



## Spring 2011 Conference National Association of Geoscience Teachers Far-Western Section

*Hosted by the Tectonics Observatory, California Institute of  
Technology  
Pasadena, CA*

**Friday – Sunday, March 25 – 27, 2011**

Conference website: <http://www.tectonics.caltech.edu/meetings/nagt>

### **Co-Coordinators:**

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### **Biographies**

#### **Jess Adkins**

Jess Adkins was born in New York City in February 1968. After many years of an idyllic suburban lifestyle, he graduated from Haverford College in 1990. Unable to truly decide between majors (Chemistry and Political Philosophy), Jess was also unable to choose a direction in life. A job as a lab technician at UC Santa Barbara opened his eyes to the worlds of Oceanography and Climate, which led to a PhD with Ed Boyle at MIT. In 1998 he graduated from the MIT/WHOI program in Oceanography with a degree in Chemical Oceanography and thesis title of, “Deep-Sea Corals: A New Paleo Archive.” Following post-docs at Columbia and the U. of Minnesota, Jess was appointed an Assistant Professor at Caltech in 2000. Now tenured, he holds joint appointments in the Divisions of Geological and Planetary Sciences and Engineering and Applied Sciences. His current research interests include: Geochemical investigations of past climates using corals, sediments and their interstitial waters; Rate of deep ocean circulation and its relation to mechanisms of rapid climate changes; Metals as tracers of environmental processes; Radiocarbon and U-series chronology; Chemical oceanography. During his cruise with the submersible Alvin to the New England Seamounts, Jess created and updated daily a web site geared to middle school science students, as part of the “Dive and Discover” program.

#### **Tanya Atwater**

Dr. Tanya Atwater is a professor emeritus of Earth Science at U.C.S.B. She was educated at M.I.T., U.C. Berkeley, and Scripps Institute of Oceanography, earning her PhD in 1972. She was a professor at M.I.T., and then joined the U.C.S.B. faculty in 1980, becoming Emeritus in 2007. Atwater has a lifelong passion for large-scale landscapes and the plate tectonic processes that create them. She is especially well known for her works on the plate tectonic evolution of western North America and the

San Andreas fault system. Atwater is devoted to public education, working with teachers, parks and museums, and the media to spread Earth information and excitement to all. She has created a collection of geological animations that are widely used by educators at many levels (check them out at <http://emvc.geol.ucsb.edu>). Her recent honors include the NSF Director's Award for Distinguished Teaching Scholars, the Leopold von Buch Medal for "outstanding career contributions in the geosciences" and, with Joann Stock, the GSA Structure and Tectonics Division's Best Paper Award. She was elected to the National Academy of Sciences in 1997.

### **Bruce Carter**

Bruce Carter studied at Caltech where he did his Ph.D work on the precambrian anorthosite-gabbro-syenite body of the western San Gabriel Mountains of southern California. Other research included work on the offset history of the central Garlock Fault and on the origin and migration of magmas in ultramafic rocks of the Trinity peridotite of northern California. Beginning in 1971, he taught geology at Pasadena City College, and served as Dean of the Natural Sciences Division for 18 years before his retirement in 2005.

### **Ming-Hei Cheng**

Ming-Hei is a PhD student in the Department of Mechanical and Civil Engineering at Caltech. He is interested in investigating how buildings behave during earthquakes as well as during heavy rainfall. He is also currently involved in the "Community Seismic Network" project, which intends to deploy thousands of low-cost sensors in schools, offices, and homes.

### **John Eiler**

John Eiler is Robert P. Sharp Professor of Geology and Professor of Geochemistry at Caltech. He has a BS from the University of Iowa, and an MS and PhD from UW/Madison. His research focuses on the isotope geochemistry of light elements (H, C, N, O and S), as applied to: the origin and evolution of igneous rocks; the origin and evolution of meteorites; planetary atmospheres; atmospheric and environmental chemistry; paleoclimate; and paleontology.

### **Kenneth Farley**

Dr. Ken Farley is Chair of the Division of Geological and Planetary Sciences here at Caltech and is the W. M. Keck Foundation Professor of Geochemistry. He has a B.S. from Yale University and a Ph.D. from the University of California, San Diego. His research is centered around the use of noble gas concentrations and isotopic ratios to address problems in a range of Earth science disciplines. The noble gases are of interest because they are chemically inert, have large differences in concentration and isotopic composition among different terrestrial and extraterrestrial reservoirs, and many isotopes are produced by decay of common radioactive elements such as potassium, uranium, and thorium. Current areas of research include the development and application of techniques for assessing the cooling history of rocks and identifying major solar system events using extraterrestrial  $^3\text{He}$  in seafloor sediments.

