



DEPARTMENT OF EARTH AND PLANETARY SCIENCE

ALUMNI UPDATE • 2011-2012



UNIVERSITY OF CALIFORNIA, BERKELEY



US Enterprise flies directly over McCone. Photo by Tim Teague.



David Romps with his new son Felix enjoying the trains at Tilden Park. Photo by Nancy Romps.



EPS and Geography staff and students wait for the US Enterprise to fly over McCone. Photo by Tim Teague.



Group shot of members in Roland Burgmann's Active Tectonics group that ran a trail race in the Spring of 2012, RB, Kelly Wiseman, Mong-Han Huang, Amanda Thomas, and Manoochehr Shirzaei. Photo by Jim Watkins.



Octavia Crompton, Heidi Fuqua, and Inez Fung at Santa Barbara Day. Photo by Burkhard Militzer.



Mary Power and Jim Bishop in conversation at Santa Barbara Day. Photo by Burkhard Militzer.

Cover photo: 5000 meter peaks in eastern Tibet, near Bayi, May 2012. Setting of a large project involving David Shuster, Don DePaolo and colleagues at UCLA, Lehigh University, U. Chicago and China University of Geosciences. We're studying the structure and evolution of the Lhasa block over the last ~50 million years. Photo by D. Shuster.

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Bacchus Press*

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State of the Department, 2011-2012

Dear Alumni and Friends,

It is a privilege to take over the reins of the Department from outgoing Chair Roland Bürgmann. Despite continuing uncertainties in funding the department is thriving. Our undergraduate program continues to grow, we compete for the best graduate students, and faculty research attracts national and international recognition. In the most recent national ranking of graduate programs by US News and World Report Berkeley's Earth and Planetary Science Department was ranked 3rd in the country.

Over the past year we strengthened our ranks with the addition several new faculty. Nick Swanson-Hysell joined the Department as a new Assistant Professor. Nick's research integrates original field observations with a variety of geochemical and geophysical methods to reconstruct the tectonic and environmental history of the Earth over the past billion years or more. We also recruited David Shuster as a new Associate Professor. David applies geochemical tools to a remarkably broad range of problems, ranging from the evolution of mountain landscapes to the magnetization of early solar system condensates. In addition we are pleased to welcome Charles Marshall, who adds the title of Professor of Earth and Planetary Science to his long list of other duties on campus, including Director of Berkeley's Museum of Paleontology and Professor in Integrative Biology. We are also enthusiastic to introduce Stephen Self as a new Adjunct Professor. Steve has already taken an active role in teaching and research in the Department. His research interests deal with the mechanics, deposits and environmental consequences of the largest volcanic eruptions in the recent geological past.

Previous issues of our Alumni Update have reported on the honors and distinctions bestowed on members of the Department, and the present issue is no different. Barbara Romanowicz was recognized as "one of the most influential seismologists of our time" during the presentation of the Harry F. Reid Medal, the highest honor of the Seismological Society of America. On campus, Barbara was awarded the prestigious Faculty Research Lectureship, adding her name to a rarefied list of exceptional past recipients. We also offer congratulations to Ron Cohen and Steve Self, who were selected as Fellows of the American Geophysical Union in 2012. We are pleased to announce Richard Allen's promotion to Full Professor after taking over as Director of the Berkeley Seismological Laboratory.

Over the past year our faculty have been engaged in a variety of high-profile research projects. Bill Dietrich spent the Fall Term at NASA's Jet Propulsion Laboratory in Pasadena, where he is scrutinizing data from the Mars rover, Curiosity, looking for clues about geology, climate and possibly life on Mars. Michael Manga spent seven weeks at sea in the Lesser Antilles on the research drillship *Joides Resolution* as a team member of the Integrated Ocean Drilling Program, Expedition 340. Researchers recovered and studied cores that document a long history of volcanism and landslides in the Lesser Antilles.

Our Undergraduate Majors program offers six specializations, covering the full spectrum of activities in Earth and Planetary Science. Increasingly, our undergraduates take advantage of a unique opportunity at Cal to participate in research projects on campus and around the world. This experience expands students' appreciation of Earth and Planetary Science and sharpens their focus on career goals. In many instances these activities are made possible by Ramsden scholarships. These scholarships offer a meaningful and tangible way to assist the next generation of Earth Scientists. We are very grateful for the generous donations we receive to support our undergraduate and graduate students, particularly at a time of diminishing institutional funding.

A special thanks goes to Doris Sloan, who is retiring after 16 years of tireless service as an Adjunct Professor in the Department. Doris has been affiliated with the University and Department for the past 38 years, and was aptly given the "Living Legends" Award several years ago by the California Council of Geoscience Organizations. We wish you well and hope you will have the opportunity to visit on regular occasions. Sadly, we lost our colleague of many years, Garniss Curtis, who passed away in December. A celebration of his life will be held in Fall. For details see <http://www.garnisscurtis.net>. A tribute to Garniss' many accomplishments will appear in the next issue.

We encourage you to keep in touch with updates about your activities and with your thoughts about how we can make EPS work best. It is always a challenge to keep our lists of electronic contact information up to date, so don't hesitate to let us know when our contact information changes. As always, it is a pleasure to thank Rudy Wenk, Doris Sloan, Judith Coyote and Michelle Fang for making this Alumni Update possible.

Bruce Buffett

Department Faculty Research Activities



Allen, Richard M., Professor, Ph.D., 2001, Princeton University. Now exploring the use of smartphones to collect earthquake data for research and hazard mitigation. The goal is to track earthquake shaking across urban areas.



