bay Restoration Commission, and the City of Culver City. She received her Doctorate in Environmental Science & Engineering, from University of California, Los Angeles. She is a California Professional Civil Engineer with over 15 years of experience in the water quality field.

2:30 – 3:00  Agricultural Irrigation with Recycled Water
Brian Powell, Director of Planning, Eastern Municipal Water District, Perris, CA

3:00 – 3:30  San Diego’s Advanced Water Purification Demonstration Project
Greg Wetterau, Process Design Engineer, CDM Smith, Rancho Cucamonga, CA

3:30 – 3:45  Conference Wrap-up

3:45  ADJOURN

EXHIBIT AND SPONSORSHIP OPPORTUNITIES

Exhibitors: All exhibitors will be recognized in the conference program and will be offered a complimentary full page advertisement in the conference program (black & white). Exhibit tables are 8 feet long and skirted. Conference registration for exhibitors is required. Exhibits will be in the hotel atrium immediately outside the conference room. The atrium will be used for registration, coffee & breaks and the Monday evening reception.

Sponsors: We are pleased to receive event sponsorships. All sponsors will be offered a complimentary full page advertisement in the conference program (black & white). Benefits of sponsoring at the $500 level include: distribution of company/organization literature to registrants, web-site listing as a sponsor, recognition in the conference program and an electronic participant registration list. Sponsors at the $1,000 level are also entitled to a complimentary exhibit table. Sponsors above the $1,000 level, will receive a complimentary registration for every $500 above $1,000.

For more details, or for customized sponsorship opportunities (such as sponsoring lunch), call the AGWT office (800 423 7748) .
# REGISTRATION FORM – ONTARIO, CA – AQUIFER RECHARGE

## Registration – 2012 program

**Two Day**

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## CANCELLATION POLICY

- Cancellations received in the AGWT office by 5 pm (ET) 5 days prior to the start of the event will receive a full refund less a $25 processing fee.
- Cancellation 4 to 2 days prior to the start of the event will receive a 50% registration refund.
- Cancellations one day before the start of the event or on the day of the event are considered "No Shows." Refunds will not be made for "No Shows" (Substitutions gladly accepted).
- The AGWT will not cancel a program because of bad weather conditions. Except that, in the event of an event cancellation resulting from, (but not limited to) circumstances such as a state mandatory evacuation or a fire at the program facility, the AGWT will reschedule the event and honor registrations as payment for the new event.

# HOTEL INFORMATION

**Ontario Airport Hotel, 700 North Haven Avenue, Ontario, CA 91764**

For conference attendees: Free self-parking. Free wireless internet in guestrooms. Complimentary 24 hours shuttle service to and from Ontario airport, Hotel sleeping room rate of $84 per night (rate good two days before and after the event). For reservations call - 909-980-0400 tell the reservations clerk you are attending the “water conference.” The Hotel is one mile north of the Ontario International Airport. It is located just off the 10 Freeway. Take the Haven Avenue Exit. The hotel is on the southeast corner of Haven Avenue and Inland Empire Blvd. just north of 10 Freeway.