

# NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



Website: [www.ncgeolsoc.org](http://www.ncgeolsoc.org)

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## MEETING ANNOUNCEMENT

**DATE:** October 28, 2009

**LOCATION:** Orinda Masonic Center, 9 Altarinda Rd., Orinda

**TIME:** 6:30 p.m. social; 7:00 p.m. talk (no dinner) **Cost:**  
\$5 per regular member; \$1 per student or K – 12  
teachers

**SPEAKER:** **Dr. Jack Boatwright,**  
U.S.G.S., Menlo Park

### *The Loma Prieta Earthquake Turns 20: What We Have Learned from Seismology, Engineering, and Politics*

October 17, 2009, is the 20th anniversary of the M6.9 Loma Prieta earthquake. The Loma Prieta earthquake is often referred to as a "wake-up call" that signaled the renewed potential for large earthquakes in the Bay Area. In the twenty years since the earthquake, however, the Bay Area has been fortunate and has not suffered an M<sub>s</sub> 5.5 earthquake. In contrast, the US Geological Survey and the Earth Science community has responded forcefully to the challenge presented by the Loma Prieta earthquake. The USGS convened the Working Group on California Earthquake Probabilities in 1990 to evaluate the probabilities of large earthquakes in the Bay Area. This working group was followed by two subsequent Bay Area working groups, in 1995 and 2002; these efforts were fueled by a remarkable and still growing catalog of paleoseismic earthquakes on Bay Area faults. In 2007, the USGS, the Southern California Earthquake Center), and the California Geological Survey (CGS) collaborated to determine a state-wide probability report.

The probability reports provide the seismic "drivers" for detailed hazard evaluations in California and the Bay Area. In 1996, the USGS and CGS produced a set of state-wide shaking hazard maps: these maps provided the foundation for the 2000 International Building Code, which is also the national building code. Significant updates to models of ground motion attenuation were published in 2007 as a result of the New Ground Motion Attenuation Project of the Pacific Earthquake Engineering Research Center. These models will be fully incorporated into the next set of hazard maps.

The political implementation of hazard information still lags significantly behind this comprehensive scientific and engineering effort. The 1989 Loma Prieta earthquake exposed many vulnerabilities in our built environment: freeway overpasses and bridges, unreinforced masonry and non-ductile concrete-frame buildings, and in particular, soft-story structures.

*...Continued on the back...*

# NCGS 2009 – 2010 Calendar

**Time to Renew Your Membership  
See attached membership form!**

**A suggestion - Bring it to the next meeting!!  
(It'll be a good talk – they all will be good!)**

**Wednesday October 28, 2009**

*The Loma Prieta Earthquake Turns 20; What we Have Learned From Seismology, Engineering & Politics; Dr. Jack Boatwright, U.S.G.S, Menlo Park*

7:00 pm at Orinda Masonic Lodge

**Wednesday November 18, 2009**

**EARLY DATE!!**

*Massive Ionization at the Air-to-Ground Interface as Possible Pre-Earthquake Indicator – Dr. Friedmann Freund, NASA Ames Research Center, Moffett Field, CA*

**December 2009 - As usual no meeting!**

**Wednesday January 27, 2010**

*The Earthquake of 1868 and the Birth of Seismically Resistant Architecture in California*  
**Dr. Stephen Tobriner**, Professor Emeritus of Architecture, UC-Berkeley

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## Upcoming NCGS Field Trips

Do you have a place you've wanted to visit for the geology? Let us know. We're definitely interested in ideas. For those suggestions, or for questions regarding, field trips, please contact Rob Nelson at [jmc62@sbcglobal.net](mailto:jmc62@sbcglobal.net) or John Christian at: [jmc62@sbcglobal.net](mailto:jmc62@sbcglobal.net).

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## Peninsula Geologic Society

### Upcoming meetings

For an updated list of meetings, abstracts, and field trips go to <http://www.diggles.com/pgs/>. The PGS has also posted guidebooks for downloading, as well as photographs from recent field trips at this web address. Please check the website for current details, they were not yet posted at press time.