Alumbaugh, David L., Adjunct Professor, Ph.D., 1993, UC Berkeley. Completed a model resolution analysis of marine electro-magnetic exploration technologies currently being employed to de-risk petroleum drilling in deepwater environments.



Banfield, Jillian F., Professor, Ph.D., 1990, Johns Hopkins. Geomicrobiology, microbial ecology and evolution; nanoparticles in the environment.



Bishop, James K.B., Professor, Sc.D., 1977, MIT/WHOI Joint Program in Oceanography. Chemical, physical, and biological controls on the cycles of carbon and related chemical species in the ocean; robotic instruments for ocean exploration.



Boering, Kristie A., Associate Professor, Ph.D., 1992, Stanford University. Atmospheric chemistry and climate; field, laboratory, and modeling studies of the stable isotopic compositions of atmospheric trace gases; photochemical isotope effects.



Buffett, Bruce, Professor, Ph.D., 1991, Harvard University. Developed a stochastic model of magnetic reversals from a 2-Myr time series of paleointensity.



Bürgmann, Roland, Professor, Ph.D., 1993, Stanford University. Explored postseismic deformation from M9 subduction zone earthquakes in Sumatra and Japan to better understand the megathrust earthquake cycle and time-dependent hazard in these regions.



Chiang, Eugene, Professor, Ph.D., 2000, Caltech. Performed numerical simulations of how dust grains sediment in circumstellar disks to form planetesimals.



Cohen, Ronald C., Professor, Ph.D., 1991, UC Berkeley. Studied the role of soils and fires in the atmospheric nitrogen cycle using space-based UV-visible spectroscopy.



Collins, William D., Professor in Residence, Ph.D., 1988, University of Chicago. Global climate models; interactions of sunlight and heat with the Earth's surface and atmosphere; applications of remote sensing to understand climate processes.



Cuffey, Kurt M., Professor, Ph.D., 1999, University of Washington. Glacier mechanics; paleoclimatology; environmental isotope geochemistry; river processes.



DePaolo, Donald J., Class of 1951 Professor of Geochemistry, Ph.D., 1978, Caltech. Currently working on isotopic fractionation during crystal growth, geochemistry of Tibetan granites, U ore deposits, and carbon sequestration.



de Pater, Imke, Professor, Ph.D., 1980, University of Leiden. Radio and infrared observations of the Solar System, including giant planet atmospheres and Jupiter's magnetosphere.



Dietrich, William E., Professor, Ph.D., 1982, University of Washington, Seattle. His research group showed experimentally the necessary conditions for sustained river meandering and presented a theory predicting valley spacing.



Dreger, Douglas S., Professor, Ph.D., 1992, Caltech. Wave propagation; earthquake source physics; earthquake hazards; realtime seismology; nuclear monitoring.



Fung, Inez Y., Professor, Sc.D., 1977, MIT. Climate change; global carbon cycle; geophysical fluid dynamics and large-scale numerical modeling; remote sensing of the Earth.



Ingram, B. Lynn, Professor, Ph.D., 1992, Stanford University. Completed a study using oxygen and carbon isotopes in varved lake sediments from the Gulf of California for assessing Holocene changes North American Monsoon and past solar variability.



Jeanloz, Raymond, Professor, Ph.D., 1979, Caltech. Turned helium and diamond into fluid metals above pressures of 1 and 10 Mbar, respectively, in line with theoretical predictions applied to the interiors of giant planets.



Manga, Michael, Professor, Ph.D., 1994, Harvard University. Published a book with Chi Wang on "Earthquakes and water" - showed that many hydrologic responses to earthquakes are caused by permeability changes produced by shaking.



Miltzer, Burkhard, Associate Professor, Ph.D., 2000, University of Illinois. Predicted with computer simulations that water ice assumes a new superionic form in the interiors of Uranus and Neptune.



Pride, Steven R., Adjunct Professor, Ph.D., 1991 Texas A&M. Developed new models for how seismic waves can mobilize liquid pollutants and hydrocarbons trapped on capillary barriers in porous media and applied these models to a test site in Oklahoma.



Rector, Jamie, Professor, Ph.D., 1990, Stanford University. Seismic techniques for characterizing reservoir properties and processes; seismic reflection imaging; borehole seismology; near-surface seismology with applications to environmental remediation.



Renne, Paul R., Professor in Residence, Ph.D., 1987, UC Berkeley. Launched an NSF-funded project to build a "designer" reactor based on deuterium fusion to produce a high flux of nearly monoenergetic neutrons for Ar/Ar geochronology.



Richards, Mark A., Professor, Ph.D., 1986, Caltech. Mantle convection and large-scale mantle structure; dynamics of terrestrial planets; dynamics of global plate motions; regional crustal deformation and earthquake hazards.



Romanowicz, Barbara A., Professor and Director, Berkeley Seismological Laboratory, Doctorat d'Etat, 1979, Université de Paris. Used anisotropic wave-form tomography to reveal two distinct layers in the lithosphere under the North American craton.



Romps, David M., Assistant Professor, Ph.D., 2005, Harvard University. Our group uses theory, simulation, and observation of clouds and atmospheric dynamics to improve our understanding of Earth's climate.



Shuster, David L., Associate Professor, Ph.D., 2005, California Institute of technology. Studied timescales of mountain topography development in New Zealand and European Alps, and magnetization of early Solar System condensates.