### **Tom Heaton**

Thomas Heaton is a Professor of Engineering Seismology at the California Institute of Technology with a joint position in the Division of Engineering and Applied Science and the Division of Geological and Planetary Science. He is also the Director of Caltech's Earthquake Engineering Research Laboratory. He was a Research Geophysicist with the U.S. Geological Survey in their Pasadena Office from 1979 until July 1995, and he was the Scientist in Charge of the USGS Pasadena office from 1985 until October of 1992. He has received a Meritorious Service award from the U.S. Department of the Interior, he is a past President of the Seismological Society of America, and he is a Fellow of the American Geophysical Union. He received a B.S. in Physics from Indiana University in 1972, and a Ph.D. in Geophysics from the California Institute of Technology in 1979. Dr. Heaton's research falls into two broad topics, 1) understanding the physics of earthquake ruptures, and 2) understanding the impact of large earthquakes on cities. His current research on earthquake physics focuses on bridging the gap between the laboratory observations of dynamic fault friction, and large scale rupture of the Earth's crust (i.e., earthquakes). This requires the development of statistical physics of highly nonlinear dynamic systems. Dr. Heaton has also studied the nature of ground shaking in large earthquakes. Although he was originally trained as a physicist, his career took a new direction when he joined the Civil Engineering Department at Caltech. Much of his research has been on understanding the dynamics of different types of buildings. Working with Prof. John Hall (a Caltech colleague), he has shown that, although tall buildings can be expected to perform well in moderate sized earthquakes, they may experience severe damage, and possibly collapse, in large earthquakes similar to the 1906 San Francisco earthquake. Dr. Heaton is also a pioneer in the development of automated systems to react to an earthquake during the time between its origin and the onset of strong shaking at a particular site (seconds to tens of seconds).

### **Jennifer Jackson**

Jennifer Jackson is Assistant Professor of Mineral Physics at Caltech. She has a BS in Mathematics with a minor in Geology from UI/Urband-Champaign, an MS in Minerology & Crystallography from U Notre Dame, and a PhD in Geology from UI/Urband-Champaign. Her research group focuses on combining experimental results with geophysical methods to better understand planetary interiors. By combining a suite of spectroscopic methods, primarily at advanced radiation sources, they determine the elastic, vibrational, and chemical properties of candidate planetary materials under extreme conditions of pressure and temperature. Through collaborations with Seismo Lab colleagues, her group integrates the most recent mineral physics results with seismic observations and geodynamic modeling to gain a multi-dimensional understanding of the deepest parts of Earth's interior.

### **Michael Lamb**

Michael Lamb is an Assistant Professor in the Geological and Planetary Science Division at Caltech. He has a BS in both Geology and Geophysics from UM/Minneapolis, an MS in Oceanography from UW/Seattle, and a PhD in Earth and Planetary Science from UC/Berkeley. His research focuses on sedimentary and geomorphic processes that shape the surfaces of Earth, Mars, and Titan. His current areas of research include waterfall erosion, sediment transport in steep mountain streams, river terrace formation, river mouth dynamics, and hyperpycnal flows. His

group is currently constructing a 50-foot state-of-the-art Flume Lab to study how water and sediment flow in carefully controlled settings.

### **Elisabeth Nadin**

Elisabeth Nadin is a structural geologist who teaches at University of Alaska, Fairbanks. She got her PhD at Caltech, where she studied the 100-million-year history of the Kern Canyon fault in the Sierra Nevada, CA. Elisabeth's research focuses on deformation of the continental crust, specifically exhumed fault zones, to understand how the strength of the crust varies with depth and composition along fault zones. For her research, she uses techniques such as geochronology, thermobarometry, and microstructural analysis.

### **Belle Philibosian**

Belle Philibosian is a Ph.D. candidate in geology at Caltech. She received her BS in geology from Caltech in 2005 and MS from the University of Oregon in 2007. Her research interests include active tectonics, faulting, and the seismic cycle. She has studied the southern San Andreas Fault and the Sumatran subduction zone.