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## Association of Engineering Geologists San Francisco Section

### Upcoming meetings

Meeting locations rotate between San Francisco, the East Bay, and the South Bay. Please check the website for current details:

- For further meeting details go to: <http://www.aegsf.org/>

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## USGS Evening Public Lecture Series

The USGS Evening Public Lecture Series events are free and are intended for a general public audience that may not be familiar with the science being discussed. The speakers are encouraged to thoroughly explain the subject matter being presented, and to define any words or terms that may be unfamiliar to those not having a background or familiarity with the material being presented.

Monthly lectures are usually scheduled for the last Thursday evening of each month during most of the year but are occasionally presented on the preceding Thursday evening to accommodate our speakers. Also, the November and December lectures are scheduled earlier in the month to avoid conflicting with speaker and customer plans during the holiday season

Lectures are held at the USGS Menlo Park Science Center in Building 3, 2nd floor conference room A, Menlo Park, California. Click on [Campus Map](#) for building location and directions.

### Upcoming 2009 Public Lecture Schedule (Subject to change)

**October 29 -- Coast Salish Native American Puget Sound Water Quality Survey** -- a presentation on the recent Coast Salish canoe journey which simultaneously collected water samples for USGS studies of Puget Sound water quality. This public lecture has been scheduled for late October to focus attention on cooperative activities involving Native Americans just prior to the annual November recognition of National Native American

Heritage Month, presented by USGS scientist Eric Grossman

**November 19 -- Aleutian Island Mega-Earthquakes and Pacific Basin Tsunami Generation** -- a discussion of Aleutian Island earthquake history, the generation of large earthquakes in that region, and resultant tsunamis affecting Pacific Basin shoreline areas, presented by USGS geologists Steve Kirby and David Scholl

**December 17 -- Currently Unschduled** -- possibly a USGS scientist working at the Alaska Volcano Observatory presenting a summary of the recent explosive activity at Redoubt Volcano

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## Latest News on the Status of the California Board of Geology and Geophysics

As a general update to members the hearing to file the injunction for the Temporary Restraining Order to help preserve the BGG was held on Tuesday October 20, 2009, at 2:30 pm in Sacramento Superior Court, Department 54. It is now Case Number 2009-00060392. Documents will be available on-line after 72 hours, so likely Monday (October 26, 2009) at some point.

As you are likely aware, there is a social networking site that gathers a great deal of what is occurring relevant to this issue. This site is located at: <http://californiapg.ning.com/>. We encourage you to check the site for changes on this issue as they develop. **If visiting the site, please take the time to register so that you can be easily contacted if and when the time comes that letters to legislators would be beneficial.**

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## Occidental Petroleum Announces Significant California Oil and Gas Discovery

*(Perhaps a little dated, but not for those who may have missed the news!)*

LOS ANGELES, July 22, 2009 (GLOBE NEWSWIRE) -- Occidental Petroleum Corporation (NYSE:OXY) announced today that it has made a significant discovery of oil and gas reserves in Kern County, California.

Occidental believes there are between 150 million and 250 million gross barrels of oil equivalent (BOE) reserves within the outlined area where Oxy has drilled six wells to date to delineate the discovery. The multi-pay zone discovery area, whose areal geological extent is still being defined, has both conventional and unconventional pay zones. The bulk of the discovery's producing zones are conventional oil and gas bearing formations.

Occidental's interest in the discovery area is approximately 80 percent. Approximately two-thirds of the discovery is believed to be natural gas.

"We believe this to be the largest new oil and gas discovery made in California in more than 35 years," said Dr. Ray R. Irani, Chairman and Chief Executive Officer of Occidental Petroleum Corporation.

"It is probable that there are additional reserves outside the defined area, and it is possible that structures of this type exist elsewhere in Oxy's 1.1 million net acre position in California. We plan to drill wells to exploit these opportunities over the next 5 to 10 years," Dr. Irani said.

Oxy is currently the largest natural gas producer and third-largest oil producer in the state of California, where the company has produced oil and gas for more than 50 years. Oxy's assets in the state include more than 7,500 active wells located in 90 fields, spanning 600 miles. Oxy's California proved reserves were 708 million BOE at year-end 2008 and represent approximately 24 percent of Oxy's worldwide reserves.