Swanson-Hysell, Nicholas L., Assistant Professor, Ph.D., 2011 Princeton University. Developed constraints on Proterozoic Earth history through field-based projects in the Midcontinent Rift of Ontario, the Umkondo province of Botswana and the Tambien Group of Ethiopia.

Emeriti



Alvarez, Walter, Professor, Ph.D., 1967, Princeton University. Gave the annual campus Faculty Research Lecture in April, about Earth History and Big History, introducing the zoomable timescale of the entire past, "ChronoZoom" (search for it on the web!).



Brimhall, George H., Professor, Ph.D., 1972, UC Berkeley. Completed geological mapping in the Pioneer Mountains of Montana where a Cretaceous formation bears evidence of early uplift of the Rocky Mountains.



Bukowinski, Mark S.T., Professor Emeritus, Ph.D., 1975, UC Los Angeles. Physics and chemistry of planetary interiors; mineralogy; high pressure mineral physics; planetary structure and evolution.



Johnson, Lane R., Professor Emeritus, Ph.D., 1966, Caltech. Seismology and physics of the Earth's interior and wave propagation; seismic source theory; applied geophysics.



Kirchner, James, Professor Emeritus, Ph.D., 1990, UC Berkeley. Showed that stream chemistry time series have a common fractal structure that makes water quality trends difficult to detect and predict.



Morrison, H. Frank, Professor Emeritus, Ph.D., 1967, UC Berkeley. Applied geophysics: electrical and electromagnetic methods for mapping subsurface conductivity; cross-well electromagnetics for reservoir characterization; numerical modeling and inversion.



Sloan, Doris, Adjunct Professor Emerita, Ph.D., 1981, UC Berkeley. History of San Francisco Bay, Foraminifers in Bay sediments, biostratigraphy



Wang, Chi-yuen, Professor Emeritus, Ph.D., 1964, Harvard University. Continued to work on problems related to earthquake-induced transport. Collaborated with Wang-Ping Chen using results from seismic tomography to constrain temperature beneath Tibet.



Wenk, Hans-Rudolf, Professor Emeritus, Ph.D., 1964, University of Zurich. Focus has been on anisotropy in the deep earth--with high pressure experiments--as well as anisotropy and preferred orientation in shales and returning to the enigmatic mechanical twinning in quartz.

BIG HISTORY AT BERKELEY

by Walter Alvarez

As a geologist interested in sedimentary rocks and stratigraphy, I think of myself as a historian of the Earth. Geologists have the opportunity to work in unusual and remote places, and Milly and I have lived in many — Colombia, Mexico, Libya and Tunisia, Tajikistan, Cyprus, Corsica, Sardinia, and Italy. That has given us the chance to learn about different cultures and languages. The history of those places has fascinated us, but I always thought my interest in human history was just a hobby, separate from the Earth history that is my professional focus.

So imagine the pleasure of discovering, about ten years ago, that there is a newly emerging field called Big History, which tries to unify all of history — all of the past — from today back to the origin of the universe in the Big Bang. My hobby could become part of my research! I got in touch with the founder of Big History, David Christian, a historian in Sydney, and learned about this nascent endeavor. In 2007, with David Shimabukuro (PhD 2011), then a Berkeley grad student with unusually broad interests, I developed a course called "Big History — Cosmos, Earth, Life, Humanity," that was offered for five years. We kept the class to no more than 50 students, and selected from among many applicants, so we got particularly motivated students who were a delight to teach.

One of the really difficult problems about teaching that course was trying to convey the time scales of Big History — from the 13.7 billion years of the Cosmos and the 4.5 billion of Earth, to the 5 million years of human prehistory and the 5 thousand years of written history. I tried all kinds of linear and logarithmic plots and fancy diagrams, with little success, and after one such class, in 2009, a student named Roland Saekow said to me, "I think we could convey those time scales using computer-zoom technology." His first attempt, in his term paper, was so successful that Roland has been working ever since with David and me on the zoomable



Professor Walter Alvarez explaining ChronoZoom to a rapt audience.

time scale, which we call ChronoZoom. We approached Microsoft Research, who had the best zooming software, and they have enthusiastically supported the development of ChronoZoom for the last three years, bringing in a Russian team at Moscow State University who are doing the coding. Last spring, under Roland's leadership, our Berkeley team, which also includes former Big History students Robbie Bruens and geology major Chris Engberg, together with Microsoft Research and Moscow State University, made available a beta version of ChronoZoom that is freely available on the web, and gives an idea of what we hope ChronoZoom will eventually be like. Please try it out on the web (ChronoZoomProject.org), and we'd welcome your feedback!

Two years ago David Shimabukuro, Sandro Montanari (PhD 1986), and I offered a workshop for Big Historians from other disciplines to teach them how geologists read the history of the Earth written in rocks. We held it at the Geological Observatory of Coldigioco — the geological teaching and research institute that Sandro and his wife, Paula Metallo, have built in Italy. The other Big Historians loved learning about geology, and we decided at that workshop to start the International Big History Association, which held its first meeting this past August in Michigan. You can learn about the IBHA on line at www.ibhanet.org/. Also, this past summer, our Berkeley department held its summer field camp for geology majors at Coldigioco, which was a great success, despite a really serious heat wave.