### **Donald Prothero**

Dr. Donald Prothero has a Ph.D. from Columbia University in vertebrate paleontology and is currently Professor of Geology at Occidental College and Lecturer in Geobiology at the California Institute of Technology. He has a long track record in his field and is the author of the leading paleontology textbook in the US (*Bringing Fossils to Life: An Introduction to Paleobiology*). He is the Principal Editor for the upcoming web encyclopedia, *Paleontology Online* (Johns Hopkins Univ. Press), and won the Schuchert Award of the Paleontological Society for the outstanding paleontologist under the age of 40. He has published 27 books and over 200 scientific papers, so far! He is knowledgeable (and enthusiastic!) about any area of paleontology, from prehistoric dinosaurs and mammals to invertebrates to plants, and has considerable experience in paleontology programs, from the 1995 program *Paleoworld* (over a week of filming with a BBC film crew), *Walking with Prehistoric Beasts*, and numerous documentaries in the past three years. His current research focuses on the dating of the climatic changes that occurred between 30 and 40 million years ago, using the technique of magnetic stratigraphy.

### **Joann M. Stock**

Joann Stock is a professor in the Caltech Seismological Laboratory with research interests in geology and geophysics. Dr. Stock received her BS and MS degrees in geophysics from the Massachusetts Institute of Technology in 1981 and her PhD in structural geology from MIT in 1988. From 1982-1984 she worked as a geophysicist at the USGS in Menlo Park, California. From 1988 to 1992 she was a professor at Harvard University. Since 1992 she has been on the faculty at the California Institute of Technology. Her research involves global plate tectonics, structural geology, and seismology. Current research projects focus on the Gulf of California/Salton Trough region, tectonics of Antarctica and the southwestern Pacific, and deformation related to earthquakes in Mexico. At Caltech, she teaches Plate Tectonics and a variety of field classes in geology and geophysics. She also does news interviews about earthquakes and volcanoes for Spanish-language television.

**Margaret Vinci**

Margaret Vinci has been a member of the Caltech seismological laboratory staff for the past 18 years and is currently the Manager of the Office of Earthquake Programs. Her principal responsibility is the management of the Caltech Earthquake Research Affiliates Program, which is a partnership between academia (seismologists, geophysicists and earthquake engineers) and leaders in business, government and emergency response to assess potential risks to life and property due to earthquakes and the development of earthquake tools to reduce losses. She is also committed to the outreach and education of earthquake preparedness for businesses, schools and the public. She serves on the board of BICEPP (Business and Industry Council for Emergency Planning and Preparedness) and is a member of SCESA (Southern California Emergency Services Association) and the Earthquake Country Alliance Leaders Group, where she was a member of the steering committee that created the 2008 Great Southern California ShakeOut. She was actively involved in the statewide California ShakeOut.

**Becca Walker**

Becca Walker has been a professor in the Department of Earth Sciences and Astronomy at Mt. SAC since 2006. Specializing in geoscience education for introductory college students, she has developed and implemented field trips for Earth science, oceanography, natural disasters, physical geology, and field studies courses at Mt. SAC. She is currently PI on a Hewlett Foundation-funded Faculty Inquiry Network grant investigating critical thinking and self-directed learning on geology field trips. In 2010, she was a speaker and participant at two SERC workshops for geoscience faculty: *Teaching Geoscience in the Field in the 21st Century* and *The Role of 2-year Colleges in Geoscience Education*. She has also been involved in K-12 and public geoscience education as a *Teachers on the LEading Edge* community college team leader, Geoscientist-in-Park at Mt. Rainier, and co-facilitator of an NAGT teacher workshop on earthquakes.

**Brian Wernicke**

Brian Wernicke earned his bachelors degree from USC in 1978 and his doctorate from MIT in 1982. After working his way through the academic ranks at Syracuse and Harvard universities, in 1991 he moved west to assume a faculty position at Caltech. His research has focused primarily on the history of formation of the mountain chains, with emphasis on the Basin and Range province. He played a leading role in several large collaborative projects supported by the National Science Foundation, such as the establishment of the first subcontinental-scale continuously monitored Global Positioning System network for the study of earthquakes and tectonics. A major component of his research over the last decade has been applying newly developed thermometric methods to the problem of reconstructing paleotopography and paleohydrology.