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## Of Note at AAPG

*Contributed by Don Lewis, NCGS Delegate to the House of Delegates of AAPG*

At the annual AAPG Leadership meeting in Tulsa August 29-30, a number of things of interest to AAPG members were discussed. Among them were:

- The proposed Global Corporate Structure, much discussed for the last year, had been recommended by two special committees and had received a favorable "sense of the House" from the House of Delegates at the Denver annual convention last June. Accordingly, it was submitted to the

Constitution and Bylaws Committee of the House. This committee was to provide the appropriate language to present to the House next year to restructure the legal basis of the Association. However, the C & B committee, after much discussion, voted to not proceed with the proposal. Their opinion is that the existing structure of AAPG is sufficient to proceed with legal steps designed to protect AAPG as it opens non-U.S. offices. Such offices have already been opened in London and Bahrain and one is in process in Singapore.

- The 100<sup>th</sup> Anniversary Committee has big plans to celebrate AAPG's centennial in 2017. A professional video is planned based on "One hundred who made a difference" which has interviews with people who have made exceptional contributions to petroleum geoscience or made significant discoveries. There will be a number of worldwide field trips to famous localities. And much more.

- AAPG beat out several competitors to host the first three biannual Arctic Technology Conferences. These will be a big deal, like OTCs for the arctic. The first will be in Houston in November 2010.

- AAPG will run a major conference on Unconventional Resources in Denver in 2011.

- AAPG will also run a conference on Energy, Economics, and the Environment in 2010 or 2011. These three new conferences are in addition to the normal annual conventions in the U.S. and the annual international conferences. The next U.S. meeting will be in New Orleans in April 2010 and the next international meeting will be in Rio de Janeiro in November 2009.

- AGI has agreed to upgrade their web geocalendar. This shows when and where a host of geoscience society meetings are planned for the next three to five, years. The basic idea is to decrease schedule conflicts.

- AAPG now has student chapters in some 187 universities worldwide. Some are inactive but the total number is continuing to grow. Chevron continues to cover the cost of membership for the over 4000 student members worldwide. In our area, there are active student chapters at Stanford, Sonoma State, and Fresno State.

## AGI Government Affairs Advisory Committee

The following links were also provided by member Don Lewis, for those who might have an interest in government affairs. The embedded links will take you to an area of interest. Please note, this monthly review is free from AGI and goes out to the leadership of AGI's member societies, members of the AGI Government Affairs Advisory Committee, and other interested geoscientists as part of a continuing effort to improve communications between GAP and the geoscience community that it serves.

### \*\*\*Announcements\*\*\*

1. [AGI Government Affairs Spring Internship Due Now](#)

### \*\*\*Administration News and Updates\*\*\*

2. [NPS and CEO Nominees Confirmed](#)
3. [Committee Releases Human Spaceflight Review Summary](#)
4. [Ocean Policy Task Force Releases Interim Report](#)
5. [Further Endorsement for the Law of the Sea](#)

### \*\*\*Congressional News and Updates\*\*\*

6. [Congress Passes CR: New Budget by Halloween](#)
7. [Climate Change Bill Frozen; Expected to Heat-Up in Oct.](#)
8. [Competing Energy Bills Emerge in the House](#)
9. [House Passes Wind Energy and Advanced Vehicle Bills](#)
10. [Bill to Allow Open Source Textbooks and Other Materials](#)
11. [House Passes Student Loan Reform Bill](#)
12. [Lobbying Firm Involved in Forged Clean Coal Letters](#)

### \*\*\*Federal Agency News and Updates\*\*\*

13. [EPA Finalizes First U.S. Greenhouse Gas Reporting System](#)
14. [DOI Launches Climate Change Response Council](#)
15. [DOI Releases New Strategic Plan Framework for Comment](#)
16. [DOI to Eliminate Royalty-in-Kind Program](#)

\*\*\*Other News and Updates\*\*\*

17. [UN Estimates Cost For Renewables in Developing World](#)
18. [UN Releases Compendium on Climate Change](#)
19. [NEMA Hosts Hazard Mitigation Briefing](#)
20. [Regional Climate Modeling Briefing](#)
21. [USGS Reception Honors Senators](#)
22. [Geoscientists Show Value of R&D Funding on Capitol Hill](#)
23. [AGI Leadership Forum Focuses on Energy and Climate](#)
24. [Key Reports and Publications](#)
25. [Key Federal Register Notices](#)
26. [Key AGI Government Affairs Updates](#)