CATASTROPHIC ERUPTIONS OF MUD VOLCANOES: FORENSIC GEOLOGY AND LOOKING FORWARDS

by Michael Manga

On May 29, 2006 mud started to erupt in Sidoarjo, Indonesia. Over the next several months, an average of more than 100,000 m³ of mud erupted each day. The eruption has continued to the present, but with a gradually diminishing eruption rate. More than 40,000 people have been displaced and economic losses may exceed \$4B US.

The eruption began about 140 m away from a gas exploration well that was being drilled. This raises the possibility that drilling operations somehow initiated the eruption. Those associated with drilling attributed, instead, the eruption to the Yogyakarta earthquake, a devastating magnitude 6.3 earthquake that occurred two days earlier and 250 km away.

We have known for thousands of years that earthquakes influence many other geological phenomena, including triggering other earthquakes, prompting volcanoes to erupt, and causing hydrological responses such as liquefaction, changes in stream discharge, and changes in the water level in wells. An earthquake trigger of the eruption might thus be plausible.

I became involved in the debate about the initiation of the Indonesian mud eruption shortly after it began. A paper I had just published on when and why earthquakes cause magmatic and mud volcanoes to erupt was cited as evidence that this eruption was also triggered by an earthquake. Over the next few years, with graduate student Maria Brumm, and colleagues in the UK and Australia, we systematically evaluated the various ways in which the stresses produced by the Yogyakarta earthquake may have initiated an eruption. We found that this earthquake was too small and too far away to initiate an eruption, by comparison with all other examples of eruptions influenced by earthquakes. More compelling was that there were many much larger and closer earthquakes that did not trigger an eruption. We argued, instead, that drilling operations might have increased pressure in the well to the point that hydrofractures formed, or more likely that faults were reactivated, allowing overpressured mud and fluids to



Professor Michale Manga collecting samples from a mud volcano in the Italian Apennines. Photo by M. Bonini

escape to the surface.

Much more important than looking retrospectively at what might have happened, is looking to the future of the ongoing eruption. To predict when the eruption might end and its expected evolution, with graduate students Max Rudolph and Leif Karlstrom, we have developed a mechanical model for how this eruption works. The novel aspect of the model is that mud at depth is gradually transformed from a solid to liquid state as the eruption progresses. This is equivalent to having a mud chamber that grows over time. We even proposed that magma chambers may work the same way if they are full of crystals. This model can be constrained by how the surface deforms in response to the ongoing eruption. With postdoc Manoo Shirzaei, Max Rudolph, and colleagues in Japan, we have used

satellite data to show that the pressure in the mud source is decaying over time, and that some of the key features of our novel mechanical model might be right. The prediction: discharge should decrease to 1/10 of that today within six years.

This event was a most unfortunate geological disaster and leaves a human and environmental legacy that will last for many decades. It did offer an unexpected opportunity to apply what we have learned over the last decade about how eruptions work, and to test models and ideas. Equally valuable has been the chance to work with new colleagues in the UK, Italy, Australia, Japan and Indonesia. The event also prompted us to begin new field projects to study mud volcano systems in the Salton Sea, California, the Northern Apennines, Italy, and Hokkaido, Japan.

Details posted at <seismo.berkeley.edu/~manga/pub_lusi.html>.

WHAT A PEBBLE TELLS US

by Bill Dietrich

I watched the launch of the Curiosity Rover in Cape Kennedy the day after Thanksgiving not quite sure what to expect. Surrounded by hundreds of engineers and scientists and their families who had worked on and lived with this mission already many years, I watched the distant launch pad and wondered what lies in Gale Crater some 50 million miles away that brought so much effort together. At launch the rocket shot up, emitting a golden glow unlike anything I had seen before and at that moment I felt strangely attached to that car-sized robot being hurled so far away from us. When it landed on Mars 8 months later, the packed room at the Jet Propulsion Lab in which I was standing, full with the co-researchers and engineers, breathed a euphoric sigh that the amazing landing strategy actually worked. Then, shortly, our attention was drawn to the first black and white, somewhat fuzzy pictures of the ground. Gravel! Water transported? We debated for hours in front of the projected image on the screen. But now, some 70 "sols" (Martian days) and thousands of photographs later, we have journeyed about 400 m from the landing site and from there until where we are now we have seen a patchy occurrence of gravels. When we got our first really sharp, well-lit photograph (from a remarkable pair of cameras mounted on the rover's mast) on sol 27, we saw something startling: beautifully rounded, disc and ellipsoidal shaped pebbles collected beneath (clearly having fallen from) a coherent piece of conglomerate lying at the surface. The pebbles were too large to be transported by Martian wind. The rounding we concluded must have resulted from water transport of the pebbles and their consequent repeated collision. Their deposition became recorded in the conglomerate. Hence, the rover was traveling over an area once crossed by flowing water, a Martian stream, it seems. This first on-the-ground-evidence of what has been proposed for decades, based on orbital imagery-- that in the Martian past there were active river networks, meanders, fans and deltas--gives a special significance to the observation. We can also reason where there are streams flowing, habitability is much increased.

The landing area was chosen with the intent to explore a deep (5 km) exposure of bedrock, probably sediment, that collected in the 150 km diameter Gale Crater, forming the gently rising Mount Sharp, the peak of which extends slightly above the northern rim of the crater. The specific goal of the mission is to look for



The exposed conglomerate named "Link" on sol 27 during the journey of the rover Curiosity on Mars. Visit the NASA web page http://www.nasa.gov/mission_pages/msl/index.html to see edited images, videos and reports, or view <http://mars.jpl.nasa.gov/msl/multimedia/raw/> to see the raw images as they arrive from Mars.

evidence of conditions favorable to habitability. Spectral signatures from orbiting instruments suggested the presence of clay and sulfates, good candidates for water-influenced environments, in the base of the Mount Sharp sediments. The landing ellipse was selected in part because it lay at the base of what appeared to be an alluvial fan, hence even in the ellipse, evidence of past water was thought to be possible. But fortunately for a geomorphologist like me, the landing occurred toward the eastern edge of the ellipse, tantalizingly close to a conjunction of three very different (based on images taken from orbit) materials along this downstream end of the fan. Hence, a decision was made to travel the some 500 m to what became known as Glenelg, a name carefully chosen as a palindrome to reflect our hobbit like adventure of "there and back again", in which we will examine these three materials and then pack up, turn around, and head to Mt. Sharp, with or without the evidence of the ring of life

The life of the mission is 23 months, but, of course, the prior twin rovers who together roamed Mars for 5 years (with Opportunity rover still on the move) make us aware of the possibility of a longer trip. Our hobbit rover is ready for this adventure and we all travel with it to see what story unfolds.

COMMENCEMENT 2012

BACHELOR OF ARTS

ATMOSPHERIC SCIENCE
John Kelly Kodros*

ENVIRONMENTAL EARTH SCIENCE

Jesson Jayag Go
Jasmin Anastasia Hayes
Rachel Horn
Reina Iwadate
Kristina Lofman
Sky Makena Lovill
Leah Yvonne Redon
Florence Tran
Brian Lee Tsang

GEOLOGY

Anisa Ahmadzai
Taylor Hildreth*
Trevor Ray Hillebrand*
Kristen Anne Johnson
Jasmine Mason
Brooke Joy Rumley
Tyler Chang Seaman
Kara J Torbert

GEOPHYSICS
Magali Barba
Anthony W. Engelbrecht
Barone
Patrick John Gustie
Mary Marguerite Reagen
Xinyue "Dennis" Tong
Ryan Clayton Turner*
Tamerlane Conan Sir Visher

MARINE SCIENCE

Roman Boiko
Sarah Dendy
Thomas Reed Farrell
Michael Brian Fong*
Nin Gan
Courtney Helen Hann*
Julia Hann Hassen
Paul Lerner*
Brian Louis Mogollon
Patrick Li Ching Shen
Gabrielle Alana Weiss

PLANETARY SCIENCE
Dennis Chan
Michael L. Wong
Shawn Yeh

UNDERGRADUATE AWARDS

Departmental Citation:
Michael L. Wong
AWG Outstanding Woman Student:
Jasmine Mason
GeoOlympics:
Sam Birch

MASTER OF ARTS
Stephen Ferencz
Justin Schaefer

* Honors



Top row: Paul Lerner, Anthony Barone, Nin Gan, Michael Fong, Roman Boiko, Brook Rumley, Kristen Johnson, Patrick Gustie, Xinyue "Dennis" Tong, Ryan Turner, Tamerlane Visher. Middle Row: Michael Wong, Patrick Shen, Brian Mogollon, Kara Torbet, Tyler Seaman, Kristina Lofman, Mary Reagen, Taylor Hildreth, Sky Lovill, Trevor Hillebrand, John Kodros, Thomas Farrell, Jesson Go. Bottom Row: Shawn Yeh, Gabi Weiss, Courtney Hann, Jasmine Mason, Brian Tsangm, Florence Tran, Magali Barba, L. Yvonne Redon, Rachel Horn, Anisa Ahmadzai.



MA students: (L to R): Justin Schaefer, Stephen Ferencz



PhD Students: Front row, L to R: Laura Nielsen, Bill (William) Cassata, Christian Braudrick, Jenny Druhan, Amanda Thomas, Tess McEnulty; Back row, L to R: Kyung-Eun Min, Dino Bellugi, Edwin Kite, Kelly Wiseman

DOCTOR OF PHILOSOPHY

Dino Bellugi

What controls shallow landslide size across landscapes

Christian Arthur Braudrick
Meandering in gravel-bed rivers

William Cassata
Systematic variations in argon diffusion in feldspars: Constraints on diffusion length scales, diffusive anisotropy, and non-linear Arrhenius arrays and implications for noble gas thermochronometry

Jennifer Lea Druhan

Stable isotope fractionations in biogeochemical reactive transport

Edwin Stephen Kite
Climate change on ancient Mars. Exoplanet geodynamics and climate

Tess McEnulty
Water loss from Venus and the influence of extreme solar wind conditions

Kyung-Eun Min
Eddy-covariance observations of the atmosphere-biosphere exchange of nitrogen oxides

Laura Christina Nielsen

Kinetic isotope and trace element partitioning during calcite precipitation from aqueous solution

Alyssa Rose Rhoden
The rotation and fracture history of Europa from modeling of tidal-tectonic processes

Amanda Thomas
The dynamic influence of the solid earth tides on low-frequency earthquakes and slow earthquake propagation

Kelly Grijalva Wiseman

The far reach of megathrust earthquakes: Evolution of stress, deformation and seismicity following the 2004 Sumatra-Andaman rupture

GRADUATE AWARDS

George Louderback Award:
Amanda Thomas
Outstanding Graduate Student Instructor:
Alyssa Rhoden
Graduate Field Studies Support Award:
Peter Olds

STUDENT ACTIVITIES

Elsie Carillo, Marine Science: Present abstract from her UCB Caldwell lab research at AISIS National Conference, November 2012, Anchorage, Alaska.