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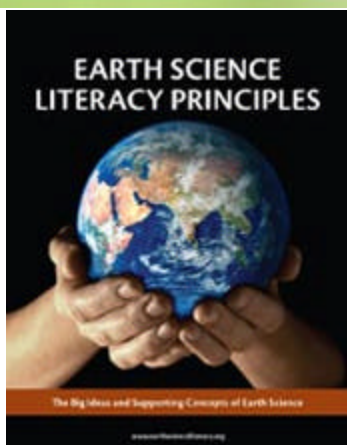
Remarkably the following message by **K-12 Program Chair Paul Henshaw** before the recent actions affecting the BGG. As Paul relayed, "This document can help the entire geology/earth science community speak with one voice on need for earth science education, and assist K-12 teachers". Be sure to download the full color glossy brochure from the following website. It is very impressive.

<http://www.earthscienceliteracy.org/>

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Press Release 09-119

## New Report Sets Forth Principles of Earth Science Literacy



### June 4, 2009

NSF and other organizations have released a report on earth science literacy importance

Earth's rocks and other materials provide a record of its history. Our solar system formed from a vast cloud of gas and dust 4.6 billion years ago. Earth's crust has two distinct types: continental and oceanic.

These and other concepts are the major ideas of Earth science that all citizens should know, according to a newly released report--*Earth Science Literacy Principles: The Big Ideas and Supporting Concepts of Earth Science*--funded by the National Science Foundation (NSF)-supported Earth Science Literacy Initiative (ESLI).

Even modest changes to Earth's systems have had profound influences on human societies and the course of civilization, according to the report. Understanding these systems and how they interact is vital for our survival, the report states.

"The Earth sciences have never been more important than they are today," says Robert Detrick, director of NSF's Division of Earth Sciences. "It's important that every citizen have knowledge of the fundamental concepts of Earth science such that he or she may make informed and responsible decisions about public issues--from climate change to energy, from natural resources to earthquake hazards.

"The Earth Science Literacy Initiative is a very important effort to convey this information about Earth science to the general public."

Earth science literacy is especially important at this time in history, echoes the report: "There are many challenges facing humanity--dwindling energy and mineral resources, changing climate, water shortages--directly relating to the Earth sciences. There are many difficult decisions that governments, local and national, will have to make concerning these issues. How well humans survive the twenty-first century will depend on the success of these decisions."

*Earth Science Literacy Principles* provides a summary of the major ideas in earth science for policy makers, educators, students and the general public.

The report complements the efforts of ocean, climate and atmospheric scientists, educators and others to define the ideas and concepts essential for a geoscience-literate public.

*Earth Science Literacy Principles* was developed through an online workshop held in May 2008, and a writing workshop held in July 2008.

The workshops brought together scientists from across the earth sciences, including mineralogists, petrologists, sedimentologists, paleontologists, geophysicists, geomorphologists, biogeochemists, volcanologists, geohazards specialists and hydrologists, among others.

The document has undergone review by leading scientists on each of the topics. Major geoscience and earth science education professional organizations have endorsed the report.

"Because of its validity, authority and succinct format, *Earth Science Literacy Principles* will be influential in a wide variety of scientific, educational and political domains," says Michael Wyession, chair of ESLI and a geoscientist at Washington University in St. Louis. "New textbooks and curricula are already being developed using the report."

As principle 9.9, the final one of the report, states, "An Earth-science-literate public, informed by a current and accurate understanding of the Earth, is critical to the promotion of good stewardship, sound policy and international cooperation."

For humans--and the planet on which they live--earth science literacy is a prerequisite to a successful future.

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### Related Websites

Earth Science Literacy Initiative and Link to Report:  
<http://www.earthscienceliteracy.org/>

*The National Science Foundation (NSF) is an independent federal agency that supports fundamental research and education across all fields of science and engineering. In fiscal year (FY) 2009, its budget is \$9.5 billion, which includes \$3.0 billion provided through the American Recovery and Reinvestment Act. NSF funds reach all 50 states through grants to over 1,900 universities and institutions. Each year, NSF receives about 44,400 competitive requests for funding, and makes over 11,500 new funding awards. NSF also awards over \$400 million in professional and service contracts yearly.*

### Useful NSF Web Sites:

NSF Home Page: <http://www.nsf.gov>  
NSF News: <http://www.nsf.gov/news/>  
For the News Media:  
<http://www.nsf.gov/news/newsroom.jsp>

Science and Engineering Statistics:

<http://www.nsf.gov/statistics/>

Awards Searches: <http://www.nsf.gov/awardsearch/>

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## Why Do Earthquakes Stop?

*ScienceDaily (Feb. 6, 2008)* — Why do some earthquakes terminate along a fault, while others jump or step-over a gap to another fault? The underlying structure of a fault determines whether an earthquake rupture will jump from one fault to another, magnifying its size and potential devastation.

Understanding why some earthquakes terminate along a fault, while others jump or step-over a gap to another fault, is essential to forecasting the seismic hazard of complex fault systems, such as the San Andreas Fault. In a paper published in the February issue of BSSA, author David Oglesby of University of California at Riverside suggests that the pattern of stress at the end of the primary fault can strongly affect an earthquake's ability to jump to a secondary fault. He suggests that a smooth, gradual decrease in stress along a rupture results in slower rupture deceleration, less strain, less generation of seismic waves, and lowers the likelihood that the earthquake will jump to another fault. In contrast, a stress pattern that terminates suddenly leads to abrupt rupture termination, higher strain, more seismic radiation, and a higher likelihood of the rupture jumping to a secondary fault. The results of this numerical study illustrate the importance of the slip gradient and the acceleration of the rupture front in determining the probability of a rupture jumping from one fault segment to another.

*Adapted from materials provided by Seismological Society of America, via EurekAlert!, a service of AAAS.*

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## Ancient Climate-Change Event Puzzles Scientists

By Phil Berardelli, *ScienceNOW* Daily News

Carbon dioxide (CO<sub>2</sub>) gets a bad rep for contributing to global warming, and deservedly so. But scientists say they can't entirely blame the greenhouse gas for a curious spike in Earth's temperature 55 million years ago. New research reveals that something else also seems to have

warmed the planet during that time, though no one's quite sure what it was.

Over the past couple of decades, researchers have been gathering data about a mysterious event known as the Paleocene-Eocene Thermal Maximum (PETM). The data, derived from drill cores brought up from the deep seabed in the Atlantic and Pacific Oceans, show that the surface temperature of the planet rose by as much as 9°C within 10,000 years during the PETM, which itself started out warmer than our current world. Temperatures stayed at this elevated level for nearly 100,000 years.

On the surface, the culprit appeared to be CO<sub>2</sub>. For reasons unknown, atmospheric concentrations of the gas rose by about 700 parts per million, from 1000 ppm to 1700 ppm--more than four times higher than today's level of 385 ppm--during the PETM. That much of an infusion of the well-established greenhouse gas should have been plenty to spike temperatures.

But a new analysis doesn't fully support this scenario. Oceanographer Richard Zeebe of the University of Hawaii, Manoa, and colleagues ran carbon-cycle simulations of the oceans and atmosphere based on the data yielded by the sediment cores. They even simulated what would happen to global temperatures when they increased the atmosphere's sensitivity to doubling CO<sub>2</sub> levels--to 2000 ppm--during the PETM. The most they could achieve was a warming of 3.5°C, [they report online this week](#) in *Nature Geoscience*. That means some other phenomenon must have pushed up temperatures by as much as 5.5°C, the team says. So at present, the unexplained warming represents a gap in understanding about what causes significant and rapid climate change.

"It's possible that other greenhouse gases such as methane could have contributed to the [PETM] warming," Zeebe says. It's also possible that the models are underestimating the climate response to CO<sub>2</sub> increases. If that's the case, it "would mean our understanding of the climate system is incomplete," he says.

Zeebe's team is now looking at smaller warming events that occurred within several million years after the PETM. "We're currently trying to find out whether or not [they] were caused by the same mechanism," he says. The idea is to determine

whether the PETM warming was unique "or a universal feature."