Adam Cohen, Marine Science: Research and field training at Bodega Marine Laboratory.

Monica Decker, Atmospheric Science: Research to identify and quantify organic compounds in aerosol samples collected at Blodgett Forest Research Station in the Sierra Nevada.

Nan Gin, Marine Science: Assist research dives off Catalina Island to complete research diver accreditation.



Amelia Weiss and Tyner Pesch in a Panama cave. Photo by Tamara Thomsen.

Jessica Hernandez, Marine Science: Hydrozoan research along the coast of Lecc, Italy

Rachel Horn, Environmental Earth Science: Forestry field camp training through UC's ESPM research station, Quincy, CA.

Ellen Knappe, Geophysics: Study soil conservation techniques and analyze local land use impacted by increasing populations in Tanzania's National Parks.

Jasmine Mason, Geology: Teach coastal geology, climate warming and reforestation to high school students and work on re-forestation of mangrove trees in La Punta Gorda, Ecuador.

Tyner Pesch, Environmental Earth Science, and Amelia Weiss, Marine Science: Research on abiotic influences on distribution of tropical cave dwellers in limestone caves, Panama

Rocio Pelayo, Environmental Earth Science: Environmental Field Camp through South Dakota School of the Mines in the Black Hills, SD.

Rebecca Trinh, Marine Science: Attended the Sea Education Association Summer Program to learn about various aspects of oceanography and nautical science and how to safely operate a ship.

ALUMNI NOTES

1949

Sherman Smith - BA Geology: My study at UC Berkeley under the Navy V-12 program was a wonderful event.

1967

Richard Buffler - PhD Geology: We are slowly transitioning to Santa Fe, I am living there pretty much full time, while Pat is still working full time at UC Berkeley School of Public Health and is commuting.

1968

James Murray - BA Geology: I spent fall quarter 2011 as a visiting Fellow at the Smith School at Oxford.

1971

Robert Barker - PhD Geology: Cynthia and I have moved to Williamsburg, MA this year, to a house on a rocky hill with a great eastern view of the Connecticut River valley. Though I am trying to retire, I am still working with a number of small mineral exploration companies. Still having fun and (I think) making positive contributions.

Frank Pabian - BA Geology: It has been awhile, but given that I'm now back in the Bay Area (and on a university campus again for the first time in 40 years), I was thinking about my days as a student at Cal. I thought that I should pass along the following links in the hope that they might be of interest to other alumni (and former faculty?). http://www.lanl.gov/news/stories/pabian_stanford_visiting_fellow.html and <http://cisac.stanford.edu/people/frankpabian>

1976

Paul Butler - MS Geology: I received my PhD in geology from UC Davis in 1984. I began teaching at the Evergreen State College in Olympia, WA in 1986. I retired in December and will now spend much of my time working on my 40-acre forest and paddling local rivers.

1979

Doug Conrad - BA Geophysics: I'm now a long way from my earth science days at Cal, both geographically and in my career. I've resided in Austin, TX for the past eight years, and work as a grant writer for Meals on Wheels and More. But I'm still a rock hound at heart, even if I don't get out in the field that much these days.

1986

Yaolin Shi - PhD Geophysics: Now professor of geophysics in Graduate University of Chinese Academy of Sciences, Beijing, China. Member of Chinese Academy of Sciences elected 2001; Fellow of the Academy of Sciences for Developing World (TWAS) elected 2005. Vice president of Chinese Geophysical Society since 2008. Vice president of Seismological Society of China since 2006. Award of Geological Science of J.S. Lee (2003). Member of the 10th National Committee of the Chinese People's Political Consultative Conference, and member of the Standing Committee of 11th CPPCC National Committee.

IN MEMORIAM

John T. de Runtz - BA Geology 1952; died 12/17/10
Bert P. Nunn - BA Geology 1951; died 8/18/2007
Paul I. Elmon - BA Geology 1951; died 10/11/11



Professor Emeritus Garniss Curtis died on Dec. 19, 2012 at the age of 93. An obituary will be in the 2012-13 Alumni Report. A celebration of his life will be held at the Faculty Club on Sept. 29, 2013. For information see <http://www.garnisscurtis.net>.



Charles Shaw, one of our most generous alumni, passed away on August 12, 2012. Charles grew up in Pasadena and started his studies at Caltech with Linus Pauling. During the war he joined the Navy, then came to Cal, got his BS in Chemistry in 1950 and finished in 1956 with a PhD thesis "An investigation of some chemical reactions involved in the genesis of metamorphic rocks" supervised by John Verhoogen. The research was an experimental study of the system MgO-SiO₂-H₂O. During his studies he received a Fulbright fellowship to visit petrologist Tom Barth in Oslo. His later career he spent mainly in mining as an independent consultant for government, mining companies, prospecting, and even owned a gold mine. His last visit to the Department was in 2008. Charles made major contributions to the Department, including substantial funding of the Charles Meyer Fellowship Fund, which has provided significant support to graduate students for field and laboratory studies of ore, mineral, and rock-forming processes."