Geochemist Gabriel Bowen of Purdue University in West Lafayette, Indiana, applauds the work. "We've long had a hunch that something was fishy about the climate response during the PETM," he says. "This study puts the nails in the coffin of the idea that climate during the PETM responded to CO<sub>2</sub> alone." Says Bowen, "The urgent challenge now facing us is to find out what was amplifying [temperatures] during this event and understand what it means for Earth's future."

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## Did an Ancient Volcano Freeze Earth?

By Phil Berardelli, *ScienceNOW* Daily News

One fine day about 74,000 years ago, a giant volcano on Sumatra blew its top. Washington State did in 1980. In the process, it cooled the climate by at least 10°C, causing a global famine. But could the aftermath have been even worse? A new study puts to rest questions about whether Toba plunged Earth into a 1000-year deep freeze and whether an equivalent event today could jump-start a new, millennia-long ice age.

Giant volcanic eruptions such as Toba briefly cause the opposite of global warming. Although eruptions do emit greenhouse gases such as carbon dioxide, volcanoes also spew sulfur dioxide. Combined with water vapor, sulfur dioxide forms sulfate aerosols, which can spread around the globe, blocking solar radiation and chilling the air before becoming acid rain and snow.

Paleoclimate evidence suggests that the Toba eruption, which occurred during the last ice age, emitted lots of sulfur dioxide--vastly more than Mount St. Helens did. The eruption also seems to have coincided with the start of a 1000-year period of even colder temperatures. Some scientists have suggested that Toba caused the deep freeze and that perhaps such an event happening today could bring on a new ice age. But models developed by NASA and the National Center for Atmospheric Research in Boulder, Colorado, argue otherwise.

Researchers led by climatologist Alan Robock of Rutgers University in New Brunswick, New Jersey, ran scenarios that featured eruptions producing up to several times more sulfur dioxide than Toba. The

result, published 27 May in the *Journal of Geophysical Research—Atmospheres*, was a cooler climate that lasted only a few decades. So the 1000-year cold spell was probably part of the natural cycle that has produced more than a dozen ice ages over the past couple of million years.

"The results virtually eliminate mega volcanic eruptions as one of the key drivers of global-scale glaciation," says climatologist Ellen Mosley-Thompson of Ohio State University in Columbus, who was not involved in the study. So, paleoclimatologists should focus on more likely climate coolers, she says, such as changes in ocean circulation or cyclical variations in Earth's orbit around the sun.

Still, if Toba erupted today like it did in the past, the results would be catastrophic. Although the volcano isn't expected to blow its top for thousands of years, Robock and colleagues estimate a megaeruption could lower global temperatures by as much as 17°C for several years, followed by a recovery to normal conditions that could take decades. That would hit the human population with the double whammy of dramatically reduced agricultural production and widespread loss of vegetation, leading to widespread food shortages and starvation.

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## **Fossil Beer It's About Time!**

Pint glasses full of Fossil Fuels Beer are raising eyebrows around northern California. This could be due to the fact that the unique ingredient for the line of Fossil Fuels beer is a yeast strain dating back to the Eocene Epoch, which is about 45 million years ago. A team of scientists, Dr. Raul Cano (Cal Poly, San Luis Obispo, CA) and Lewis "Chip" Lambert (Fremont, CA), are partnering with brew masters Peter Hackett (Stumptown Brewery, Guerneville, CA), Joe Kelley (Kelley Bros. Brewing, Manteca, CA) and attorney Scott Bonzell (Oakland, CA) to produce what is surely one of the most interesting and unique beers of this or any time. With the green light from beer critics, brewers and end consumers alike, the team that comprises Fossil Fuels Brewing Co. is gearing up to share the product with the public.

The history of the yeast literally dates back before the dawn of man, to a time when the

earth was warm, tropical and teeming with life.



Modern mammals that we see today were beginning to appear in what is known as the Eocene epoch (from the Greek word eos meaning "dawn"). During this time, a snapshot of biological life was trapped by tropical tree sap. Over the course of millions of years, the sap hardened into amber, which preserved and protected its contents. That is, until Dr. Cano, using amber obtained from locations around the world (including Burma, Central and North America), isolated and revived a bacterium, which had lain dormant in the gut of an encased bee for approximately 40 million years (*Science* 268, pp. 1060-1064, 1995). During his research, Dr. Cano, periodically working with Mr. Lambert, isolated a few yeast strains that resembled modern *Saccharomyces cerevisiae*. In other words, they are similar to the yeast we use every day for brewing and baking, except the newly discovered yeasts were much further back in the evolutionary chain. Essentially, Dr. Cano isolated the long lost ancestors of modern brewing yeast.

Fossil Fuels Brewing Co. hosted a launch party at Kelly Brothers Brewing Co. in the summer of 2008 to commence the release of their new beer brewed with its truly remarkable yeast to the public.

(A marketer's dream, this bit of refreshing news comes straight from the Fossil Beer website:

<http://www.fossilfuelsbrewingco.com/>).

# NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



## 2008-2009 COLLEGIATE SCHOLARSHIP PROGRAMS

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The Northern California Geological Society is pleased to announce the availability of scholarships for undergraduate and graduate students for the 2008-2009 academic years.

### **Undergraduate Scholarship Awards of \$ 500**

For candidates working toward completion of a senior thesis or honors research program.

Funding is provided for projects implemented during the 2008-2009 academic year.

*Submission deadline is October 31, 2008 with an award date on or about December 1, 2008*

### **The Richard Chambers Memorial Scholarships For Graduate Degree Programs**

**\$ 1,000 scholarships for students working towards the Masters degree**

**\$ 2,000 scholarships for students working towards the Doctorate degree**

Funding is provided for projects scheduled for completion during the 2008-2009 calendar years.

*Submission deadline is December 15, 2008 for an award date on or about January 31, 2009.*

Multiple scholarships may be awarded at each academic level.

Funding priorities for these scholarships will be directed towards research focused on topics including geologic mapping, structural, economic, engineering and environmental geology, geophysics, stratigraphy, paleontology or paleoecology, implemented in (northern) California or states immediately adjacent to (northern) California.

Individual scholarship announcements with instructions can be requested from and proposals submitted to:

Phillip Garbutt, Chair  
NCGS Scholarship Committee  
6372 Boone Drive  
Castro Valley, CA 94552-5077

email: [plgarbutt@comcast.net](mailto:plgarbutt@comcast.net)  
Voice: (510) 581-9098

# NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



## NORTHERN CALIFORNIA GEOLOGICAL SOCIETY and AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS

### K-12 EARTH SCIENCE TEACHER OF THE YEAR AWARD

**\$750 Northern California Geological Society**

**\$500 Pacific Section AAPG**

**\$5,000 National AAPG**

#### **Call for Nominations for the Year 2009 - 2010 NCGS Competition**

*The Northern California Geological Society (NCGS) is pleased to announce that it will accept applications from candidates in the Northern California region for the Year 2009 - 2010 competition for the Earth Science Teacher of the Year Award. The \$750 NCGS award is intended to recognize pre-college earth science programs already in place, and to encourage their organization in districts where they have not been fully developed. Nominations of qualified K-12 teacher candidates are solicited from teachers, school administrators, teacher outreach programs, and other interested parties.*

The NCGS awardee's application will be submitted to a regional competition sponsored by the American Association of Petroleum Geologists (AAPG) Pacific Section. The Pacific Section winner will receive a \$500 award at the Pacific Section regional meeting in Anaheim, California, May 27 - 27, 2010, plus up to \$250 toward meeting expenses. The regional winner's project will be submitted to AAPG headquarters for the national contest. The national winner will receive an expense-paid trip to attend the national AAPG meeting in Houston, Texas, April 2011, to receive the national award.

At the national level, the AAPG Foundation presents an annual \$5,000 award to a K-12 teacher for *Excellence in the Teaching of Natural Resources in the Earth Science*. The award recognizes balanced incorporation of natural resource extraction and environmental sustainability concepts in pre-college Earth science curricula. It includes \$2,500 to the teacher's school for the winning teacher's use, and \$2,500 for the teacher's personal use.