Left: Charles Shaw at his visit to EPS in 2008. Photo by Rudy Wenk

DONATIONS TO THE DEPARTMENT

July 2011 through July 2012

FRIENDS OF EARTH & PLANETARY SCIENCE

Abrahamson, Norman
Allan, James
Bilodeau, Bruce
Chambers, Roseanne
Conrad, Douglas
Davies, Kyle
Englander, Claire
Firencz, Robert*
Foxall, Bill
Galehouse, Jon
Gillerman, Virginia
Gomez, Joseph
Holdaway, Michael
Hwang, Lorraine
Irvine, Pamela
Jones, Randall
Knapp, John
Langenheim, Victoria
Lee, Cyn-Ty
Liston, James²
Maloof, Giles W.*
McKee, Edwin
Merino, Enrique
Mortensen, Carl
Mozley, Edward C.
Murray, James*
Nolan, Julie Donnelly
Odlum, Nicholas
Pexton, Robert
Prindle, Robert
Randolf, Michael
Savina, Mary
Scheingross, Joel
Schmidt, Kevin
Schwartz, Morgan
Sloan, Doris
Snyder, Robin
Taylor, Roge³
Thacher, Anson B.
Welby, Charles
Welsh, Tom*¹

EPS SCHOLARSHIP FUND

Alexander, Mia
Barker, Robert
Kharaka, Yousif
Maloof, Giles W.*
Thacher, Anson B.

FIELD GEOLOGY AND DIGITAL MAPPING FUND

Booth, Charles V.*⁴
Welsh, Tom-

PERRY BYERLY FELLOWSHIP FUND

Alexander, Mia
Dewey, James
Maloof, Giles W.*
Plumb, Bob³

IAN S. E. CARMICHAEL FUND

Alvarez, Walter
Anderson, Alfred
Bacon, Charles
Bishop, Jim
Burgmann, Roland
Caputo, Nancy
Cerny, Joseph*
Clark, Simon
Clarke Jr, Samuel*
Fung, Inez
Glazner, Allen
Hare, Patricia
Hildreth, Wes*
Johnson, Brann
Lovell, Margaretta
Marsh, Bruce & Judith
Mo, Xuanxue*
Nicholls, James*
Onley, M.S.
Plank, Terry
Renne, Paul*
Rutherford, Malcolm & Helen

Schafer, Phylliss
Schwartz, Alex
Spera, Frank
Stebbins, Jonathan*
Strang, Craig
Zhao, Zhidan

GARNISS CURTIS DISTINGUISHED PROFESSORSHIP

Cebull, Stanley
Maloof, Giles W.*
Ohlmann, John
Schetter, William C.³
Seuss, Steven
Sloan, Doris
Summer, Neil
Thacher, Anson B.*

LOUDERBACK FUND

Maloof, Giles W.*
Sander, Nestor*

THOMAS McEVILLY FELLOWSHIP FUND

Allen, Rex & Mary
Bakun, William
Boyd, Nicholas
Dewey, James
Hood, Julie
Hwang, Lorraine
Leith, William

CHARLES MEYER FELLOWSHIP FUND

Gillerman, Virginia
Jones, Randall
McAlee, Joe
Solomon, Ernest
Stimpson, Douglas
Thacher, Anson B.

MILTON B. SMITH SCHOLARSHIP FUND

Johnson, Brann

SUTHERLAND MEMORIAL SCHOLARSHIP

Soloman, Ernest

DON TOCHER MEMORIAL FELLOWSHIP FUND

Bakun, William
Dewey, James

FRANCIS J. TURNER FELLOWSHIP FUND

Borg, Iris**
Maloof, Giles W.*

GRADUATE STUDENT FIELD SUPPORT FUND

Behrman, Philip**
Buffler, Richard
Butler, Paul
Thacher, Anson B.¹

* Donation of \$1000 or more

** Donation of \$10,000 or more

Matching funds

- ¹ Chevron Match
- ² Fluor Corporation
- ³ Exxon Mobile Corporation
- ⁴ Shell Oil Company Foundation Inc.

DEPARTMENT FUNDS

Friends of Earth and Planetary Science Fund Memorial Funds

Established in 2007 to solicit funds for emergency student aid, collegial activities in support of education and research as well as equipment and facilities upgrades; to help with costs for student activities such as field trips and the yearly Santa Barbara's Day event; to make a monetary award to the winner of the Departmental Citation; to support alumni outreach; to defray the costs of the weekly departmental Speaker's Program in which distinguished speakers from around the country are invited; and to assist in the acquisition of journals for the Earth Sciences Library and Map Collection. To donate, see <http://eps.berkeley.edu>

Endowed Funds

Garniss H. Curtis Endowed Chair: Established in 2004 in honor of Garniss' contributions to science and to UC Berkeley.

John E. and Dorothy G. Kilkenny Earth Science Fund: This Fund will be used at the Chair's discretion to ensure the vitality of the department's Speakers Program.

Richard Mielenz Geology & Geophysics Fund: Established in June 2011 in memory of Richard Mielenz to be used in the Department of Earth & Planetary Science at the discretion of the department Chairman in consultation with the Dean at the University of California, Berkeley.

Earth Science Scholarship Fund: For graduate fellowships, undergraduate stipends, honorary awards.

The Allen James Garber Endowed Fund: Established in August 2011 to provide support to either undergraduate or graduate students in the Department of Earth & Planetary Science on the Berkeley campus of the University of California.

Esper S. Larsen, Jr. Research Fund

Formally established on October 31, 1989. The proceeds of an endowment left to the University by Eva A. Larsen are used to support new research in the fields of geology, mineralogy and petrology. 2011-2012 recipients were:

Don DePaolo: Petrologic and Hydrologic Controls on Mineralization of Geologically Sequestered CO₂

Lynn Ingram: Reconstructing Past "Megafloods" in California's Central Valley

Michael Manga: Geological significance of KT boundary chromites

Ramsden Scholarships: Established in 1994 to support undergraduates who have expressed an interest in preparing for careers in the geosciences. In 2011-12 the Fund awarded \$8,500 in financial aid to undergraduate students and an additional \$6,500 to undergraduates for the following research projects: Sara Dendy, Michael Fog, Nin Gan, Courtney Hann, Rachel Horn, Paul Lerner, Jasmine Mason, Leah Redon, Kara Torbert, Gabi Weiss

Perry Byerly Fellowship Fund: Established in 1978 to honor the memory of Perry Byerly with a graduate fellowship in seismology. 2011-2012 recipients: Qingkai Kong, Andrea Chiang

Louderback Fund: Established in 1957 in honor of George D. Louderback to award outstanding students who are pursuing research, particularly in the field, in geology and paleontology. 2011-2012 EPS recipient: Amanda Thomas

Thomas McEvelly Fellowship Fund: Established in 2002 to honor Professor Thomas V. McEvelly with a graduate fellowship in seismology. 2011-2012 recipient: Chris Johnson

Charles Meyer Fellowship Fund: Established in 1980 to honor Professor Charles Meyer by awarding a graduate fellowship in the area of integrated field and laboratory studies of ore, mineral, and rock-forming processes.

Milton B. Smith Memorial Fund: Established in 2002 in honor of Professor Clyde Wahrhaftig by the estate of Dr. Milton B. Smith, B.A. 1936, Geology. The fund provides financial assistance to undergraduate students. 2011-2012 recipients: Winglee Lee, Weihan Liu

Harlan Todd Sutherland Memorial Scholarship: Established in 1987 in memory of undergraduate student, Harlan Todd Sutherland, killed doing field research. Supports graduate student research. 2011-2012 recipient: Noah-Randolph-Flagg.

Don Tocher Memorial Fellowship Fund: Established in 1979 to honor the memory of Don Tocher with a graduate fellowship in seismology. 2011-2012 recipients: Brent Delbridge, Avinash Nayak

Francis J. Turner Fellowship Fund: Established in 1986 to honor the memory of Professor Francis Turner with a graduate fellowship in geology.

Faculty Endowed Funds

Graduate Student Field Support Fund: Established in 2008 to support, at the discretion of the department chair or graduate adviser, field work for earth science graduate students within the Department of Earth and Planetary Science. 2011-2012 recipient: Fall--Courtney Sprain, Spring--Marisa Palucis

Michael Manga and Susan Storch Graduate Student Support Fund

Richards Family Graduate Support Fund: Established in 2008 to support high-achieving graduate students with financial need in the Department of Earth & Planetary Science. 2011-2012 recipient: Jake Edman

Julia and Rudy Wenk Graduate Student Support Fund: 2011-2012 recipient: Courtney Sprain

2012 DEPARTMENT BARBEQUE

Photos by Margie Winn



MA students Krista Lofgren, Leah Redon, back Sevag Mehterian, John Li.



Undergraduates: Max Dieckman, Ryan H, Chris Baden, unknown guest



Undergraduates: James Dabalas, John Domingo, Teresa Hoang, Eric Blass, Jessica Ton



Prof. Ron Cohen, 1st year PhD Xueling Liu



Chair Bruce Buffett, Prof. Doug Dreger, 2nd year PhD Brent Delbridge



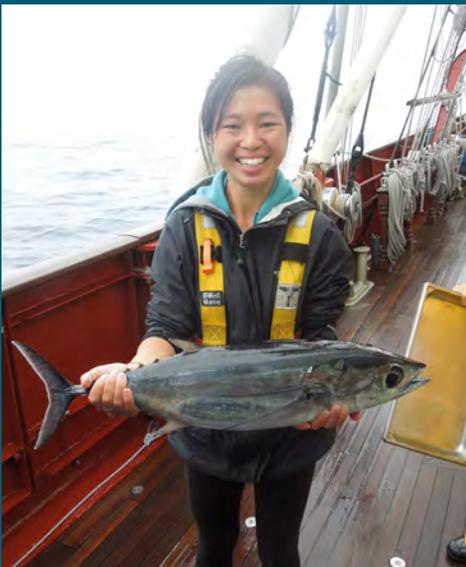
Visitor Ronni Grapenthin, 1st year PhD Chris Johnson; guests, SAO Catherine Pauling



Prayer wheels and mountains near Zhawogang, Tibet (elevation ~3900 m) May, 2012. This is part of a large project involving David Shuster, Don DePaolo and colleagues at UCLA, Lehigh University, U. Chicago and China University of Geosciences. We're studying the structure and evolution of the Lhasa block over the last ~50 million years. Photo by David Shuster



EPS116 field trip, from Spring 2011 at Moss Beach (Jasmine Mason and Alyse Briody). Photo by Ryan Turner



Rebecca Trinh holding catch during Sea Education Association Summer Program. Photo credit unknown.



Bill Dietrich, Milly and Walter Alvarez in discussion at Santa Barbara's Day dinner.



Katie Wooddell and family at Santa Barbara's Day dinner



Katie Wooddell, Avinash Nayak, Stephanie Wuerth, Jake Edman, Octavia Crompton, Xueling Liu, Courtney Sprain, Noah Randolph-Flagg



Undergraduate event volunteers.