**The deadline for application submittal by candidates for the \$750 NCGS award is Monday, January 18, 2010**

Interested candidates or nominators can request Application Information and an Entrant Application Form, or submit an application, by contacting:

**Paul Henshaw**

**Chair, K – 12 Geosciences Education Committee**

**Northern California Geological Society**

6 Rachel Ranch Court

Clayton, CA 94517

(925) 673-8745

[candphenshaw@comcast.net](mailto:candphenshaw@comcast.net)

# NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



## NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

### K-12 GEOSCIENCE TEACHING AWARD

\$500 Northern California Geological Society

### Call for Applications for the Year 2009 - 2010 NCGS Competition

The Northern California Geological Society (NCGS) invites applications from candidates in the Northern California region for the Year 2009-2010 competition for the K-12 Geoscience Teaching Award. Applications may be submitted by any teacher regardless of experience.

Applications reflecting teaching of units addressed to any of the earth or environmental sciences, including but not limited to mineralogy, petrology, economic geology, geomorphology, paleontology, hydrology, and planetary geology are invited from physical science, earth science, and geology teachers.

The deadline for application submittal by candidates for the \$500 NCGS award is Monday, January 18, 2009. **The application process is uncomplicated.**

The winner will receive a \$500 award at a Northern California Geological Society meeting in Orinda in late February 2010.

**Interested candidates can request an *Application Information* and an *Entrant Application Form* or submit an application by contacting:**

**Paul Henshaw**

**Chair, K – 12 Geosciences Education Committee**

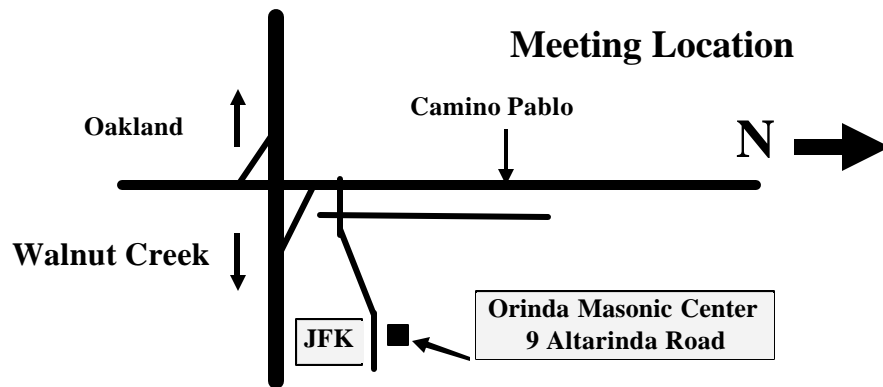
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The upgrade of building codes addresses only the construction of new buildings, and not the retrofit of older building stock. While Caltrans has been aggressive in reinforcing freeway overpasses and bridges, and the cities of the Bay Area have largely addressed the problem of unreinforced masonry buildings, we are only now considering programs to retrofit soft-story buildings in San Francisco and Oakland.

**Biography:** **Dr. Jack Boatwright**, a senior seismologist at the U.S. Geological Survey, is currently serving as the Chief of Earthquake Effects Investigations in Northern California. Jack received his PhD in Seismology from Lamont-Doherty Earth Observatory at Columbia University and joined the USGS directly after. Dr. Boatwright's particular area of expertise is on the effects of earthquakes and what shaking levels to expect from future earthquakes.

Dr. Boatwright developed maps showing the shaking intensity from the 1906 San Francisco Earthquake and has recently completed a similar map for the 1868 Hayward earthquake. This work has taken him to the oldest sections of cemeteries around the Bay Area, in which he attempts to determine which percentage of the gravestones were broken by the 1868 and 1906 earthquakes. His results are equally spooky, and show that a repeat of either the 1906 or 1868 earthquake will produce strong shaking and damage throughout the Bay Area.

Northern California Geological Society  
 c/o Mark Detterman  
 3197 Cromwell Place  
 Hayward, CA 94542-1209

*Would you like to receive the NCGS newsletter by e-mail?* If you are not already doing so, and would like to, please contact **Dan Day** at [danday94@pacbell.net](mailto:danday94@pacbell.net) to sign up for this free service.